Whistling Ridge Energy Project

Final Environmental Impact Statement

August 2011



Washington State Environmental Policy Act Lead Agency:
State of Washington, Energy Facility Site Evaluation Council

This Final Environmental Impact Statement has been issued by the Washington State Energy Facility Site Evaluation Council (EFSEC) to fulfill its lead agency responsibilities under EFSEC's SEPA rules at Washington Administrative Code (WAC) 463-47-150. The Bonneville Power Administration (BPA) also will be issuing this FEIS to meet its obligations under the National Environmental Policy Act (NEPA) before it makes a decision on whether to allow an interconnection of the proposed project to the BPA transmission system. EFSEC and BPA have worked together to ensure that this joint FEIS meets the requirements of both SEPA and NEPA.

Note to Reader: This Final EIS revises and updates the information presented in the Draft EIS for the Whistling Ridge Energy Project issued in May 2010. New or revised text is shown in red underlined font and deleted text is crossed out with a solid black line (*e.g.* ~~example~~). Changes to tables, graphs, and other figures are indicated using similar editorial techniques.

TABLE OF CONTENTS

1.0 SUMMARY AND PURPOSE OF AND NEED FOR ACTION 1-1

1.1 Introduction 1-1
1.2 Purpose of and Need for Action 1-3
1.2.1 EFSEC's Purpose and Need for Action 1-3
1.2.2 Bonneville Power Administration Purpose of and Need for Action 1-4
1.2.3 Applicant-Identified Needs 1-4
1.2.3.1 Regional Need for New Sources of Renewable Energy 1-4
1.2.3.2 Need for Reliable Transmission for the Proposed Project 1-6
1.2.3.3 Business Needs of the Applicant 1-6
1.3 SEPA/NEPA Compliance and Decision-Making 1-7
1.3.1 EIS Lead Agencies 1-7
1.3.2 Uses Of This EIS 1-8
1.3.3 Integration Of SEPA and NEPA Requirements 1-8
1.4 Description Of Alternatives 1-9
1.4.1 Proposed Action 1-9
1.4.1.1 Wind Turbines 1-10
1.4.1.2 Electrical Collector System 1-10
1.4.1.3 Project Collector Substation and Interconnection to the FCRTS 1-10
1.4.1.4 Operations and Maintenance Facility 1-11
1.4.1.5 Water Supply and Wastewater 1-11
1.4.1.6 Site Access for Construction and Operation 1-12
1.4.2 No Action Alternative 1-12
1.4.3 Alternatives Considered But Eliminated From Detailed Study 1-13
1.4.3.1 Alternative Project Locations 1-14
1.4.3.2 Larger or Smaller Generation Facility Size 1-14
1.4.3.3 Alternative Wind Generation Technologies 1-15
1.4.3.4 Alternative Project Configurations 1-15
1.4.3.5 Alternative Interconnections 1-15
1.4.3.6 Alternative Access Roads 1-16
1.5 Summary of Public Involvement, Consultation, and Coordination 1-16
1.5.1 Public and Agency Scoping 1-16
1.5.2 Agency Consultations 1-18
1.5.3 Applicant Meetings and Consultation 1-19
1.5.3.1 Local Government 1-19
1.5.3.2 State Government 1-20
1.5.3.3 Federal Government 1-21
1.5.3.4 Tribal Government 1-21

1.5.3.5 Railroad 1-22
1.5.4 Draft EIS Comment Period and Public Meetings 1-22
1.6 Summary of Potential Project Impacts and Mitigation Measures 1-22
1.7 Summary Of Unavoidable Adverse Impacts 1-35
1.8 Cumulative Impacts 1-36
1.8.1 Projects Considered 1-37
1.8.1.1 Existing Development 1-37
1.8.1.2 Reasonably Foreseeable Future Development 1-37
1.8.2 Results Of Cumulative Impacts Analysis 1-39
1.9 Organization Of This EIS 1-39
1.10 References 1-40

2.0 PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 Proposed Action 2-1
2.1.1 Wind Power In General 2-1
2.1.2 Project Overview 2-2
2.1.3 Project Components 2-5
2.1.3.1 Wind Turbines 2-5
2.1.3.2 Electrical Collector System 2-6
2.1.3.3 Project Substation and Interconnection 2-6
2.1.3.4 Operations and Maintenance Facility 2-7
2.1.3.5 Meteorological Tower 2-7
2.1.3.6 Water Supply and Wastewater 2-7
2.1.3.7 Access Roads 2-8
2.1.4 Project Construction 2-9
2.1.4.1 Construction Activities 2-9
2.1.4.2 Construction Schedule 2-12
2.1.4.3 Construction Manpower and Truck Trips 2-12
2.1.4.4 Construction Costs and Fiscal Considerations 2-14
2.1.5 Project Operation 2-14
2.1.6 Forest Harvest During Project Construction and Operation 2-14
2.1.7 Project Decommissioning 2-18
2.2 No Action Alternative 2-18
2.3 Alternatives considered But Eliminated From Detailed Study 2-19
2.3.1 Alternative Project Locations 2-20
2.3.2 Larger or Smaller Generation Facility Size 2-21
2.3.3 Alternative Wind Generation Technologies 2-22
2.3.4 Alternative Project Configurations 2-22
2.3.5 Alternative Interconnections 2-22
2.3.6 Alternative Access Roads 2-23
2.4 Benefits and Disadvantages of Delaying Project Implementation 2-24
2.5 Comparison Of Alternatives 2-25
2.6 References 2-27

3.0 AFFECTED ENVIRONMENT, IMPACTS AND MITIGATION 3-1

3.1 Earth 3-1
3.1.1 Affected Environment 3-1
3.1.1.1 Topography 3-1
3.1.1.2 Regional Geology 3-1
3.1.1.3 Local Geology and Soils 3-3
3.1.1.4 Geologic Hazards 3-7
3.1.2 Impacts 3-9
3.1.2.1 Proposed Action 3-9
3.1.2.2 No Action Alternative 3-12
3.1.3 Mitigation Measures 3-12
3.1.4 Unavoidable Adverse Impacts 3-14
3.1.5 References 3-14
3.2 Air Quality 3-14
3.2.1 Affected Environment 3-15
3.2.2 Impacts 3-19
3.2.2.1 Proposed Action 3-19
3.2.2.2 No Action Alternative 3-22
3.2.3 Mitigation Measures 3-22
3.2.4 Unavoidable Adverse Impacts 3-23
3.2.5 References 3-23
3.3 Water Resources 3-24
3.3.1 Affected Environment 3-24
3.3.1.1 Surface Water 3-24
3.3.1.2 Stormwater Runoff 3-25
3.3.1.3 Groundwater 3-25
3.3.1.4 Floodplains 3-25
3.3.1.5 Public and Private Water Supplies 3-25
3.3.2 Impacts 3-27
3.3.2.1 Proposed Action 3-27
3.3.2.2 No Action Alternative 3-30
3.3.3 Mitigation Measures 3-30
3.3.4 Unavoidable Adverse Impacts 3-33
3.3.5 References 3-33
3.4 Biological Resources 3-33
3.4.1 Affected Environment 3-34
3.4.1.1 Regional Environment 3-34
3.4.1.2 Habitats 3-35
3.4.1.3 Wetlands 3-40
3.4.1.4 Special Status Plant Species 3-40
3.4.1.5 Special Status Wildlife Species 3-44
3.4.1.6 Other Wildlife Species 3-60
3.4.1.7 Noxious Weeds 3-72
3.4.2 Impacts 3-73
3.4.2.1 Proposed Action 3-73
3.4.2.2 No Action Alternative 3-83
3.4.3 Mitigation Measures 3-84

3.4.4 Unavoidable Adverse Impacts 3-85
3.4.5 References 3-85
3.5 Energy and Natural Resources 3-89
3.5.1 Affected Environment 3-89
3.5.1.1 Region 3-89
3.5.1.2 Project Area 3-91
3.5.2 Impacts 3-91
3.5.2.1 Proposed Action 3-91
3.5.2.2 No Action Alternative 3-94
3.5.3 Mitigation Measures 3-95
3.5.4 Unavoidable Adverse Impacts 3-95
3.5.5 References 3-95
3.6 Public Health and Safety 3-95
3.6.1 Affected Environment 3-96
3.6.1.1 Existing Health and Safety Risks 3-96
3.6.1.2 Fire Prevention 3-96
3.6.1.3 Law Enforcement 3-97
3.6.1.4 Emergency Medical Services 3-97
3.6.2 Impacts 3-99
3.6.2.1 Proposed Action 3-99
3.6.2.2 No Action Alternative 3-108
3.6.3 Mitigation Measures 3-109
3.6.4 Unavoidable Adverse Impacts 3-113
3.6.5 References 3-114
3.7 Noise 3-115
3.7.1 Affected Environment 3-115
3.7.1.1 Analysis of Environmental Noise 3-115
3.7.1.2 Regulatory Overview 3-118
3.7.1.3 Affected Environment 3-122
3.7.2 Impacts 3-127
3.7.2.1 Methodology 3-127
3.7.2.2 Proposed Action 3-130
3.7.2.3 No Action Alternative 3-137
3.7.3 Mitigation 3-137
3.7.4 Unavoidable Adverse Impacts 3-138
3.7.5 References 3-138
3.8 Land Use and Recreation 3-139
3.8.1 Affected Environment 3-139
3.8.1.1 Existing Land Use 3-139
3.8.1.2 Recreation 3-141
3.8.2 Applicable Land Use Regulations 3-145
3.8.2.1 Skamania County Comprehensive Land Use Plan 3-146
3.8.2.2 Skamania County Zoning Ordinance SCC Title 21 3-150
3.8.2.3 Skamania County Code, Title 20, Shorelines 3-155

3.8.2.4 Skamania County Code, Title 21A, Critical Areas 3-155
3.8.3 Impacts 3-155
3.8.3.1 Proposed Action 3-156
3.8.3.2 No Action Alternative 3-161
3.8.4 Mitigation Measures 3-161
3.8.5 Unavoidable Adverse Impacts 3-161
3.9 Visual Resources 3-161
3.9.1 Methodology 3-162
3.9.1.1 Scenic Quality Assessment 3-163
3.9.1.2 Visual Sensitivity Assessment 3-164
3.9.1.3 Preparation of Visual Simulations 3-166
3.9.2 Affected Environment 3-167
3.9.2.1 Regional Landscape Setting 3-168
3.9.2.2 Local Landscape Setting 3-168
3.9.2.3 Viewpoints 3-170
3.9.3 Impacts 3-178
3.9.3.1 Proposed Action 3-178
3.9.3.2 No Action Alternative 3-200
3.9.4 Mitigation Measures 3-200
3.9.5 Unavoidable Adverse Impacts 3-201
3.9.6 References 3-201
3.10 Historical and Cultural Resources 3-201
3.10.1 Regulatory Setting 3-202
3.10.1.1 Laws and Regulations 3-202
3.10.1.2 Area of Potential Effect 3-202
3.10.2 Affected Environment 3-203
3.10.2.1 Cultural Context 3-203
3.10.2.2 Cultural Resources Overview 3-209
3.10.2.3 Project Area Inventory 3-212
3.10.3 Impacts 3-217
3.10.3.1 Proposed Action 3-217
3.10.3.2 No Action Alternative 3-218
3.10.4 Mitigation measures 3-218
3.10.5 Unavoidable Adverse Impacts 3-218
3.10.6 References 3-219
3.11 Transportation 3-221
3.11.1 Affected Environment 3-221
3.11.1.1 Roadway Transportation 3-221
3.11.1.2 Rail Transportation 3-228
3.11.1.3 River Transportation 3-229
3.11.1.4 Air Transportation 3-229
3.11.2 Impacts 3-229
3.11.2.1 Proposed Action 3-230
3.11.2.2 No Action Alternative 3-240
3.11.3 Mitigation Measures 3-240

3.11.4 Unavoidable Adverse Impacts 3-241
3.11.5 References 3-241
3.12 Public Services and Utilities 3-242
3.12.1 Affected Environment 3-242
3.12.1.1 Public Services 3-242
3.12.1.2 Utilities 3-243
3.12.2 Impacts 3-244
3.12.2.1 Proposed Action 3-244
3.12.2.2 No Action Alternative 3-250
3.12.3 Mitigation Measures 3-250
3.12.4 Unavoidable Adverse Impacts 3-251
3.12.5 References 3-251
3.13 Socioeconomics 3-252
3.13.1 Affected Environment 3-253
3.13.1.1 Demographics 3-253
3.13.1.2 Housing 3-255
3.13.1.3 Employment 3-256
3.13.1.4 Public Finance and Fiscal Conditions 3-258
3.13.2 Impacts 3-260
3.13.2.1 Proposed Action 3-260
3.13.2.2 No Action Alternative 3-269
3.13.3 Mitigation Measures 3-269
3.13.4 Unavoidable Adverse Impacts 3-270
3.13.5 References 3-270
3.14 Cumulative Impact Analysis 3-272
3.14.1 Existing Development 3-272
3.14.1.1 Surrounding Land Uses 3-272
3.14.1.2 Existing Wind Projects 3-273
3.14.2 Reasonably Foreseeable Future Development 3-275
3.14.3 Cumulative Impacts 3-278
3.14.3.1 Earth 3-278
3.14.3.2 Air Quality 3-278
3.14.3.3 Water Resources 3-281
3.14.3.4 Vegetation and Wetlands 3-282
3.14.3.5 Habitat and Wildlife 3-283
3.14.3.6 Energy and Natural Resources 3-290
3.14.3.7 Public Health and Safety 3-290
3.14.3.8 Noise 3-291
3.14.3.9 Land Use and Recreation 3-291
3.14.3.10 Visual Resources 3-291
3.14.3.11 Historic and Cultural Resources 3-296
3.14.3.12 Transportation 3-296
3.14.3.13 Public Services and Utilities 3-296
3.14.3.14 Socioeconomics 3-297
3.14.4 References 3-297

3.15 Relationship Between Short-Term Uses of the Environment and Long-Term Productivity 3-299
3.16 Irreversible and Irretrievable Commitment of Resources 3-299
3.17 Intentional Destructive Acts 3-300
3.18 Adverse Effects That Cannot Be Avoided 3-301

4.0 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMITTING REQUIREMENTS 4-1

4.1 National and State Environmental Policy Act 4-1
4.2 Endangered Species Act 4-1
4.3 Fish and Wildlife Conservation Act and Fish and Wildlife Coordination Act 4-4
4.4 Magnuson-Stevens Fishery Conservation and Management Act 4-4
4.5 Migratory Bird Treaty Act 4-5
4.6 Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds 4-5
4.7 Bald and Golden Eagle Protection Act 4-5
4.8 Heritage Conservation Acts 4-6
4.9 Environmental Justice 4-8
4.10 State, Area-wide, and Local Plan and Program Consistency 4-8
4.10.1 Energy Facility Site Evaluation Council 4-8
4.10.2 Skamania County 4-9
4.11 Columbia River Gorge National Scenic Area Act 4-9
4.12 Farmland Protection Policy Act 4-10
4.13 Recreation Resources 4-10
4.14 Clean Water Act 4-11
4.15 Floodplain/Wetlands Assessment 4-11
4.16 Coastal Zone Management Act 4-11
4.17 The Safe Drinking Water Act 4-12
4.18 Clean Air Act 4-12
4.19 Global Climate Change 4-12
4.20 Pollution Control Acts 4-13
4.21 Noise Control Act 4-14
4.22 Notice to the Federal Aviation Administration 4-14
4.23 Federal Communications Commission 4-14

5.0 DISTRIBUTION LIST 5-1

5.1 Federal Agencies 5-1
5.2 Tribal Governments 5-2
5.3 Public Officials 5-3
5.4 State Agencies 5-4
5.5 Local Governments and Utilities 5-4
5.6 Libraries and Educational Institutions 5-5
5.7 Media 5-6
5.8 Utilities 5-6

5.9 Interested Groups 5-6
5.10 Interested Individuals 5-7

6.0 LIST OF PREPARERS 6-1

6.1 Washington EFSEC 6-1
6.2 BPA 6-1
6.3 Consultants 6-2
6.3.1 URS 6-2
6.3.2 West 6-4
6.3.3 NorthWest Wildlife Consultants 6-4
6.3.4 Geodatascape 6-5
6.3.5 Turnstone Environmental 6-5
6.3.6 Carroz Consulting 6-5
6.3.7 Cardno ENTRIX 6-5

7.0 INDEX 7-1

LIST OF FIGURES

Figure 1-1 Location of Proposed Whistling Ridge Energy Project .. Follows Page 1-1
Figure 2-1 Proposed Project Elements ..... Follows Page 2-2
Figure 2-2 Current Forest Types ..... Follows Page 2-10
Figure 2-3 Harvesting Schedule ..... Follows Page 2-15
Figure 2-4 Turbine Timber Buffer ..... Follows Figure 2-3
Figure 3.1-1 Site Topography ..... Follows Page 3-1
Figure 3.1-2 Site Geology ..... Follows Page 3-3
Figure 3.1-3 Soil Classifications ..... Follows Page 3-5
Figure 3.1-4 Landslide Hazard Areas ..... Follows Page 3-7
Figure 3.3-1 Waterways in the Project Vicinity ..... Follows Page 3-25
Figure 3.4-1 Habitat Types ..... Follow Page 3-39
Figure 3.4-2 Project Site Wetland ..... Follows Page 3-41
Figure 3.4-3a East Access Route NWI Wetlands ..... Follows Figure 3.4-2
Figure 3.4-3b West Access Route NWI Wetlands ..... Follows Figure 3.4-3a
Figure 3.4-4 2003-2006, 2009 Rare Plant Survey Areas ..... Follows Page 3-45
Figure 3.4-5 2008-2009 Northern Goshawk Survey Locations ..... Follows Page 3-48
Figure 3.4-6 2008-2009 Spotted Owl Calling Points ..... Follows Page 3-52
Figure 3.4-7 Map of Spotted Owl MOCAs and CSAs ..... Follows Page 3-57
Figure 3.4-8 Western Gray Squirrel Survey Areas ..... Follows Page 3-60
Figure 3.4-9 2004, 2006, 2008 and 2009 Bird Survey Locations ..... Follows Page 3-62
Figure 3.4-10 2009 Bat Survey Locations ..... Follows Page 3-69
Figure 3.4-11 Designated Critical Fish Habitat ..... Follows Figure 3.4-10
Figure 3.7-1 Noise Level Contours ..... Follows Page 3-122
Figure 3.7-2 Low Frequency and Infrasonic Normal Hearing Thresholds .... Page 3-136
Figure 3.8-1 Residences within Three Miles of the Project Site ..... Follows Page 3-141
Figure 3.8-2 Recreation Facilities within Five Miles of the Project Site ..... Follows Figure 3.8-1

Figure 3.8-3 Skamania and Klickitat Counties Comprehensive Plan Designations ..... Follows Figure 3.8-2
Figure 3.8-4 Skamania County Zoning ..... Follows Page 3-147
Figure 3.8-5 Land Use within Five Miles of the Site ..... Follows Page 3-151
Figure 3.9-1 Locations of Simulation Viewpoints ..... Follows Page 3-172
Figure 3.9-2 Residences with Visible Turbines ..... Follows Figure 3.9-1
Figure 3.9-3 Viewpoint 1 – Pucker Huddle ..... Follows Page 3-182
Figure 3.9-4 Viewpoint 3 – Husum ..... Follows Figure 3.9-3
Figure 3.9-5 Viewpoint 4 – Ausplund Road and Cook-Underwood Road ..... Follows Figure 3.9-4
Figure 3.9-6 Viewpoint 5 – Willard ..... Follows Figure 3.9-5
Figure 3.9-7 Viewpoint 7 – Mill A ..... Follows Figure 3.9-6
Figure 3.9-8 Viewpoint 11 – I-84 Westbound ..... Follows Figure 3.9-7
Figure 3.9-9 Viewpoint 12 – Koberg Beach State Park ..... Follows Figure 3.9-8
Figure 3.9-10 Viewpoint 13 – I-84 Eastbound ..... Follows Figure 3.9-9
Figure 3.9-11 Viewpoint 14 – Viento State Park ..... Follows Figure 3.9-10
Figure 3.9-12 Viewpoint 15 – Frankton Road ..... Follows Figure 3.9-11
Figure 3.9-13 Viewpoint 17 – Providence Hospital ..... Follows Figure 3.9-12
Figure 3.9-14 Viewpoint 19 – Columbia River Highway ..... Follows Figure 3.9-13
Figure 3.9-15 Viewpoint 23 – Ausplund Road End ..... Follows Figure 3.9-14
Figure 3.10-1 Area of Potential Effects ..... Follows Page 3-203
Figure 3.10-2 Cultural Resources Survey Locations ..... Follows Page 3-213
Figure 3.11-1 Project Roadway Access from the East ..... Follows Page 3-222
Figure 3.11-2 Project Roadway Access from the West ..... Follows Figure 3.11-1
Figure 3.11-3 Project Site Roadway Network ..... Follows Page 3-231
Figure 3.14-1 Existing and Proposed Development ..... Follows Page 3-275
Figure 3.14-2 Existing Wind Projects Visibility from I-84 ..... Follows Page 3-394

LIST OF TABLES

Table 1-1 Summary of Environmental Consequences and Design and Mitigation Measures 1-23
Table 1-2 Summary of Unavoidable Adverse Impacts 1-35
Table 2-1 Area of Development (acres) 2-4
Table 2-2 On-Site Construction Workers by Activity 2-13
Table 2-3 On-Site Construction Labor by Month 2-13
Table 2-4 Operations and Maintenance Staff 2-14
Table 2-5 Comparison of alternatives to BPA Purposes 2-26
Table 3.1-1 2006 International Building Code Seismic Design Values 3-13
Table 3.2-1 Air Pollutant Emissions Displaced by the Project 3-21
Table 3.4-1 Habitat Types within the Project Site 3-38
Table 3.4-2 Federal and State Special Status Species with the Potential to Occur in the Vicinity of the Whistling Ridge Energy Project Site 3-46
Table 3.4-3 Whistling Ridge Energy Project Site Survey Results for Northern Spotted Owl at the Mill Creek Core Areas 3-51
Table 3.4-4 DNR/NCASI Mill Creek and Moss Creek Owl Data 3-54

Table 3.4-5 Birds Observed in the Project Area Across All Seasons 3-64
Table 3.4-6 Bat Species Likely to Occur in the Project Area, Based on Range-Maps (Revised to Add Call Frequency) 3-67
Table 3.4-7 Average Bat Detections Per Night During Three Survey Years 3-68
Table 3.4-8 Noxious Weed Observations 3-72
Table 3.4-9 Temporary Impacts from Project Elements to Habitat Types (acres) 3-74
Table 3.4-10 Permanent Impacts from Project Elements to Habitat Types (acres) 3-75
Table 3.6-1 Fire Departments in the Whistling Ridge Energy Project Vicinity 3-98
Table 3.6-2 Police Department Staffing Levels in the Whistling Ridge Energy Project Vicinity 3-98
Table 3.6-3 Ambulance Service Providers in the Whistling Ridge Energy Project Vicinity 3-99
Table 3.6-4 Electromagnetic Field Readings for Common Equipment 3-107
Table 3.6-5 Fire and Explosion Risk Mitigation 3-112
Table 3.7-1 Common Noise Levels and Subjective Human Responses 3-119
Table 3.7-2 Washington Maximum Permissible Sound Levels 3-120
Table 3.7-3 Class A EDNA Receiver Noise Limits (dBA) 3-120
Table 3.7-4 Short-Term Noise Measurement Data Summary 3-125
Table 3.7-5 Long-Term Noise Measurement Data Summary 3-126
Table 3.7-6 Average Ambient for ST1/LT1 Measurement Area 3-126
Table 3.7-7 Commercial Wind Turbine Sound Reference Data 3-129
Table 3.7-8 Noise Model Sound Level Parameters 3-129
Table 3.7-9 Predicted Construction Noise Levels at Receivers Closest to Project 3-130
Table 3.7-10 Nighttime Operational Noise Impact Assessment 3-131
Table 3.7-11 Daytime Operational Noise Impact Assessment 3-132
Table 3.7-12 Refined Noise Analysis 3-132
Table 3.7-13 Results of Comparison of dBC vs. dBA Levels 3-135
Table 3.8-1 Public Park and Recreation Facilities within 25 Miles 3-146
Table 3.9-1 Landscape Scenic Quality Scale 3-164
Table 3.9-2 Summary of Existing Scenic Quality Assurance and Project Visual Impacts 3-182
Table 3.11-1 Annual Daily Traffic at West and East Junctions of SR 14 and Cook Underwood Road 3-222
Table 3.11-2 Estimated 2009, 2011, and 2012 Peak Hour Traffic Volumes at West and East Junctions of SR 14 and Cook-Underwood Road 3-225
Table 3.11-3 Level of Service Criteria for Two-Way-Stop-Control Intersections 3-226
Table 3.11-4 2009 Level of Service Summary at West and East Junctions of SR 14 and Cook Underwood Road 3-226
Table 3.11-5 Collision Numbers and Rates for Years 2006 through 2008 3-227
Table 3.11-6 Road and Bridge Restrictions for Oversize Motor Vehicles on SR 14 3-231

Table 3.11-7 Estimated 2011 Traffic Volumes during Peak Construction Period 3-235
Table 3.11-8 Level of Service during Construction 3-235
Table 3.11-9 Estimated 2012 Traffic Volumes during Operation at Junctions of Cook-Underwood Road and SR 14 3-238
Table 3.11-10 Level of Service during Operation 3-239
Table 3.12-1 Enrollment Trends in the Whistling Ridge Energy Project Vicinity .. 3-243
Table 3.13-1 Population Distribution in the Project Vicinity 3-254
Table 3.13-2 Temporary Lodging Units 3-256
Table 3.13-3 Unemployment Trends 3-257
Table 3.13-4 Monthly Unemployment Rates, 2008 and 2009 3-258
Table 3.13-5 Skamania county Revenues and Expenditures, 2008 3-259
Table 3.13-6 Breakdown of Taxing District No. 109 Millage Rates 3-260
Table 3.13-7 Estimated Quarterly Construction Personnel 3-261
Table 3.13-8 Employment Impacts of Construction 3-262
Table 3.13-9 Employment Impacts of Operation 3-265
Table 3.14-1 Avian and Raptor Use of Proposed Wind Energy Facilities in Managed Coniferous Forest Habitats of Western Washington Compared to the Columbia Plateau Ecoregion 3-287
Table 3.14-2 Bat Acoustic Activity Indexes for Proposed Wind Energy Facilities in Managed Coniferous Forest Habitats of Western Washington 3-288
Table 4-1 Summary of Whistling Ridge Energy Project Permits and Approvals .. 4-2

APPENDICES

Appendix A Application for Site Certification, as amended October 12, 2009
Appendix B Geotechnical Report
Appendix C Wildlife Reports

- Vegetation Technical Report: Saddleback Wind Project (CH2MHill, no date) (Appendix C-1)
- Wetland Delineation Report, Saddleback Wind Energy Project (CH2MHill 2007) (Appendix C-2)
- Rare Plant Survey Report: Saddleback Wind Project (CH2MHill 2003) (Appendix C-3)
- Baseline Avian Use Surveys of the Project in Fall 2004, Summer 2006, and winter-spring 2008-2009 (West Inc. 2009a) (Appendix C-4)
- Final Report, Northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project (Turnstone 2004) (Appendix C-5)
- 2008 Final Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2008) (Appendix C-6)
- 2009 Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2004) (Appendix C-7)

- Bat Acoustic Studies for the Whistling Ridge Wind Resource Area in 2007 (West Inc. 2008; Appendix C-8), 2008 (West Inc. 2009b) (Appendix C-9), and 2009 (West Inc. 2009c) (Appendix C-10)
- Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon (West, Inc. 2010) (Appendix C-11)
- Avian and Bat Cumulative Impacts Analysis. Shepherds Flat Wind Project. (West, Inc. 2007) (Appendix C-12)

Appendix D Land Use Consistency Determination
Appendix E Agency Consultations
- DAHP to Applicant's APE
- BPA's Section 106 Consultation
- BPA's Section 7(a) Consultation

Appendix F Consultant Disclosure Statements
Appendix G Response to Comments
Appendix H Comment Letters (disk only)

ACRONYMS AND ABBREVIATIONS

µPa	micropascals
AADT	average annual daily traffic
APE	area of potential effects
Applicant	Whistling Ridge Energy LLC
bgs	below ground surface
BMPs	best management practices
BP	before present
BPA	Bonneville Power Administration
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPE	Columbia Plateau Ecoregion
CRL 40	Commercial Resource Land 40
CSA	Conservation Support Area
CTED	Community, Trade and Economic Development
CRGNSA	Columbia River Gorge National Scenic Area
DAHP	Department of Archeological and Historic Preservation
dB	decibels
dBA	A-weighted decibels
dBG	G-weighted decibels
DNR	Department of Natural Resources
Ecology	Washington Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EFSEC	Energy Facility Site Evaluation Council
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
FAA	Federal Aviation Administration
FCRTS	Federal Columbia River Transmission System
FHWA	Federal Highway Administration
FL 20	Forest Land 20
For/Ag-20	Resource Protection
GIS	Geographic Information System
GMA	General Management Area
Hz	Hertz
I-84	Interstate 84
ISO	International Organization for Standardization

kV	kilovolt
KVA	Key Viewing Area
kW	kilowatt
kV	kilovolt
L_{10}	noise levels equaled or exceeded 10 percent of a measured time interval
L_{50}	noise levels equaled or exceeded 50 percent of a measured time interval
L_{90}	noise levels equaled or exceeded 90 percent of a measured time interval
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
LHA	Landslide Hazard Areas
L_{max}	maximum L_{eq}
L_{min}	minimum L_{eq}
LOS	level of service
mG	milligauss
MOCA	managed owl conservation area
MP	milepost
mph	miles per hour
msl	mean sea level
MVM	million-vehicle-miles
MW	megawatt
MWh	megawatt hours
NAT	Natural
NCASI	National Council for Air and Stream Improvement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NOC	Notice of Construction
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NPCC	Northwest Power and Conservation Council
ODEQ	Oregon Department of Environmental Quality
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PM	particulate matter
$PM_{2.5}$	particulate matter 2.5 micrometers diameter and smaller
PSD	Prevention of Significant Deterioration
PUBFh	palustrine unconsolidated bottom, semi-permanently flooded, impounded
PUD	Public Utility District

PWL	sound power level
R-10	Residential 10
RCW	Revised Code of Washington
RES-20	Rural Estates 20
ROD	Record of Decision
rpm	revolutions per minute
RPS	Renewable Portfolio Standard
RV	recreational vehicle
SCC	Skamania County Code
SCFD3	Skamania County Fire District No. 3
SDS	SDS Lumber Company
SEPA	State Environmental Policy Act
SMA	Special Management Area
SOSEA	spotted owl special emphasis area
SPCC	Spill Prevention, Control and Countermeasure
SPL	sound pressure level
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
TMP	Transportation Management Plan
Turnstone	Turnstone Environmental Consultants, Inc.
UNM	Unmapped
USC	United States Code
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
V	volts
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WNHP	Washington Natural Heritage Program
WSDOT	Washington State Department of Transportation

This page intentionally left blank.

1.0 SUMMARY AND PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

Whistling Ridge Energy LLC (the Applicant) proposes to construct and operate the Whistling Ridge Energy Project (the Project) approximately 7 miles north of the City of White Salmon in Skamania County, Washington (Figure 1-1). The proposed Project would be an approximately 75-megawatt (MW) wind turbine facility located within an approximately 1,152-acre Project Area on land that is currently private commercial forest land. The facility would be located on north-trending ridges that range in elevation from about 2,100 to 2,300 feet above mean sea level (msl). There is a proven wind resource at the site of the proposed Project Area. The proposed Project would consist of up to 50 wind turbines that could each range in size from 1.2 to 2.5 MW. The proposed Project also includes an Operations and Maintenance facility, an electrical collector substation, underground collector lines and systems, and other ancillary facilities.

The Applicant has submitted an application to the Washington State Energy Facility Site Evaluation Council (EFSEC) for site certification that would allow the Applicant to construct and operate the Whistling Ridge Energy Project. The Application is included as Appendix A to this EIS. As part of its responsibilities for evaluating this application, EFSEC must conduct an environmental review of the proposed energy facility under the Washington State Environmental Policy Act (SEPA). The Applicant has also requested interconnection of the proposed Project to the regional transmission system owned and operated by the Bonneville Power Administration (BPA), which is a federal agency. Interconnection of the Whistling Ridge Energy Project to the regional transmission system would require construction of a new BPA substation and related electrical equipment within the Project Area. As part of its consideration of the Applicant's interconnection request, BPA must evaluate the proposed interconnection under the National Environmental Policy Act (NEPA).

Accordingly, EFSEC and BPA have prepared this joint environmental impact statement (EIS) to be consistent with the requirements of both SEPA and NEPA. Because of the State of Washington's primary role in the siting of the proposed Project, this EIS generally follows the EIS format and content guidance contained in Washington Administrative Code (WAC) 197-11, as adopted by EFSEC through WAC 463-47. However, the EIS format and content has been modified, adjusted, and expanded where appropriate to ensure compliance with NEPA, as well.

The remainder of this chapter of the EIS describes the purpose of and need for action concerning the proposed Project, and further discusses the two agencies' approach to SEPA and NEPA compliance and decision-making for this Project. This chapter also summarizes the proposed Project and alternatives, identifies public involvement activities, and summarizes Project impacts and mitigation measures. An outline of the organization of this EIS is provided at the end of this chapter.

33758687_112.cdr

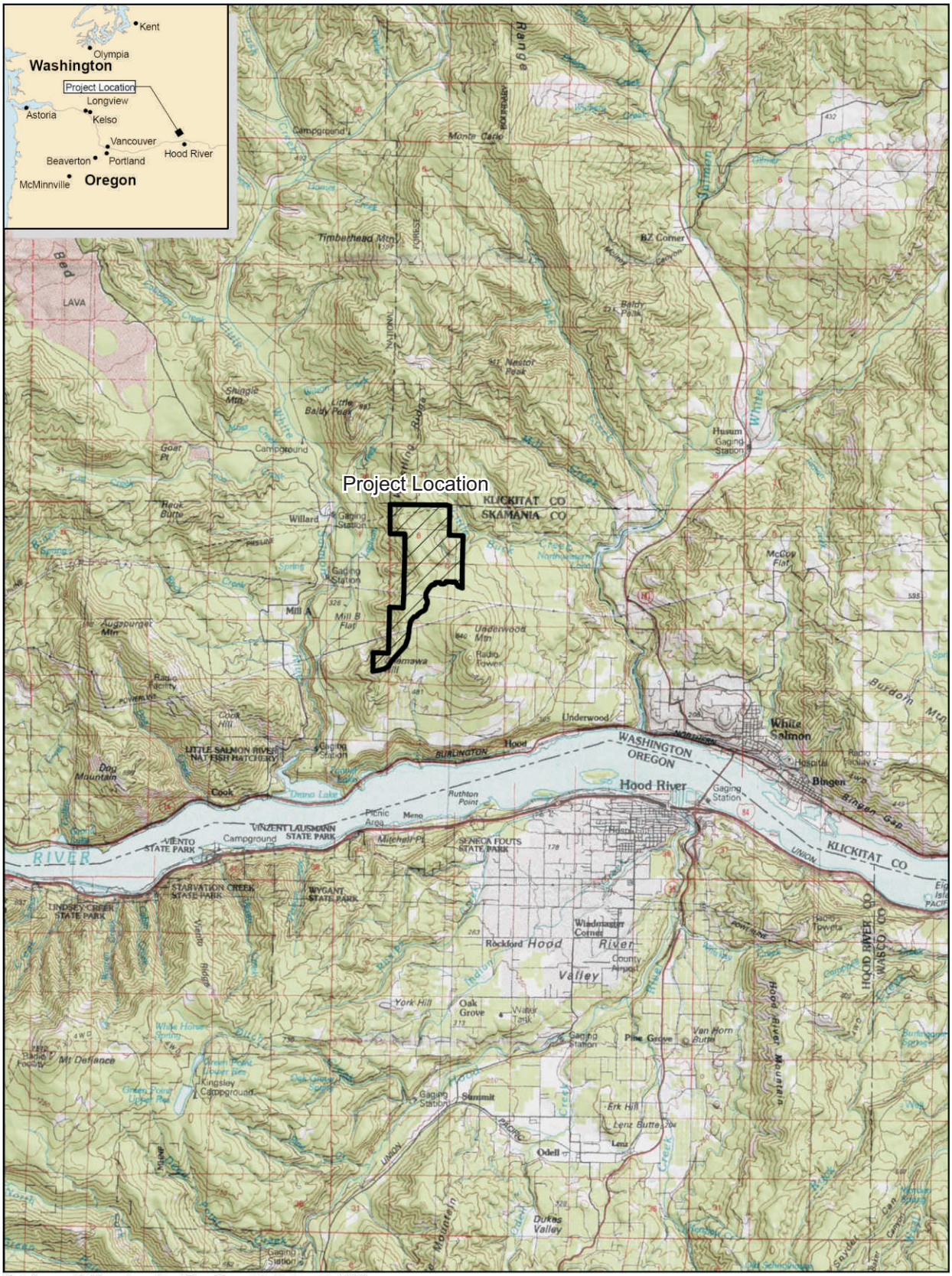


Figure 1-1

Location of Proposed Whistling Ridge Energy Project

1.2 PURPOSE OF AND NEED FOR ACTION

This section describes the respective need for action by EFSEC and BPA concerning the Applicant's proposed Whistling Ridge Energy Project, as well as purposes or objectives that these two agencies will consider in their respective decisions concerning the Project. This section also identifies various needs that the Applicant is responding to in proposing the Project.

1.2.1 EFSEC'S PURPOSE AND NEED FOR ACTION

On March 10, 2009, the Applicant submitted an Application for Site Certification (ASC 2009-01) to EFSEC to construct and operate the Whistling Ridge Energy Project in accordance with WAC 463-42. The Applicant chose to apply for certification of the proposed Project according to the Revised Code of Washington (RCW) 80.50.060, under which EFSEC has siting jurisdiction over energy facilities, such as the proposed Project, in the state of Washington.

EFSEC is a Washington State board comprised of a Chairman appointed by the Governor and representatives from five state agencies. The Council is augmented by representatives from the particular counties, cities, or port districts where potential projects may be located, as well as additional state agencies that can opt into the review of a new proposal. The Council is responsible for evaluating applications to ensure that all environmental and socioeconomic impacts are considered before a site is approved.

In accordance with RCW 80.50.040, EFSEC must review and act on the Application in the following ways:

- Prepare written reports to the governor which shall include: (1) A statement indicating whether the application is in compliance with the council's guidelines, (2) criteria specific to the site and transmission line routing, (3) a council recommendation as to the disposition of the application, and (4) a draft certification agreement when the council recommends approval of the application;

- Prescribe the means for monitoring of the effects arising from the construction and the operation of energy facilities to assure continued compliance with terms of certification and/or permits issued by the council;

- Integrate its site evaluation activity with activities of federal agencies having jurisdiction in such matters to avoid unnecessary duplication;

- Present state concerns and interests to other states, regional organizations, and the federal government on the location, construction, and operation of any energy facility which may affect the environment, health, or safety of the citizens of the state of Washington; and

- Issue permits in compliance with applicable provisions of the federally approved state implementation plan adopted in accordance with the Federal Clean Air Act, as now existing or hereafter amended, for the new construction, reconstruction, or enlargement or operation of energy facilities.

1.2.2 BONNEVILLE POWER ADMINISTRATION PURPOSE OF AND NEED FOR ACTION

BPA owns and operates the federal transmission system in the Pacific Northwest. This system, which is referred to as the Federal Columbia River Transmission System (FCRTS), consists of more than 15,000 circuit miles of high-voltage (115-kilovolt [kV] and above) electric transmission lines. These transmission lines are used to move most of the power from Pacific Northwest generating facilities to power users throughout the Northwest and nearby interconnected regions.

BPA has adopted an Open Access Transmission Tariff, which is generally consistent with the Federal Energy Regulatory Commission's *pro forma* open access tariff. Under BPA's tariff, BPA offers transmission interconnection to the FCRTS to all eligible customers on a first-come, first-served basis, with a decision on whether or not to make this offer subject to environmental review under NEPA. Electricity generated by the Project would be delivered to the BPA electric grid via a new transmission interconnection.

The Applicant has requested interconnection of its proposed Project to BPA's existing North Bonneville-Midway 230-kV transmission line, a portion of the FCRTS that traverses the Project Area. In response, BPA will consider the following objectives or purposes in deciding whether to grant the request:

- Maintain the electrical stability and reliability of the FCRTS;
- Continue to meet BPA's statutory and contractual obligations;
- Act consistently with BPA's environmental and social responsibilities; and
- Provide for cost and administrative efficiency.

Although BPA is considering interconnecting the Project, BPA is not considering acquiring any of the output of the proposed Project. In addition, BPA has no siting authority for the proposed Project.

1.2.3 APPLICANT-IDENTIFIED NEEDS

The Applicant's purpose in proposing the Whistling Ridge Energy Project is to help meet the future need for energy resources, while at the same time enabling the Applicant to further diversify its business through a technically and economically feasible project. This section identifies the regional needs for this proposed Project that have been identified by the Applicant, as well as the Applicant's needs that would be met by the Project.

1.2.3.1 Regional Need for New Sources of Renewable Energy

The Fifth Northwest Electric Power and Conservation Plan was issued by the Northwest Power and Conservation Council (NPCC) in May 2005. The Plan found that Northwest electricity demand was projected to grow at an average annual rate of nearly 1 percent per year, resulting in an over 5,000-MW deficit by 2025 using the medium forecast.

The Fifth Power Plan states that: *"Renewable resources are also a priority resource in the Northwest Power Act. Like conservation, their potential and cost-effectiveness are sensitive to developing technology and the cost of more traditional generating alternatives. Renewables have potential risk reduction benefits related to their ability to hedge risks of fuel price volatility and the risks of possible measures to mitigate greenhouse gas emissions."*

In September 2009, the NPCC released the Draft Sixth Northwest Power Plan (NPCC 2009), which contains projections for regional power demand. The plan notes that regional population in Idaho, Montana, Oregon, and Washington is likely to increase from 12.7 million in 2007 to 16.3 million by 2030. This 3.6 million increase in population compares to a 3.8 million increase between 1985 and 2007. The population growth will be focused on older-age categories as the baby boom generation reaches retirement age.

The cost of energy of all types is expected to be significantly higher over the next twenty years than during the 1980s and 1990s. Cost increases will be driven by increasing demand and the fact that the cost of finding and producing new energy sources is higher than for conventional supplies. Carbon emission taxes or cap-and-trade policies are likely to further raise energy costs. The NPCC predicts that wholesale electricity prices are expected to increase from about $45 per MW-hour in 2010 to $85 by 2030 (2006$).

Demand for electricity is expected to grow. The plan states that *"The Pacific Northwest consumed 19,000 average megawatts or 166 million megawatt-hours of electricity in 2007. That demand is expected to grow to 25,000 average megawatts by 2030 in the Council's medium forecast. Between 2007 and 2030, demand is expected to increase by a total of 6,500 average megawatts, growing on average by 270 average megawatts, or 1.2 percent, per year."*

According to the NPCC, much of the future demand for electricity in the region could be met through conservation. However, markets for renewable or "green" energy are still growing in the Pacific Northwest. One driver for this shift is the establishment of Renewable Portfolio Standards (RPS) at the state level, which requires that utilities obtain a percentage of their power from renewable sources. For example, in 2006, voters in Washington passed Initiative 937, which requires that by 2020 large public and private utilities must obtain 15 percent of their electricity from renewable resources, and undertake cost-effective energy conservation. In 2008, California increased its RPS goal from 20 percent to 33 percent renewable energy by 2020.

In addition to the RPS requirements, Washington law requires larger utilities in Washington to offer a voluntary "qualified alternative energy product," essentially an electricity product powered by green resources, beginning January 2012. State law defines a qualified alternative energy resource as electricity fueled by wind, solar energy, geothermal energy, landfill gas, wave or tidal action, gas produced during the treatment of wastewater, qualified hydropower, or biomass. As of 2008, 15 of the 16 utilities covered by the report had an active green power program with customers participating, and five additional utilities not covered by the law reported to the state that they were operating green power programs. Estimated sales of green power for 2008 were up 17 percent over 2007. Wind powered electricity represented 83.3 percent of green power sales (WUTC and CTED 2008).

In recent reports to the Washington State Legislature, the Washington Department of Commerce (formerly the Department of Community, Trade and Economic Development, CTED) has found

that: *"…the region should begin an aggressive program to capture the large amount of cost-effective conservation that is available and to lay the groundwork for building a large amount of wind generation…"* (Washington CTED 2005).

More recently, state policy has been driven by the electorate's enactment of an RPS that requires all but the state's smallest utilities to acquire new sources of renewable energy with which to supply consumers with clean electricity. This policy, mandated by the voters, resembles similar (though more aggressive) standards in Oregon and California, and has spurred active development of potential wind energy resources within the state to serve in-state utilities.

The RPS, coupled with load growth in Washington's urban areas, has prompted investor-owned and public power utilities to seek new sources, most often developed by independent power producers, to meet their resource goals.

1.2.3.2 Need for Reliable Transmission for the Proposed Project

Power generation resources typically require interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. Goals and policies aimed at reducing greenhouse gas emissions are driving the need for new resources such as wind-powered projects, yet the location of such projects is constrained by the availability of high voltage transmission lines.

Transmission planning and construction can be the longest lead-time item in power plant development. While lead times for the development of new generation have become shorter, the lead time for major transmission improvements and their costs can be a major barrier to acquisition of needed and cost-effective resources. For some projects, the lead time for the development of new transmission can be as much as seven years, and the cost of the transmission can be somewhat more than half the total capital cost of a project.

In order to provide new energy resources within the next three to five years, it is critical to locate projects in areas where transmission lines currently exist. The Applicant thus needs to locate near existing high-voltage transmission, such as the FCRTS.

1.2.3.3 Business Needs of the Applicant

As stated in Section 1.1, the Applicant for the Whistling Ridge Energy Project is Whistling Ridge Energy LLC, which is a limited liability corporation operating in the State of Washington. Whistling Ridge Energy LLC has been formed by S.D.S. Co., LLC, which is an affiliated entity of SDS Lumber Company (SDS). The Applicant has owned and operated a wood products manufacturing facility in Bingen, Washington continuously since 1946. Operations include lumber and plywood manufacturing, log handling and transportation, marine transportation and construction, log chipping for the pulp and paper industry, biomass energy generation, and other land development and land use ventures in the Skamania and Klickitat County area.

When the company began in 1946, there were 26 employees in its original crew. This number grew to a high of 450 employees during the 1970s when logging and lumber production were at a peak. Production has since slowed tremendously, as the supply of timber from national forests has sharply declined due to environmental legislation. For this reason, many of the mills in

Skamania County have closed down. The Applicant was able to survive the crises and changes of the last 30 years and no longer relies on timber from national forests. While the company has scaled back operations, today they are one of the largest employers in Klickitat County, Washington, employing 325 people during their busiest production times.

The company has remained viable during changes in the market through expanding and diversifying its enterprises beginning in 1978 to include power produced in its steam-operated power plant, which creates energy from wood waste, a renewable, organic resource, and to include marine services in 1984. The proposed Whistling Ridge Energy Project is intended to provide another means of diversifying the holdings of the company to ensure a continuation of a resource-based work force in Skamania County, to create new construction and operation jobs at a time when jobs in Washington State are being lost, and to help to diversify the tax base of Skamania County.

The Applicant also seeks to provide an additional renewable resource for electric utilities in Washington. As described above and enacted in November 2006 as Initiative 937, each Washington utility serving more than 25,000 customers is required to meet specific targets for using eligible renewable resources to produce electricity. Examples of eligible renewable resources include wind energy facilities, solar panels, and geothermal plants. Each utility would have to use renewable resources to serve at least 3% of its load by 2012 through 2015; 9% of its load by 2016 through 2019, and 15% of its load by 2020.

As it has done in the past, the Applicant seeks to create new business and job opportunities through diversifying and maximizing the use of its existing holdings. A wind power project presents a new opportunity to the Applicant to provide green energy, but only if it fits with its existing business uses and its existing holdings, and is located in an area where generated electricity can be delivered to urban power markets.

1.3 SEPA/NEPA COMPLIANCE AND DECISION-MAKING

1.3.1 EIS LEAD AGENCIES

As discussed in Section 1.2.1, the Applicant has chosen to apply for site certification of the proposed Whistling Ridge Energy Project from Washington EFSEC, which has siting jurisdiction over energy facilities, such as the proposed Project, in the state of Washington. Because of its primary role as the project siting authority, EFSEC is the SEPA lead agency for this EIS.

As discussed in Section 1.2.2, the Applicant also has requested interconnection of the proposed Whistling Ridge Energy Project to the FCRTS, which is owned and operated by BPA. As a federal agency, BPA must consider the environmental consequences of its proposed actions—in this case, the proposed interconnection of the Project to the FCRTS—under NEPA prior to making a decision on whether to proceed with the proposed action. The proposed approval of the requested interconnection is the main federal proposed action related to the proposed Whistling Ridge Energy Project. BPA, therefore, is the NEPA lead agency for this EIS. While several federal agencies participated in the NEPA review for this Project, no federal agency has served as a cooperating agency (pursuant to 40 CFR § 1501.6) during the preparation of this EIS.

1.3.2 USES OF THIS EIS

This EIS will be used primarily to inform the lead agencies, the public, and other interested and affected parties about the potential environmental consequences of the proposed Whistling Ridge Energy Project, as required by SEPA and NEPA. The draft EIS was distributed to the public and other interested parties, and was used to solicit comments on the adequacy and accuracy of the environmental analysis contained in the draft EIS. Distribution of the draft EIS provided the public with information about the Project and its environmental effects, while simultaneously allowing an opportunity for meaningful public participation and comment on the draft EIS. All responses to comments received on the draft EIS are presented in Appendix G. All comment letters are presented in Appendix H.

In addition to providing the public with updated environmental information, the final EIS will be used to inform agency decisions on whether or not to issue authorizations and approvals for the proposed Project, consistent with the requirements of SEPA and NEPA. More specifically, EFSEC will use the final EIS to inform its decision on whether to recommend approval or denial of the Whistling Ridge Energy Project to the Governor of Washington. The Governor then will make a decision on whether to approve or deny the proposed Project. BPA will use the final EIS to inform its decision on whether to grant the requested interconnection of the Project to the FCRTS. BPA grants such requests by offering a final Large Generator Interconnection Agreement to a party requesting interconnection (such as the Applicant), pursuant to its tariff.

Other federal, state or local agencies also may have permitting or other approval authority for the proposed Whistling Ridge Energy Program (see Chapter 4). Those agencies may use this EIS in order to fulfill their NEPA or SEPA responsibilities.

1.3.3 INTEGRATION OF SEPA AND NEPA REQUIREMENTS

As indicated in Section 1.1, this EIS has been prepared as a joint SEPA/NEPA EIS. As such, it is intended to fulfill the format and content requirements, as well as the spirit, of both of these statutes and their implementing regulations and associated guidance documents. Preparation of a joint SEPA/NEPA EIS for a project that requires both state and federal decisions ~~approvals~~ is encouraged by both the State of Washington and the federal government.

At the state level, the Washington Department of Ecology (Ecology), the state agency charged with issuing uniform SEPA rules and guidelines for the state, has prepared the SEPA Handbook (Ecology 1998) to provide guidance on implementing SEPA requirements. Chapter 9 of the SEPA Handbook specifically recognizes that the SEPA and NEPA lead agencies for a proposed project may agree to be co-lead agencies, and encourages the preparation of a combined, or joint, SEPA/NEPA EIS in such situations to meet the requirements of both SEPA and NEPA.

At the federal level, the Council on Environmental Quality (CEQ) NEPA regulations specifically provide that state and local agencies may act with at least one federal agency as joint lead agencies for an EIS (See 40 CFR § 1501.5[b]). These regulations also specify that federal agencies shall cooperate with state and local agencies to the fullest extent possible to avoid duplication between NEPA and comparable state requirements (See 40 CFR § 1506.2[c]). Under 1506.2(c), this cooperation shall include preparation of a joint state-federal EIS where both state

and federal decisions ~~approvals~~ are involved, and the state and federal lead agencies are to act as joint lead agencies for the EIS.

Much of the organization of this document is based on the SEPA EIS format and content specified in WAC 197-11-430 and 197-11-440, with adjustments made to ensure NEPA compliance as well.

1.4 DESCRIPTION OF ALTERNATIVES

Two alternatives are evaluated in this EIS: the Proposed Action (authorizing construction and operation of the proposed Whistling Ridge Energy Project and associated components, and BPA granting the proposed interconnection) and the No Action alternative (not authorizing construction and operation of the proposed Project and associated components, and BPA not granting the proposed interconnection). These alternatives are summarized below. Alternative wind energy technologies, alternative wind turbine locations, and off-site alternatives considered but eliminated from further study in this EIS also are described.

1.4.1 PROPOSED ACTION

Under the Proposed Action, the state of Washington (acting through Washington EFSEC and the Governor of Washington) would approve the Site Certificate for the proposed Whistling Ridge Energy Project, thereby authorizing the Applicant to construct and operate the Project. Upon the issuance of the Site Certificate, BPA will concurrently issue its Record of Decision (ROD) and will thereby grant interconnection access to the Applicant under its Open Access Tariff. The proposed Whistling Ridge Energy Project would be located on an approximately 1,152-acre site approximately seven miles northwest of the City of White Salmon in Skamania County, Washington (Figure 1-1). The Applicant has identified this site for the proposed Project based on many factors, including:

- The site has a proven, robust wind resource;
- The site is large enough to accommodate enough wind turbines to produce a minimum of 70 MW nameplate capacity of electricity;
- The site is owned and controlled by the Applicant;
- The site has a long history of commercial logging. ~~and associated absence of native habitat, reducing or eliminating the need to clear additional forest land~~ Native species remain; however, the native habitat has been disturbed through commercial forestry activities;
- The site is uniquely suited for its access to on-site high voltage transmission in proximity to urban power markets; and
- The site is in proximity to the mill site and business offices of the Applicant.

The proposed Project would consist of wind turbine generators and associated components, and would have a total nameplate capacity of up to 75 MW. Approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines. Information about the proposed wind turbines and other project components is summarized below.

1.4.1.1 Wind Turbines

The proposed Project would consist of up to 50 wind turbine generators, each of which would likely range in size from 1.2 to 2.5 MW, for a total of up to 75 MW. Each turbine would be up to approximately 426 feet tall (262-foot hub height and 164-foot radius blades, measured from the ground to the turbine blade tip), and would be mounted on a concrete foundation. Wind turbines would be grouped in "strings," each spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). The turbines throughout the Project would all be the same model, although height may vary in response to terrain.

Each wind turbine would consist of four main components: the turbine tower, the nacelle, the rotor hub, and the blades. Each turbine tower would be a tapered, hollow tubular structure, approximately 14 feet in diameter at the base and weighing approximately 30 tons. The towers would likely be painted a flat neutral gray or white color. Each tower would be mounted on a concrete foundation with a diameter up to approximately 60 feet. Tower foundations would be spread footing or pier-type footings. To the extent required by the Federal Aviation Administration, turbine towers would be furnished with blinking lights visible to aircraft.

The remaining three turbine components are all mounted at the top of each turbine tower. The nacelle is encased in fiberglass, and is mounted on top of the tower to house the gearbox, the generator, and the control system. The rotor hub is attached to the nacelle, and holds the blades in place. Each turbine has three laminated fiberglass blades, each approximately 129 to 164 feet long, depending on which turbine is selected. The diameter of the circle swept by the rotors would be approximately 264 to 320 feet, depending on which turbine is selected. The wind turbines would operate at wind speeds from 9 to 56 miles per hour (mph), with a rotor speed range of 10 to 20 revolutions per minute (rpm).

1.4.1.2 Electrical Collector System

The Project would include an electrical collector system to collect energy generated at approximately 575 volts (V) from each wind turbine, transform the voltage of this energy to 34.5-kV using a pad-mounted transformer, and deliver the energy via underground cables to the proposed Project substation. Each turbine's 575-V to 34.5-kV transformer would be located on a transformer pad adjacent to each tower, or enclosed in the nacelle, depending on the turbine model. From there, power would be transmitted via underground 34.5-kV electric cables. These cables would be buried by digging trenches up to 5 feet wide and approximately 3 to 4 feet deep, placing the cables in these trenches, and then filling the trenches back in with the excavated soils. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the proposed substation) multiple sets of cables would be installed within each trench where possible. There would be approximately 8.5 miles of underground collector cable trenches. In areas where environmental constraints, geologic features, or cultural features necessitate, minor aboveground placement of collector cables may occur.

1.4.1.3 Project Collector Substation and Interconnection to the FCRTS

The Project also would include a project collector substation, which would further transform the energy delivered by the underground electrical collector system from 34.5-kV to 230-kV, so that it would be suitable for delivery to the FCRTS. The proposed collector substation would occupy

a portion of a fenced 5-acre area at the southwest end of the Project Area, immediately adjacent to BPA's transmission line. A 50-foot cleared area would be maintained around the substation. The substation site would be a graveled, fenced area with transformer and switching equipment and an area to park utility vehicles.

Additionally, the Project would include the construction of a new BPA substation located within the Project Area which would interconnect the Project into BPA's North Bonneville-Midway 230-kV transmission line. The proposed BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there would be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work. There would be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that would be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

The interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line could cross underneath for this interconnection.

1.4.1.4 Operations and Maintenance Facility

A permanent Operations and Maintenance facility would be constructed on an approximately 5-acre area located at one of the following two locations: (1) adjacent to the proposed substation; or (2) west of the Project Area along West Pit Road. The Operations and Maintenance building would have approximately 3,000 square feet of enclosed space, including office and workshop areas, a kitchen, bathroom, shower, and a utility sink. It would be constructed of sheet metal, and would be approximately 16 feet tall (to the roof peak). A graveled parking area for employees, visitors, and equipment would be located adjacent to the building. The entire area would be fenced and have a locked gate.

1.4.1.5 Water Supply and Wastewater

During construction of the proposed Project, approximately 1.7 million gallons of water would be consumed for road compaction, dust control, wetting concrete and other construction purposes. The construction contractor would supply water used during construction. Water needed for construction would be purchased by the Applicant's construction contractor from an off-site vendor with a valid water right and transported to the site in water-tanker trucks.

The Project would not be connected to a sewer system. Sanitary wastes would be collected in portable toilets during construction. Disposal of sanitary wastes would be managed through a contract with a portable toilet vendor. The contractor would incorporate applicable state capacity requirements based on the construction worker population on the Project Area at any given time. Collected wastes would be managed and disposed of by the contracted vendor.

Project operations would not require the use of any water for cooling or any other use aside from the limited needs of the Operations and Maintenance facility. Potable water intake would be in the form of a well accommodating the Operations and Maintenance facility's needs. The Applicant would seek and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and Ecology.

There would be no industrial wastewater stream from operation of the Project. Wastewater discharge would come from the Operations and Maintenance facility discharging to an on-site septic system. Less then 5,000 gallons per day is anticipated for kitchen and bathroom use. No wastewater would be used, discharged, or recycled for wind turbine operations.

1.4.1.6 Site Access for Construction and Operation

From State Route (SR) 14, access would be provided via county roads (Cook-Underwood Road to Willard Road) and then via a new connection to West Pit Road, an existing private logging road that connects to a network of existing logging roads on the Project Area.

Because the Project Area already has a network of logging roads, relatively few new roads would have to be constructed. Approximately 7.9 miles of existing private logging roads would be improved. In areas where there are no existing logging roads near proposed wind turbine strings, approximately 2.4 miles of new gravel access roads would be constructed. All new roadway construction would occur on private lands.

In addition to the permanent access roads described above, temporary access may be required to construct some facilities. For example, constructing the underground collector cables would require that heavy equipment be able to access trench locations where they are not directly adjacent to roads. Generally, equipment would be driven across open ground to accomplish this construction. In some locations minor grading may be required to allow safe access to construction locations (that would be determined only after final pole locations have been selected). These temporary access roads would be re-graded and re-seeded as necessary to restore vegetation after the construction phase is over.

After the Project is constructed, use of the improved and new access roads on private lands would be limited to use by the landowner and Project maintenance staff.

1.4.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and/or BPA would not grant interconnection of the Project to the FCRTS. As a result, the proposed Whistling Ridge Energy Project would not be constructed or operated under the No Action Alternative. This alternative would not help utilities seeking renewable energy resources in states with RPSs, such as Washington, Oregon, and California, in achieving the renewable energy goals mandated by each state's RPS. Furthermore, this alternative would not help to meet the region's need for additional power in coming years. If the proposed Project is not constructed, it is likely that this need would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources.

In addition, it is reasonable to expect that under the No Action Alternative, the proposed Project Area would continue to be used for logging and other timber harvest activities. This site has been in commercial forestry use for the last century, during which the site has been logged over a series of approximately 50-year logging rotations. If the proposed wind project is not approved and built, the Applicant and others would continue to use the site for commercial forestry production. Ongoing timber management activities within the Project Area under this alternative would include regular tree clearing, harvesting, replanting, and development of additional access roads as necessary.

1.4.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

The Applicant has proposed a particular type of generation facility (wind) at a specific site. The lead agencies, Washington EFSEC and BPA, must respond to the Applicant's requests for authorizations and approvals for the proposed Project at this site. While this EIS focuses on the alternatives of either granting or not granting the Applicant's requests, various ~~other~~ alternatives to the Proposed Action described in Section 1.4.1 ~~also~~ have been considered. These alternatives include alternate locations for the proposed Project, different Project sizes, alternative wind generation technologies, and different Project configurations. ~~For potential alternatives,~~ The Applicant identified a number of criteria that needed to be met in order ~~for the Applicant~~ to have a technically and economically feasible project suitable for further consideration. These criteria are as follows:

- The Project must be located in an area with a steady supply of robust wind power, and on a site on which construction could reasonably occur (no significant geotechnical constraints);

- To reduce startup costs, the Project must be located on land the Applicant owns and controls, and land that could serve a dual purpose of commercial forestry and power production;

- To allow ~~enable~~ the power to reach urban markets and eliminate the cost and time required to construct new transmission lines, the Project must be located in proximity to existing high-voltage transmission lines;

- The costs of construction must be outweighed by the potential return on investment, thereby requiring a minimum number of potential megawatts to be achieved by the Project; and

- The Project output must be at a competitive price and of adequate supply to be attractive to utilities looking to fulfill their Renewable and Alternative Energy Portfolio Standards.

The following discussion describes alternatives that were considered but eliminated from detailed study in this EIS because of technical or economic feasibility issues, not meeting the identified purpose of and need for the proposed action, or clearly greater environmental impacts:

1.4.3.1 Alternative Project Locations

The Applicant owns and manages 70,000 acres of timberland in Washington and Oregon. The Applicant manages its forestlands with the objective of producing as much high quality wood as possible, without compromising the future economic and environmental benefits of their forests. In reviewing its lands for location of a wind project, the Applicant sought:

- Areas of Applicant-owned property found to have a steady source of robust wind;
- Applicant-owned land that contained high ridges on which to place wind turbines with little impact to the continued underlying use of the land for commercial forestry;
- Land in proximity to existing high voltage transmission lines.

No other sites were identified that were under the ownership of the Applicant or as close to existing transmission infrastructure facilities as the proposed Project Area.

1.4.3.2 Larger or Smaller Generation Facility Size

During the Project planning process, the Applicant considered the feasibility of constructing and operating a larger generation facility, both in terms of more wind turbines and a larger Project Area ~~area, involving the proposed~~. Regarding more turbines, the site does contain a series of ridge lines that are conducive to locating wind turbines but at the same time are limiting as to where those turbines could be placed. In general, placement of turbines in areas substantially below the ridge lines would not effectively make use of the wind resource within the Project Area, thereby compromising the economic feasibility of the proposed Project. Accordingly, the constrained topography has necessitated a restricted generation facility ~~power plant~~ design.

Regarding a larger Project Area, the proposed Project is located on land situated between the Columbia River Gorge National Scenic Area on the south and land owned by the Washington State Department of Natural Resources (DNR) on the north. Land to the east and west was not considered, as those lands are at a lower elevation and do not include the north-trending ridge lines that exist on the proposed Project Area. While the Applicant did not consider locating turbines within the Scenic Area due to its sensitivities, consideration was given to locating turbines on the DNR lands directly north of the site. These lands have topographical characteristics similar to the proposed Project Area, and also have been logged through commercial forestry activities. However, use of these lands for Project turbines was rejected from further consideration due to comments from the public and DNR's own reluctance to consider leasing the site to the Applicant.

The Applicant also considered the feasibility of a smaller generation facility within the proposed Project Area, either by removing turbines or utilizing a smaller Project Area. However, the Project is being proposed as an "integrated whole"—in other words, as a single generation facility, not pieces of a whole, where some turbines may be eliminated. The proposed Project includes a defined energy output, based on site and design characteristics, market demand, and Applicant objectives. These objectives include providing a minimum level of generation to be attractive to utilities seeking to fulfill their RPS requirements, as well as providing a return on investment to the Applicant. In order to provide this return, the Applicant has determined that the Project must be capable of producing a minimum of 70 MW. The number of wind turbines

within the Project Area already has been minimized to the extent practicable in light of the Applicant's objectives. Accordingly, if any turbines are removed from the Project design, other locations must be found to replace those turbines to maintain the minimum necessary capacity. The constrained site location and topography limits the ability to relocate turbines within the Project Area.

In sum, the Project size was selected to optimize Project energy output and economic feasibility. A smaller wind turbine facility would be unlikely to offset Project development costs. A larger project would require additional infrastructure capacity and transmission capacity.

1.4.3.3 Alternative Wind Generation Technologies

Alternative technologies for the generation of power from a wind resource were considered. Several types of wind energy conversion technologies have been developed over the past three decades and include 1) vertical axis Darrieus wind turbines, 2) two-bladed downwind wind turbines, 3) smaller three-bladed upwind wind turbines (500 to 750 kilowatt [kW]), and 4) larger 3-bladed upwind wind turbines (1 to 3 MW). The three-bladed, upwind, horizontal axis is currently the preferred technology, based on proven reliability and commercial viability.

1.4.3.4 Alternative Project Configurations

As discussed above, the proposed Project Area contains a series of ridge lines that are conducive to locating wind turbines, but at the same time are limiting as to where those turbines could be placed. This means that there are limited options for locating wind turbines within the Project Area. Alternative turbine configurations were considered, but were eliminated from further study because they either did not appropriately utilize the wind resource present within the Project Area or compromised the economic feasibility of the proposed Project.

1.4.3.5 Alternative Interconnections

Alternatives for interconnecting the proposed wind Project with the existing high voltage transmission lines that currently cross the Project Area were considered. Initially, an option of interconnecting at a point within the Project Area directly east of the currently proposed interconnection point was identified. This alternative interconnection point was located between structures 22/6 and 23/1 on the North Bonneville-Midway 230-kV transmission line. However, this option would have required the development of interconnection facilities within the Columbia River Gorge National Scenic Area because structure 22/6 is on the border of, and structure 23/1 is within, the Scenic Area. Given the high sensitivity of the Scenic Area, construction of an interconnection alternative within its boundaries was eliminated from further study in this EIS.

An alternative interconnection also was considered outside the Project Area, approximately 1.5 miles west of the currently proposed interconnection point. BPA's transmission engineers identified a potential alternative interconnection site between structures 21/4 and 22/1 on the North Bonneville-Midway 230-kV transmission line. This site is located in a relatively flat, lower-elevation area that may have easier access in the winter than the currently proposed interconnection site. However, this alternative would have required the Applicant to construct and operate a new 1.5 mile section of 230-kV transmission line from the proposed Project to this

interconnection point. Development of such a new line would have required the clearing of an approximately 125-foot-wide right-of-way corridor for the line, as well as the clearing and construction of additional new transmission line access roads. The Applicant also has stated that the additional costs of constructing this new line likely would make the Project no longer economically viable. Because of the much greater potential for environmental effects as compared to merely developing the currently proposed interconnection within the already planned Project Area, as well as the significant additional cost implications, this alternative was considered but eliminated from detailed study in this EIS.

An interconnection with the other existing BPA transmission line that crosses the Project Area also was considered but rejected from further study because the line is a 115-kV line and does not have sufficient capacity to transmit the energy from the Whistling Ridge Energy Project.

1.4.3.6 Alternative Access Roads

Finally, several alternatives for accessing the proposed Project Area were investigated. There are three potential ways to access the Project Area. All are via county roads from SR 14 to Cook-Underwood Road. In addition to the proposed access route from Cook-Underwood Road, which is included as part of the Proposed Action, the Project Area could be accessed by:

- **Route 1:** Ausplund Road to a private logging road vacated by Skamania County in 1987, which crosses private property (not owned by the Applicant) that is currently used for residential, agricultural orchards, and commercial timber production and harvest.

- **Route 2:** Kollock-Knapp Road to Scoggins Road to a private logging road called the CG2930 road on County Assessor's maps, which crosses property owned by the Applicant that is currently used for commercial timber production and harvest.

The private logging road in Route 1 was made a County right-of-way in 1923. It was vacated for public use in 1987 by resolution of the Skamania Board of County Commissioners; however, the rights to use the road by abutting property owners remain. Additionally, road improvements to this route would be required for access to construct the wind energy facility and for ongoing Operations and Maintenance traffic. Impacts to a non-project landowner from these activities would occur if Route 1 were used. Therefore, Route 1 was eliminated as a construction roadway access alternative.

Route 2 would require minor roadway improvements that would not directly impact any non-project landowners. However, these roadway improvements would require construction within the Columbia River Gorge National Scenic Area. Therefore, Route 2 was eliminated as a construction roadway access alternative.

1.5 SUMMARY OF PUBLIC INVOLVEMENT, CONSULTATION, AND COORDINATION

1.5.1 PUBLIC AND AGENCY SCOPING

Both SEPA and NEPA require opportunities for public involvement and comment during the preparation of an EIS. The initial phase of public involvement is the draft EIS "scoping" phase,

during which the lead agencies request public input on the scope of the draft EIS to be prepared, including the range of alternatives, potential environmental impacts, and possible mitigation measures. The lead agencies notify the public of the draft EIS scoping phase through various media (e.g., sending letters, publication notices, and internet postings), provide for a public scoping comment period, and hold public meetings to accept scoping comments. This section summarizes the public involvement and agency coordination activities that have been conducted to date for this EIS.

- **Initial EFSEC Public Notice.** On April 6, 2009, EFSEC mailed out a notice to the public concerning the Applicant's March 10, 2009 Application for Site Certification Agreement for the Whistling Ridge Energy Project. Among other things, this notice included a summary of the proposed Project, a determination that an EIS was required, and information concerning the scoping process for the joint SEPA/NEPA EIS to be prepared by EFSEC and BPA. The notice also requested that all scoping comments be submitted by May 11, 2009 and provided the date, time, and location for the initial public information and scoping meeting for the EIS.

- **BPA Scoping Letter.** On April 17, 2009, BPA mailed a letter to agencies and individuals ~~people~~ potentially interested in the proposed Whistling Ridge Energy Project that explained the proposal, BPA's role, the EIS process including scoping, and how to participate. A comment sheet was included so interested parties ~~people~~ could mail their comments to BPA. This letter also was posted on a BPA website created specifically for posting information and updates related to the EIS. BPA also provided advance notice to the State of Washington and appropriate tribes.

- **Revised EFSEC Public Notice.** On April 21, 2009, EFSEC issued a revised public notice ~~that added~~ announcing a second public information and scoping meeting for the EIS. This notice also extended the date for submitting scoping comments to May 18, 2009.

- **BPA Notice of Intent.** On April 21, 2009, BPA published a Notice of Intent (NOI) to prepare an EIS in the *Federal Register*. Like the BPA scoping letter, this NOI explained the proposal, BPA's role and proposed action related to the proposal, the EIS process including scoping, and how to participate.

- **Agency Scoping Meeting.** An agency scoping meeting was held at the Rock Creek Center in the Skamania County Fairgrounds in Stevenson, Washington during the afternoon of May 6, 2009. The meeting was attended by representatives from EFSEC, BPA, the US Forest Service (USFS), the State Attorney General's office (i.e., the Counsel for the Environment) and the general public. The primary agency comments received during the agency scoping meeting were provided by USFS.

- **First Public Information and EIS Scoping Meeting.** On May 6, 2009, EFSEC and BPA hosted an evening scoping meeting at the Rock Creek Center ~~in the Skamania County Fairgrounds~~ in Stevenson, Washington. The meeting included presentations by (1) EFSEC, explaining the process that would be followed during preparation of the EIS, (2) BPA on its role, and (3) the Applicant on the Project itself. Members of the public

asked questions and were given the opportunity to provide oral and written ~~scoping~~ comments on the scope and content of the EIS.

- **Second Public Informational and EIS Scoping Meeting.** On May 7, 2009, EFSEC hosted an afternoon scoping meeting at the Underwood Community Center in the community of Underwood, Washington. Similar to the May 6 meeting, the meeting included presentations by (1) EFSEC, explaining the process that will be followed for preparation of the EIS, (2) BPA on its role, and (3) the Applicant on the Project itself. Members of the public asked questions and were given the opportunity to provide oral and written scoping comments on the EIS.

- **Mailing List.** EFSEC and BPA have developed and maintained a mailing list of interested and affected parties for the EIS. All public notices and announcements concerning the Project have been mailed to all parties on the mailing list.

- **EIS Scoping Report.** Following closure of the public scoping comment period on May 18, 2009, EFSEC and BPA jointly reviewed all of the comments received from the public, tribes, public agencies, interest groups, and other parties and developed the scope of issues to be evaluated in the EIS. An EIS Scoping Report was prepared by EFSEC, in consultation with BPA, and made publicly available on August 25, 2009.

EIS scoping comments were received both at the EIS scoping meetings and through written submittals. A total of 122 people attended the two scoping meetings, and 79 speakers provided verbal comments. By the close of the comment period, a total of 421 EIS scoping letters or e-mails had been received from public agencies, tribes, environmental organizations, interested citizens, and others. Fifty-one of these submittals were duplicate letters or cover letters/e-mails attached to supporting documentation that did not include substantive comments. A total of 1,803 individual comments from the remaining 370 submittals were identified for consideration in this EIS. The EIS Scoping Report, which is incorporated by reference, provides additional information on the EIS scoping comments that were received.

1.5.2 AGENCY CONSULTATIONS

This section summarizes federal and Washington state statutes, implementing regulations, and Executive Orders requiring consultation, review, and/or permits or approvals. A complete listing of all Environmental Consultation, Review, and Permitting Requirements is provided in Section 4.0 of this EIS.

- **Endangered Species Act.** On June 8, 2010, BPA consulted with the U.S. Fish and Wildlife Service with the determination that the proposed Project may affect but is not likely to adversely affect northern spotted owl populations or critical habitat within the Project Area. On July 19, 2010, the U.S. Fish and Wildlife Service concurred with BPA's findings under the Endangered Species Act, and provided comments on the draft EIS.

- **National Historic Preservation Act.** On August 2, 2010, BPA consulted with the Washington State Department of Archaeology and Historic Preservation (DAHP) regarding BPA's Area of Potential Effects (APE) pursuant to BPA's responsibilities

under Section 106 of the National Historic Preservation Act and 36 CFR 800. On August 9, 2010, BPA received concurrence for its APE from DAHP (Log No. 080910-26-BPA). BPA also initiated consultation with The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, The Cowlitz Indian Tribe, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4) on August 2, 2010. On June 2, 2011, BPA submitted a cultural resources survey report to DAHP and interested Tribes (listed above) and determined that the federal undertaking should result in no historic or cultural properties affected.

- **Adjudicative Proceedings.** EFSEC has held adjudicative proceedings for the Whistling Ridge Energy Project under Chapter 34.05 RCW, the Administrative Procedure Act and commenced the adjudicative hearing related to Application No. 2009-01 in accordance with the procedural requirements found in Chapter 463-30 WAC and Chapter 34.05 RCW. For further information including motions, orders, and filings related to EFSEC adjudicative proceedings of the Whistling Ridge Energy Project, please see *http://www.efsec.wa.gov/Whistling%20Ridge/Adjudication/wradj.shtml*.

1.5.3 APPLICANT MEETINGS AND CONSULTATION

In addition to the EIS public scoping activities, the Applicant has been actively involved in meeting and consulting with local and state agency personnel and with Tribal leaders during the preparation of studies supporting the Application. The key contacts made by the Applicant to date are summarized in this section.

1.5.3.1 Local Government

- **City of Bingen (January 2009).** Consulted with city administrator to obtain information stating that there are currently no load restrictions in place for Maple Street in the City of Bingen, Washington. Additional information was provided, stating that there is a significant increase in traffic volumes during the summer months due to recreational activities in the local area.

- **Klickitat County Public Works Department (January 2009).** Obtained the County "Resolution to Designate Haul Routes" document that could be used as a haul route agreement template for the Project by Skamania County. The document was forwarded to Skamania County for review.

- **Skamania County Planning Department.** Held three pre-application conferences between 2004 and 2008 with staff (including meetings on March 24, 2006 and August 22, 2007).

- **Skamania County Public Works Department.** Held pre-application meeting on August 22, 2007 with the County Road Engineer, and Building Inspector; meeting also attended by the Planning Department. In addition, the Skamania County Public Works Department Manager, the County Engineer, and the Maintenance Superintendent were

consulted to better understand existing roadway conditions, the proposed haul route, and traffic patterns. Meetings and consultation included:

- Meeting with Skamania County Public Utility District and Embarq, the local telephone service provider on utility availability

- A determination on weight restrictions for the tracks that cross Maple Street in the City of Bingen, Washington from the Burlington Northern Santa Fe Railroad

- Obtained average daily traffic on Cook-Underwood Road at approximately milepost 12 and location of the Cook-Underwood Road and Kollock-Knapp Road intersection at approximately milepost 10 to 10.5.

- Recommendation that right of way ownership and easements be determined early on in the planning process

- Requirement that both pre and post construction roadway inspections would need to be conducted along the haul route and that one additional roadway inspection would be required at one year post construction

- **Skamania County Assessor.** Conducted phone and office discussions regarding tax benefits to Skamania County from a potential wind energy project.

- **Skamania Economic Development Council.** Held various meetings and discussions regarding economic development and wind energy.

- **Skamania Public Utility District.** Met with Commissioners and General Manager regarding Skamania Public Utility District system vulnerability to interruption by BPA and benefits to be realized by a potential wind energy project in Skamania County.

- **Underwood Fire District.** Met with Fire Commissioners to discuss a service agreement for a potential wind energy project.

- **Mill A Volunteers.** Met with members to discuss the possible formation of a Fire District and inclusion of a potential wind energy project.

1.5.3.2 State Government

- **Washington Department of Archeology and Historic Preservation**. Conducted file search for historic and cultural properties within or near the Project Area.

- **Washington Department of Fish and Wildlife (WDFW).** Meetings with WDFW included:

  - February 26, 2004 meeting with WDFW and US Fish and Wildlife Service (USFWS) staff to discuss survey methods and results of wildlife surveys completed to date, and to discuss future surveys

- November 16, 2007 meeting and site tour to discuss survey methods and results of additional wildlife surveys completed to date.
- Several information exchanges with WDFW Area Habitat Biologist to discuss Project impacts, review survey results, and discuss survey protocols.
- Several follow-up meetings with WDFW staff during June, July and August of 2009 to continue the discussion and consultation on wildlife.
- Meeting with WDFW staff on December 8, 2009 to review results of wildlife surveys.

- **Washington State Department of Natural Resources.** Held a meeting and discussions with DNR staff regarding application to lease adjoining DNR property for wind energy purposes.

- **Washington State Department of Transportation, Goldendale Office.** Discussed information relating to over-size and over-weight vehicles traveling on SR 14. They stated that the current prohibition for loads in excess of 125 feet (including the trailer and load) between mileposts 19.00 and 83.53 could be overruled for trucks traveling between the SDS facility and the junction of SR 14 and Cook-Underwood Road. The Goldendale office must be contacted prior to any over-size hauls. Pilot cars would be required and Washington State Patrol involvement may be required.

- **Washington State Department of Transportation, Southwest Region Office.** Discussed information relating to road and bridge restrictions for over-size and over-weight motor vehicles traveling on SR 14 and over-size and over-weight load permit requirements.

1.5.3.3 Federal Government

- **U.S. Army Corps of Engineers at Bonneville Dam (January 2009).** Obtained information on lockage length and width parameters as well as average daily usage numbers for the months of May through October.

- **US Fish and Wildlife Service.** Meetings with USFWS included:
  - February 26, 2004 meeting with USFWS and WDFW staff to discuss survey methods and results of wildlife surveys completed to date, and to discuss future surveys.
  - Ongoing consultation with USFWS staff to discuss survey work and results.

1.5.3.4 Tribal Government

- Letter sent to Yakama Nation Cultural Resources Department.
- Site tour and consultation with local Tribes of Yakama Nation (see Section 3.10).
- Communication with Yakama Nation Cultural Resources Program concerning consultation and survey assistance.

- Site tour and survey by representatives of the Yakama Nation Cultural Resources Program.

1.5.3.5 Railroad

- **Burlington Northern Santa Fe Railroad.** Transportation Technology Services provided rail car length, width, and weight parameters as well as transport restrictions between the Port of Longview and the SDS facility.

1.5.4 DRAFT EIS COMMENT PERIOD AND PUBLIC MEETINGS

After completion of the draft EIS, EFSEC and BPA established an initial ~~minimum~~ 45-day comment period and distributed the draft EIS ~~document~~ for public comment and review. The comment period was later extended. During the comment period, the public had the opportunity to review and submit comments on the draft EIS to EFSEC and BPA both in writing and at two public meetings. EFSEC and BPA then prepared this final EIS that considers and responds to these comments and makes any necessary corrections or revisions to the EIS text. Responses to comments are presented in Appendix G.

This section summarizes the public involvement and agency coordination activities that have been conducted since the release of the draft EIS.

- On May 25, 2010, EFSEC and BPA sent out a letter to interested parties announcing the release of the draft EIS. This letter was also posted on a BPA website created specifically for posting information and updates related to the EIS.
- On May 28, 2010, the draft EIS was filed with the U.S. Environmental Protection Agency which published a Notice of Availability of the draft EIS to the Federal Register (volume 75, number 103).
- On June 16, 2010, EFSEC and BPA hosted a public meeting at the Underwood Community Center in the community of Underwood, Washington. On June 17, 2010, EFSEC and BPA hosted a second public meeting at the Rock Creek Center in the Skamania County Fairgrounds in Stevenson, Washington. These meetings were held to accept public comments on the draft EIS.
- The initial close of comment period for the draft EIS was July 19, 2010. EFSEC and BPA extended the comment period for comments to the draft EIS to August 27, 2010.

1.6 SUMMARY OF POTENTIAL PROJECT IMPACTS AND MITIGATION MEASURES

Table 1-2 summarizes the potential impacts, design measures, and mitigation measures to be implemented by the Project. This table is organized by the various elements of the environment. For each element, the potential impacts of the alternatives are summarized. Specific design measures that would reduce or eliminate impacts to which the Applicant has committed are also listed, as are other mitigation measures that have been identified.

Table 1-1
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
Earth	Construction: • Potential erosion during grading and foundation construction. • Minor to moderate changes in topography. Operation: • Low potential for liquefaction. • Small potential for surface rupture. • Low probability for ash deposition during volcanic event. • No obvious recent mass wasting features. • No anticipated impacts from Class III Landslide Hazard Areas.	Same potential impact levels as for proposed Project with the exception that the site identified for the alternative. Operations and Maintenance facility on West Pit Road is at a lower elevation and is a more level site so erosion potential may be less.	Existing potential for erosion from logging operations would continue.	Construction: • A detailed geotechnical investigation would be performed to identify any subsurface conditions. • A Construction SWPPP would be submitted for EFSEC approval and would include measures to control erosion. • Foundations and building would be designed for Seismic Zone 2. Operation • Erosion and Sedimentation Control Plan, Environmental Protection Control Plan, and Stormwater Pollution Prevention Plan would be submitted to EFSEC for approval, and all would include BMPs to minimize erosion. • Visual inspection would be conducted following any seismic activity to look for incipient mass movement. Adverse effects on wind turbines from ash fall would be mitigated through appropriate design.
Air Quality	Construction: • Temporary exhaust emissions from construction vehicles and equipment. • Temporary odors from diesel equipment and vehicles. • Temporary dust from construction operations. Operation: • Minor dust and emissions from Operations and Maintenance vehicles. • Avoided emissions from fossil fuel power plants, including of greenhouse gasses and other pollutants.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	• Existing potential for fugitive dust and emissions would continue from logging operations. • Construction of fossil-fuel power plants to meet regional demand could impact air quality through releases of SO2, NO, CO2 and other pollutants.	Construction • All vehicles used during construction would comply with applicable Federal and state air quality regulations. • Operational measures such as limiting engine idling time and shutting down equipment when not in use. • Active dust suppression on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations. • Dust control program to minimize any potential disturbance from construction-related dust. Dust suppression would be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin. • Traffic speeds on unpaved Project roads would be kept to 25 mph to minimize dust generation. • Carpooling among construction workers would be encouraged. • Disturbed areas would be replanted or graveled to reduce wind-blown dust. • Erosion control measures would be implemented to limit deposition of silt to roadways. • Temporary rock crushers or concrete batch plants would be required to submit a Notice of Construction to the Southwest Clean Air Agency and to comply with all permit requirements. Operation • ~~No mitigation proposed.~~ • Limit traffic speed on unpaved roads to 25 MPH to minimize dust from operation and maintenance vehicles.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
Water	Construction • On site development would not impact ground water, surface water, public water supplies, floodplains or wetlands. • Off site, improvements to West Pit Road would potentially impact surface water. Operation • Operation of the Project would not impact ground water, surface water, public water supplies, floodplains or wetland.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	Existing patterns of ground and surface water use and impacts would continue.	Construction • Discharge of stormwater runoff from the Project would be regulated by EFSEC, based on Ecology's stormwater pollution control program. • EFSEC may require the Project to obtain coverage under the Construction Stormwater General Permit, since it would disturb more than 1 acre of land. • Final design would conform to the applicable Ecology Stormwater Management Manual in effect at the time or as instructed by EFSEC. • Unless it is instructed by EFSEC that it is not necessary to do so, the Applicant would file an NOI to obtain coverage under the Construction Stormwater General Permit and the Industrial Stormwater General Permit. • Applicant has committed to design and implement the same BMPs as required in Ecology's permits to prevent and minimize the discharge of pollutants in its stormwater runoff, and to prepare SWPPPs for the construction and operation of the Project in substantially the same form and content. • All plans would be submitted to EFSEC for approval prior to construction. Implementation of the construction BMPs would be carried out by the site work contractor, with oversight by environmental monitors. • Site-specific BMPs for temporary erosion and sedimentation control during construction would be identified on the construction plans submitted to EFSEC. See Section 3.3.3.1 for a list of proposed construction BMPs. Operation • Permanent stormwater management requires construction of appropriate stormwater hydraulic and treatment facilities, routine maintenance thereof, and prevention of chemical pollution through source control. • The constructed permanent stormwater BMPs would include: - Vegetated drainage ditches, - Culverts with stabilized inlets and outlets, - Permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover, - Runoff treatment BMPs facilities would be designed to conform to the applicable Stormwater Management Manual. • Due to the small area of impervious surface in the Project Area, no detention storage is required. • Operational BMPs would be adopted as part of the SWPPP to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				keeping practices as necessary to prevent stormwater pollution. • At least annually, facility operators would receive spill response training and training in the applicable pollution control laws and regulations. • Storage of chemicals onsite would be minimal; however, the site development plan would require a SPCC Plan that would protect groundwater.
Biological Resources	Construction • Temporary impact to approximately 53.6 acres of grass/forb, brushfield/shrub, conifer-hardwood forest and conifer forest habitat. • Permanent impact to approximately 60.7 acres of grass/forb, brushfield/shrub, conifer-hardwood forest and conifer forest habitat. • Potential loss of suitable habitat, potential fatalities during clearing or grading of the construction area, and disturbance/displacement from construction activity and personnel occupying the site. • Potential mortality to birds through nest disturbance during clearing for turbine strings and new roads. Operation • ~~There would likely be some~~ The proposed Project would result in mortality to some birds and bats due to turbine collision and displacement, though not in sufficient quantities to affect population viability. • No impacts to listed species.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	• Existing pattern of habitat fragmentation from logging would continue • Other power generation facilities, including other wind projects or generation using fossil fuels, could be constructed and operated in the region to meet long-term needs for power. • ~~Potential impacts from construction of fossil fuel power plants.~~	Design Features Include: • Micrositing of turbines and associated facilities would allow any sensitive resources discovered during construction to be avoided. • Avoiding and minimizing the use of overhead collector lines which create areas where birds may congregate and perch, thus decreasing the potential for turbine collisions. • Use of tubular turbine towers, avoiding the lattice type towers which create areas where birds may congregate and perch thus decreasing the potential for turbine collisions. • Use of un-guyed meteorological towers, reducing the potential for bird collision with wires. • Minimization of turbine lighting in the Project Area, thereby reducing the potential for birds and bats to be disoriented by lights or attracted to turbines. • Installation of newer generation up-wind turbines. • As per the WDFW Wind Power Guidelines, completion of extensive pre-project assessment of wildlife, habitat and plants in the Project Area, including review of existing information and databases, habitat mapping, general avian use surveys, bat surveys, and surveys for threatened or endangered species. Construction • Use of certified “weed free” straw bales during construction to avoid introduction of noxious weeds. • All temporarily disturbed areas would be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to avoid the establishment and spread of noxious weed species. • Implementation of a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species. • In order to avoid or minimize impacts to any raptors potentially nesting in or near the Project Area, a raptor nest survey would be conducted during the breeding season, approximately April to July, prior to construction activities that would remove forest cover and/or require heavy equipment substantial enough to potentially disturb nesting activities.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				• Convene a Technical Advisory Committee to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The Technical Advisory Committee would be composed of representatives from WDFW, USFWS, Skamania County, and the Applicant. The role of the Technical Advisory Committee would be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the Project, including potential adaptive management opportunities. The post-construction monitoring plan would be developed in coordination with the Technical Advisory Committee. • For potential impacts to big game species (deer and elk), coordination with WDFW would occur if appropriate. • Prepare a SWPPP for both the construction and operation phases of the Project, and submit to EFSEC for approval. • Coordinate and consult with BPA to ensure that any potential impacts to fish are prevented, as part of the interconnection agreement. Operation • Prepare and follow a post-construction monitoring plan (developed in coordination with the Technical Advisory Committee described above). • Implement a two year minimum post-construction avian mortality study. • Prepare a SWPPP for both the construction and operation phases of the Project, and submit to EFSEC for approval.
Energy and Natural Resources	Construction Construction of the Project would require approximately: • 19,250 gallons of fuel (diesel and gasoline) for construction equipment, • 3,700 tons of steel for turbine towers, • 1,000 tons of steel for tower foundation reinforcement, • 100,000 yards of gravel (aggregate) for roads and crane pads, • 10,000 cubic yards of concrete for turbine foundations, • 1.7 million gallons of water for road compaction, dust control, wetting concrete, etc., assuming plain water is used for dust control (this amount could be reduced through the use of lignin or other dust palliative if permitted by EFSEC). Operation • Fuel for Operation and Maintenance vehicles (approximately 8,500 gallons annually). • Minor quantities of lubricating oils, greases and hydraulic fluids for the wind turbine generators (less than five 50-gallon drums).	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	• Energy and water use for the Operations and Maintenance facility would not take place. • Base load demand would likely be filled through expansion of existing, or development of new, thermal generation such as gas-fired combustion turbine technology. Other wind sources could also be developed.	Adverse impacts to energy and natural resources are expected to be minimal and therefore no mitigation measures would be required.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	• Electricity for Project operations (less than approximately 600 kilowatt hours per wind turbine generator per month). • Water for use at the Operations and Maintenance facility and periodic maintenance of turbine blades (less than 5,000 gpd).			
Public Health and Safety ~~Environmental Health~~	Construction • Project construction could temporarily increase the risk of fire in the Project Area as a result of the operation of vehicles and power equipment, which may cause fires through contact with dried plants during dry summer weather. • Blasting may be used where solid rock is encountered during construction of turbine foundations or trenches for the underground electrical collection system. Blasting could also create a fire hazard during dry weather. • The risk of releases to the environment that would impact health would be similar to any large construction project. The primary potentially hazardous materials used during construction would be diesel fuels, lubricating oils, hydraulic fluids, and mineral oil. • Vandalism of Project facilities and theft of equipment may occur during construction. • Project construction could lead to a slight increase in the chance of traffic accidents, due to the presence of a peak of 265 construction workers traveling to the site, along with the transport of construction materials and the turbine components. This impact would last a maximum of one year, with peak impacts limited to a several-month period in the summer. • The risk of turbine structural failure during construction would be very small. Operation • Turbine fires are possible, however with the types of modern wind turbines proposed for the Project, turbine malfunctions leading to fires in the nacelle are extremely rare. • Operation of the Project would not result in the generation of regulated quantities of hazardous wastes. Since no fuel would be burned to power the wind turbine generators, there would be no spent fuel, ash, sludge or other process wastes generated. The only materials used during Project operations that present any potential for accidental spills are lubricating oils and hydraulic fluids used in the wind turbine generators and transformers. • Vandalism of Project facilities and theft of equipment during operation is similar to that expected during construction. • The risk of traffic accidents during operation would be low. • Structural failure of the turbine tower is very rare, though some instances of turbine failure have been documented in older turbine models.	The West Pit Road site would have a lower fire risk and shorter response times for emergency services since the facility would be along a county road.	• The risk of fire due to lightning strikes or human activity in the general area would continue at their present levels, as would the risk of hazardous waste release, vandalism, and traffic accidents. • The electrical energy that would otherwise be produced by the Project would need to be obtained from another generating source. The most likely alternative method for meeting the region's electricity needs would be use of a fossil fuel-powered generating facility. Such facilities have a higher risk of fire and explosion than wind energy due to their reliance on natural gas or oil rather than wind as fuel. Other wind sources could also be developed.	• Prior to construction of the Project, the Applicant would develop agreements related to emergency planning with Skamania County Department of Emergency Management. • An Emergency Plan would be prepared with components applicable to both construction and operation. The plan would include the following elements: - Fire Protection and Prevention Plan, - Personal Injury Response Plan, - Safety Plan, - SPCC Plan, - Hazardous Waste Management Plan. • All conditions affecting the safety of the Project would be reported to EFSEC, including any condition, event, or action that might compromise the safety, stability, or integrity of any facility or the ability of any equipment to function safely; or that might otherwise adversely affect life, health, or property. • The Applicant and its contractors would comply with all applicable local, state and federal safety, health, and environmental laws, ordinances, regulations, and standards. • Site security measures including fencing and outdoor lighting. Fire or Explosion The Project would use the following measures to mitigate the risk of fire or explosion: - The construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting WDNR and implementing any necessary fire precautions. - A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented by the Applicant, in coordination with the Skamania County Fire Marshall and appropriate agencies. - Both the wind turbine generators and the substation would be equipped with lightning protection systems. • A full time security plan would be implemented during Project construction to reduce the potential need for increased police services to the Project Area. • A Transportation Management Plan (TMP) that would direct and obligate the contractor to implement procedures to minimize traffic impacts would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	• Cases of blade throw are rare and have generally been linked to improper assembly or exceedance of design limits. • The risk of impacts from ice throw is minimal. • At a distance beyond 2,500 feet, shadow flicker is considered to be imperceptible. Even if shadow flicker were a proven impact, none of the planned turbines are within 2,500 feet of existing residences. • EMF from the Project would be lower than those of many common household appliances and would have no proven health and safety impacts.			
Noise	Construction • Construction noise at the three closest residential properties is anticipated to be between 66 and 72 decibels. • The large distances between much of the Project Area and potentially affected residences, the temporary nature of construction, and the restriction of construction activities to daytime hours would serve to minimize potential noise impacts from construction activities. Based on the anticipated noise levels and the timing aspects of these impacts, construction noise impacts are expected to be low. Operation • During Project operations, nighttime noise levels are anticipated to increase from existing 34 dBA to 38 – 39 dBA at Receiver 1, from existing 35 dBA to 40 dBA at Receiver 2, and from existing 35 dBA to 41 -43 dBA at Receiver 3. Daytime noise levels are anticipated to increase from existing 38 dBA to 40 – 43 dBA. • Because predicted Project operation sound pressure levels at the nearest noise-sensitive receivers are at least 7 dBA lower than the 50 dBA L_{eq} compliance threshold, none of these above conditions is expected to result in the Project operation exceeding noise regulations. • Modern turbine designs have been modified to reduce or eliminate low frequency sound. • Recent studies performed for the Canadian Wind Energy Association have described usage of 85–90 dBG as a criterion for human perception of infrasound and, by reasonable extension, the likely threshold for infrasound complaint. The horizontal distances of the Project wind turbines to the nearest noise-sensitive receivers are at least 615 meters, which provides sufficient attenuation to offset the amount of decibels that one might add to account for the quantity of wind turbines of the Project. Thus, the expected infrasound at the nearest existing receivers (R1 and R2) would remain under an estimated value of 70 dBG, which is 15 dBG less than the previously stated criteria.	Noise impacts from construction and operating the Operations and Maintenance Facility on West Pit Road, as compared to the facility located within the Project Area would be higher due to the closer proximity to residences west of the Project Area. Noise levels are anticipated to be below state and local standards.	• Existing sound levels from the site vicinity include timber harvest activities ~~agricultural activities~~, which would continue in the future with or without the Proposed Action. No known noise impacts currently occur from these agricultural activities, and none would be anticipated to occur in the future.	Construction • Construction would generally occur only during daytime hours to reduce the potential for noise impacts. • All noise-producing Project equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features. • Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features. • All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by a local, state, or federal agency, would comply with such regulation while in the course of project activity. • The use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, would be for safety warning purposes only. • Unless required for such safety purposes, and as allowable by applicable regulations, no construction-related public address, loudspeaker, or music system would be audible at any adjacent noise-sensitive land use. • The construction contractor would implement a noise complaint process and hotline number for the surrounding community. • The Applicant would have the responsibility and authority to receive and resolve noise complaints. Operation The noise modeling analysis indicated that the noise levels at the three closest residences (located 0.38, 0.48 and 0.8 mile away) would be 37 to 42 dBA for the 9 m/sec wind speed case, at and above which the wind turbine generators are expected to produce the most noise. The cumulative increase over ambient noise conditions would remain below applicable thresholds, and would result in no need for operation noise mitigation.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
Land Use and Recreation	Construction • Construction-related noise and dust could temporarily affect nearby homes and businesses located along the site access route, though this impact would not be sufficient to change existing land use patterns. • Construction activities could impact some recreation users through temporary increases to traffic, and from construction-related dust and noise, such as users of the Underwood Park and Community Center located along Cook-Underwood Road. These impacts would be temporary and are expected to be minor. Operation • Operation of the Project would not cause changes to existing land uses or land use activities or development patterns. • Operation of the facility would not result in a sufficient increase in population or traffic to impact local recreational facilities. • The only potential impact of the Project to recreation resources, including users of the Columbia River Gorge National Scenic Area (CRGNSA), would be the minor to moderate impacts to the visual experience of visitors in some locations discussed in Section 3.9 Visual Resources. • The Project would not impact any Wild and Scenic Rivers.	For the Operations and Maintenance facility located at the West Pit site, earth movement and construction-related traffic would generate slightly more noise and dust along West Pit Road over anticipated levels for roadway construction without the facility. The additional noise and dust could temporarily affect nearby homes along Willard Road. Other impacts are anticipated to be similar for both alternative locations.	The existing pattern of land use would continue, including the use of the Project Area for commercial forestry and the surrounding area for commercial forestry, agriculture and rural residences	No substantial impacts to land use are anticipated, and no mitigation measures are required. The only potential impact to recreation users from operation would be the minor to moderate impact to visual resources from some viewpoints. As discussed in Section 3.9 Visual Resources, the primary mitigation measure proposed is to paint the turbines and blades a flat grey color to decrease visibility.
Visual Resources	Construction • Large earth-moving equipment, trucks, cranes, and other heavy equipment would be visible from some nearby areas. • At times, small, localized clouds of dust created by road building and other grading activities may be visible at the site. • In close-up views, the construction activities would be highly visible and would have a moderate to high visual impact. From more distant locations, the visual effects of construction would be relatively minor and would have little or no impact on the quality of views. • Construction impacts would be short-term, lasting no more than the one-year construction period. Operation • The turbines would be visible from some viewpoints, including some within the CRGNSA. The Project has the potential to create low to moderate levels of visual impact at key viewpoints. • The Project would be required to comply with Federal Aviation Administration's (FAA) aircraft safety lighting requirements for structures greater than 200 feet tall, which includes turbines and meteorological towers. The exact number of turbines that would require lighting would be specified by the FAA after it has reviewed final Project plans. These lights would be visible as	The alternative site at West Pit Road would be more visible to local traffic but would not cause a substantial visual impact.	The existing visual landscape would continue, including openings in tree cover from clear cutting and agricultural operations	Construction • No mitigation measures are proposed during construction. Operation • The turbines would be painted a non-reflective flat neutral grey or light color to minimize visual impacts. • Lights typically used to meet Federal Aviation Administration requirements would to some extent be shielded from ground level view due to a constrained (3–5 degree) vertical beam. The Federal Aviation Administration would independently review the lighting of individual turbines during the micrositing process and consult on mitigation. However, the Project must comply with the safety lighting requirement.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	small blinking points of red light; they would not light up the sky or the surrounding landscape.			
Historic and Cultural Resources	Construction • Potential impact to the remnants of the Haran Farmstead through ground disturbance during construction of the new Project road and turbine and transformer pads along Turbine String D. The degree of impact would depend on the final location of the road and turbines. This site has been recommended as ineligible for nomination to the National Register of Historic Places (NRHP). • Potential impacts to other, currently undiscovered cultural or historic resources. Based on the extensive inventories conducted, the likelihood of encountering additional sites is low. • Potential impact to Yakama Indian Nation Traditional Cultural Property (TCP) within the Applicant's Area of Proposed Effect (APE) from the proposed Project. Operation • Ongoing maintenance of the road along Turbine String D has the potential to cause additional impact to the Haran Farmstead site or other, currently undiscovered resources.	No historic or cultural resources are anticipated at the alternative site at West Pit Road.	The current potential for disturbance to undiscovered cultural resources from logging operations would continue.	Construction • ~~The primary mitigation method for construction impacts to the Haran Farmstead site would be to locate the new road for Turbine String D and the turbine and transformer pads a sufficient distance from the Haran Farmstead site so that impacts would not occur. However, if the Haran Farmstead is confirmed as ineligible for nomination to the NRHP, no mitigation would be required.~~ • Appropriate BMPs would be used to minimize impacts. These BMPs include preparation and use of an Inadvertent Discovery Plan, which would establish procedures to deal with unanticipated discovery of cultural resources before and during construction. The plan, among other provisions, would require immediate work stoppage and appropriate notification in the event of discovery of previously unknown cultural or historic materials. • The Yakama Indian Nation has requested the Applicant avoid placing turbines on TCP, or create buffered zones to protect relevant features. Operation • Design and location of the road, turbine and transformer locations to avoid and minimize impacts during construction would also avoid and minimize impacts resulting from regular maintenance operations. No additional mitigation would be required.
Transportation	Construction • Improvements to County and private roads between SR 14 and the Project Area would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components. The specific improvements required would depend primarily upon truck size, load size, and axle loading. • New roadway construction would be required for access to all proposed wind tower locations. In addition to approximately 7.9 miles of existing private logging roads that would require improvement, approximately 2.4 miles of new private gravel access roads would need to be built. • Temporary construction equipment such as cranes and derricks that would be used for the construction of the proposed towers could pose a hazard to aviation safety during the construction period. A "Determination of No Hazard to Air Navigation" would need to be obtained for the proposed Project Area. • Project construction would last approximately one year. During that time, there would be an increase in traffic activity in and around the Project Area due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14.	Construction impacts would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area. During operation, the alternative site at West Pit Road would have shorter travel times for Project staff.	Current transportation patterns would continue, including the current levels of service and the use of the Project Area roads for commercial timber harvest.	Construction • A TMP that would direct and obligate the contractor to implement procedures to minimize traffic impacts would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval. The TMP would include requirements for coordination of Project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of Project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic. • The Applicant and its contractors would be required to comply with State and County permitting requirements for over-size and over-weight vehicles. • The Applicant would be required to notify land owners in the Project vicinity prior to construction of transportation routes that would be used for construction equipment and labor. • Approved State and/or County advanced warning construction signs would be placed prior to and during construction. • Certified flaggers would be used when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	Traffic delays could occur on Project Area roads due to the maneuvering of large vehicles carrying heavy and/or long loads. • It is expected though that at the peak of construction (a period of three to five months) during the AM peak hour, approximately 210 construction vehicles would travel through either junction of SR 14 and Cook-Underwood Road. During the PM peak hour, as many as 10 construction vehicles could travel through this junction. • During the same construction peak, an increase of as many of 275 vehicles total would be southbound on Cook-Underwood Road from the Project Area during the PM peak hour. The actual proportion of vehicles using each of these junctions is not known at this time, consequently the estimated traffic volumes are based on a worst case scenario, where all construction vehicles related to Project construction would travel through either the east or the west junction Cook-Underwood Road with SR 14. • Estimated 2011 traffic volumes, including construction vehicles, would have minimal impact on the Level of Service (LOS) at either junction of SR 14, which would maintain LOS A. For vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14, delays would increase up to approximately six seconds per vehicle over estimated 2011 conditions. • The southbound approaches on Cook-Underwood Road at both the west and east junctions with SR 14 would experience degradation in LOS from A to B during the AM peak hour over estimated 2011 operations. • LOS B operations would be maintained at both the west and east junctions of Cook-Underwood Road with SR 14 during the PM peak hour with no change in LOS over year 2011. • Potential moderate impacts to travel safety could occur due to the turning movements of over-size and over-weight trucks onto and off of Cook-Underwood Road during the peak construction period of approximately three to five months. • Construction impacts to river transportation would be minimal to low. Operation • Operation of the Project would produce minimal impacts to transportation.			• Pilot cars would be used both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways. • Traffic flow would not be restricted for more than 20 minutes during the construction phase. • All loads over 10 feet wide traveling on SR 14 from east of the proposed Project Area between MP 76.77 and 76.91 would require three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500-foot separation. The lead pilot car in front of the load would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible for stopping all oncoming traffic. Construction of Access Roads • All sections of the access roadway system that would require improvements or new construction would be designed and built according to WSDOT and Washington State access management standards. Hazardous Materials Transport • Transport of hazardous materials would be conducted in a manner that would protect both human health and the environment and would be in accordance with applicable State, Federal and WSDOT requirements. Roadway Maintenance [During Construction] • Pre- and post-haul construction visual assessments of roadway surface conditions would be conducted identifying weak or deteriorated areas along the haul route that may require mitigation. • Following the end of construction, a mitigation design program would be developed as needed to repair all pavement sections to pre-construction conditions or better. • The Applicant would be responsible for maintaining turbine string access roads, access ways, and other roads built on site to construct and operate the proposed Project. Operation • All snow removal would be performed in a safe manner that would not degrade roadway conditions.
Public Services and Utilities	Construction • The use of construction workers from outside the immediate area could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments.	The West Pit Road site would have a shorter response times for emergency services since the facility would be along a county road.	The current pattern of use of public services and utilities would continue.	Construction • The Applicant would provide applicable emergency response information to local agencies prior to Project construction and would review and update employee contact information annually and provide any changes to the appropriate agencies. • A full time security plan would be implemented during Project

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
	• The impact of Project construction on local schools would be at most minor and temporary, as few out-of-area construction workers are likely to be accompanied by families for this temporary construction project. • Construction-related impacts to local utilities providing telephone, electric or solid waste pickup are also expected to be minor and temporary. Most workers would not be in the area for long enough to obtain these services; those who stayed in temporary housing in the area would not remain for more than a few months. • The presence of construction vehicles on area roads would not impact the response times for emergency providers. Construction trucks would represent additional volume on area roads, but transportation LOS would remain at LOS A or B (delays of less than 15 seconds), and thus would not cause substantial delays to emergency response vehicles. Operation • Operation of the Project would create a potential positive impact to public services and utilities. The Project's assessed value could be as much as $87.5 million, and this would generate approximately $800,000 per year in tax distributions to municipal, county and other local jurisdictions. Although impacts are expected to be minimal, a portion of these funds could nevertheless be used to upgrade existing public services and utilities in Klickitat County. • The Project would have eight to nine on-site employees during operation. Given this small number, and considering the use of on-site services and emergency response plans, the Project is expected to have minimal adverse impact on local public services and utilities.			construction to reduce the potential need for increased police services to the Project Area. Provisions could include temporary fencing with a locked gate around the construction site; the use of site trailers for the temporary storage of special equipment or materials; and the use of outdoor lighting and motion-sensor lighting. • Emergency plans would be prepared to protect the public health, safety, and environment on and off the Project Area in the case of a major natural disaster or industrial accident relating to or affecting the Project. • The construction specifications would require that the contractors prepare and implement a Construction Health and Safety Program that included an emergency plan. The Construction Health and Safety Program would include the following provisions: - Construction Injury and Illness Prevention Plan, - Construction Written Safety Program, - Construction Personnel Protective Devices, - Construction Onsite Fire Suppression Prevention, - Construction Offsite Fire Suppression Support. • In the event that operations personnel were to be seriously injured and require evacuation from the Project Area, the Applicant would make arrangements with Skamania County Emergency Medical Service or Skyline Ambulance for transport. Operation • Tax revenues generated by the Project would mitigate potential impacts to public services and utilities. • The Applicant would provide all local police, fire, and emergency medical agencies with emergency response information for the Project including employee contact information, procedures for rescue operations to the nacelles, and location of rescue basket. Fire protection • The construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting DNR and implementing any necessary fire precautions. • A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. • Both the wind turbine generators and the substation would be equipped with lightning protection systems. • All onsite operations employees would be responsible for contributing to ongoing fire prevention in the Project Area through the following programs: - Operational Safety Program, - Operations Written Safety Program, - Emergency Action Plan,

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				- Fire Prevention Plan. In addition, the Applicant would: • Provide detailed maps that show all access roads to the Project. • Provide keys to a master lock system that would enable emergency personnel to unlock gates that would otherwise limit access to the Project. • Use spark arresters on all power equipment, e.g., cutting torches and cutting tools • Inform workers in the Project Area of emergency contact phone numbers and train them in emergency response procedures • Carry fire extinguishers in all maintenance vehicles • Coordinate with DNR when the fire danger is high • Comply with equipment rules and regulations required by DNR for work conducted in wildland/forested lands Construction and Operation During both construction and operation, fire risk would be mitigated through BMPs including: • All on-site service vehicles fitted with fire extinguishers. • Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on site along roadways during summer fire season. • Minimum of one water truck with sprayers must be present on each turbine string road with construction activities during fire season. • No gas powered vehicles allowed outside of graveled areas. • Use of high clearance vehicles on site if used off-road. • Smoking restricted to designated areas (outdoor gravel covered areas). • ~~Only~~ Blasting would be conducted by state licensed explosive specialist contractors ~~are allowed to perform this work~~ – explosives require special detonation equipment with safety lockouts. • Clear vegetation from the general footprint area surrounding the excavation zone to be blasted. • Standby water spray trucks and fire suppression equipment to be present during blasting activities. • All major construction equipment used is to be diesel powered (i.e. w/o catalytic converters). • Specially engineered lightning protection and grounding systems used at wind turbines and at substation. • Footprint areas around turbines and substation would be graveled with no vegetation. • Generators not allowed to operate on open grass areas. • All portable generators to be fitted with spark arrestors on exhaust system. • Immediate surrounding area would be wetted with water sprayer. • Fire suppression equipment to be present at location of welder/torch

Table 1-1 (Continued)
Summary of Environmental Consequences and Design and Mitigation Measures

Element of the Environment	Impact of Proposed Project: Construction and Operation of Facility, Transmission Interconnection, and Access Road	Impact of Alternate Operations and Maintenance Facility on West Pit Road	Impact of No Action Alternative	Design and Mitigation Measures
				activity. • Electrical designs and construction specifications meet or exceed requirements of the National Electric Code and National Fire Protection Agency.
Socioeconomics	Construction • During the one-year construction period approximately 330 full-time and part-time workers would be employed at some point during construction. Some of these jobs would not last the entire construction period. The on-site construction work force would peak at approximately 265 workers over the construction period and average 143 workers over the 12 months. An estimated 65 to 75 percent of the construction labor force would likely be hired from outside the three-county area, and 25 to 35 percent would be residents of the area. • Indirect and induced value added from construction is estimated to be approximately $3.9 million. Also, Project construction would result in 71 indirect and induced jobs. • The local area contains sufficient temporary housing for out-of-area construction labor, and the Project is not expected to impact housing values, rents or new home starts. • Fiscal impacts are expected to be positive, with a total $150 M in construction expenditures, of which approximately $13.2 M would be spent in the local area. Most sales tax revenue would go to Skamania County. • Construction is not expected to impact property values or property tax revenues. Operation • Economic impacts would be positive due to increased tax revenues, employment and local expenditures. • Sales, use and other indirect business taxes to state and local governments attributable to Project operation are estimated at approximately $50,000 per year. • The proposed Project would have an estimated value of $87.5 million, which would represent an increase of 6.5 percent in assessed value in the County. At current tax rates, the increase in property tax revenue to the County would be $731,500 annually. • The Project would employ eight to nine employees; most would be hired from the local area. This work force would not impact local housing supply or prices. • Based on a review of available studies, operation of the Project is not expected to create adverse impact to property values.	Impact would be the same as for the construction and operation of the Operations and Maintenance facility located within the Project Area.	Current patterns of employment and housing would continue, including the reliance on the agricultural and timber economy for employment	Construction ~~• Socioeconomic impacts are expected to be beneficial, in the form of additional jobs, increased sales, and increased tax revenues.~~ • Construction contractors would be required to advertise positions locally and to employ local workers to the greatest extent possible. Operation • No mitigation measures would be required.

1.7 SUMMARY OF UNAVOIDABLE ADVERSE IMPACTS

Table 1-3 summarizes the potential unavoidable adverse impacts remaining after application of mitigation measures.

Table 1-2
Summary of Unavoidable Adverse Impacts

Element of the Environment	Unavoidable Adverse Impacts
Earth	The primary unavoidable impacts are the potential for landslide and erosion. Both can be mitigated through appropriate design and the application of mitigation measures.
Air Quality	The proposed Project would produce minor impacts to air quality, similar to existing logging operations. By producing electricity without generating air emissions, the Project would contribute to a beneficial impact on overall air quality.
Water	Construction and operation of the Project would only result in negligible to minor impacts to water resources because the impacts are localized and the disturbance is short-term.
Biological Resources	The Project would result in the permanent loss of approximately 60.7 ~~56~~ acres of habitat which would be converted to new Project roads, turbines and pads, substation and Operations and Maintenance facility. These impacts, while unavoidable, would take place in a landscape of managed timber lands which has for many years and will continue to be a fragmented environment with ongoing disturbance. During construction, direct mortality to birds could occur through nest disturbance. The Project would result in some ongoing mortality to birds and bats through turbine collisions. This level is not expected to be high enough to impact species viability. The Project is unlikely to cause mortality to any threatened or endangered species.
Energy and Natural Resources	The Project would have minor unavoidable adverse impacts to energy or natural resources. The overall impact of the Project to energy and natural resources would likely be positive, since it would provide the region with low-cost, clean, renewable energy, in accordance with state and national policies and priorities.
Public Health and Safety	Unavoidable adverse impacts to ~~environmental~~ public health and safety are anticipated to be minimal. Unlike thermal power plants, wind power projects pose a much smaller risk of explosion or fire potential, as there is no need to transport, store, or combust fuel to generate power. The risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations would be minimal. The risk of accidents during construction would be no higher than for any large construction project and would be minimized through standard construction safety requirements and procedures. The risk of accidents during operation would be minimal.

Element of the Environment	Unavoidable Adverse Impacts
Noise	Construction noise is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA L_{eq} per Washington State and Skamania County regulations. The analysis of noise impacts was based on specific design features of the proposed Project that were current as of the date of this EIS. These features, such as the turbine manufacturer and model selection, the layout of the turbines in the Project Area and their corresponding distances to identified closest noise-sensitive receivers, can greatly influence the analysis results. However, assuming that final turbine selections and siting locations are comparable to those features used in this analysis, no substantial adverse construction or operation noise impacts are anticipated for the Project.
Land Use	The proposed Project would not produce substantial impacts on land use or recreation. The 1,152-acre Project Area would continue to be predominantly used for commercial forestry operations. A maximum of approximately 56 acres of forestry land (under 5 percent of the Project Area) would be converted to energy facility use for the life of the Project. This conversion would not constitute a substantial change to area land use patterns given the area of the Project retained for active forestry operations, and given the acreage surrounding the Project in both private and state ownership that would be maintained in commercial forestry operations.
Visual Resources	The Project would cause some visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area. The visual impact analysis showed that the anticipated level of visual impact would not be higher than low to moderate at any of the viewpoints examined.
Historic and Cultural Resources	With the use of appropriate mitigation measures, the proposed Project is not expected to produce any unavoidable impacts to historic or cultural resources.
Transportation	During construction there would be an increase in traffic in and around the Project Area due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14. Traffic delays could occur on Project Area roads due to the maneuvering of large vehicles carrying heavy and/or long loads. ~~No major unavoidable adverse impacts to traffic and transportation have been identified. Construction of the Project is anticipated to have very minor impacts to LOS standards, and to have a potential very minor impact on traffic safety.~~ Operation of the Project is anticipated to have little to no impact to transportation.
Public Services and Utilities	The Project would have no unavoidable adverse impacts to public services and utilities. The small amount of additional services and utilities that would be needed would be offset by the increased tax revenue.
Socioeconomics	The proposed Project would result in beneficial impacts, primarily from employment during construction and operation. Minimal adverse impacts are expected.

1.8 CUMULATIVE IMPACTS

Cumulative impacts are the incremental impacts of a proposal when considered in the context of other past, present and reasonably foreseeable future actions. Cumulative impacts can result

from individually minor but collectively significant actions taking place over time. This section summarizes the information contained in Section 3.14.

1.8.1 PROJECTS CONSIDERED

1.8.1.1 Existing Development

The general Project vicinity is characterized by agriculture, commercial forestry, rural residential development, and a small number of commercial enterprises. The proposed Project Area is located in the state of Washington approximately two miles north of the Columbia River and directly north of the Columbia River Gorge National Scenic Area. The National Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. Although both the Project Area and the proposed access road are located completely outside the National Scenic Area, the proposed Project Area does extend south to its northern boundary. The Gifford Pinchot National Forest is located north of the Project Area.

On both the Washington and Oregon sides of the Columbia River, land use is predominantly commercial forestry and residential in numerous small, unincorporated communities. There is some limited agriculture located within the National Scenic Area. South of the Scenic Area, on the Oregon side, land uses include commercial forestry, agriculture, and some residential.

Portions of the Whistling Ridge Energy Project would be visible to drivers along I-84, located on the Oregon side of the Columbia River. For the purpose of assessing cumulative impacts to visual resources, views of other wind projects from I-84 were considered. From Cascade Locks, Oregon (located southwest of the Project Area on the Oregon side of the Columbia River) to the intersection with I-82 which leads north to the Tri-Cities, I-84 extends for a distance of approximately ~~127~~ 130 miles. Along this segment, there are 18 existing wind power generation projects, all located within a distance of approximately 70 miles east of the Whistling Ridge Energy Project site (to approximately Arlington, Oregon).[1] Eighteen projects could potentially be viewed by drivers travelling along I-84 within a driving time of approximately one to one-and one-half hours and were included in the analysis of cumulative impacts to visual resources described in Section 3.14.

1.8.1.2 Reasonably Foreseeable Future Development

Reasonably foreseeable future development generally includes those actions currently underway, formally proposed or planned, or highly likely to occur based on available information. Reasonably foreseeable future development projects located within approximately 20 miles of the Project Area were identified to determine if they could potentially have cumulative impacts on the environment, including water quality, soil erosion, vegetation, terrestrial wildlife species, and bird and bat species. Projects were identified through searches of the web sites of Skamania, Klickitat and Hood River Counties, Columbia River Gorge Commission, Washington State

421-37

[1] See map at http://www.nwcouncil.org/maps/power/Default.asp.

Department of Transportation (WSDOT), Oregon Department of Transportation, EFSEC, the Oregon Department of Energy, and the Ports of Skamania County, Klickitat County, The Dalles, and Cascade Locks.

Both non-wind and wind reasonably foreseeable future projects were initially considered for inclusion in the cumulative impact analysis. Non-wind projects involved transportation improvements, communications facilities, and power line improvements. Of these projects, only the Oregon Department of Transportation bridge replacement projects, now in progress along I-84, were considered close enough to the Project Area to be included in the cumulative impact analysis. The other transportation, communication, and power line improvement projects were considered to be too far from the Whistling Ridge Project Area to result in cumulative impacts and were therefore eliminated from further analysis. Reasonably foreseeable wind projects are shown in Figure 3.14-1. Of these projects all except the Middle Mountain Project were judged to be too far away (generally more than 20 miles) from the Whistling Ridge Energy Project site to result in cumulative impacts. Nonetheless, the cumulative visual resource impact analysis does consider reasonably foreseeable wind projects within approximately the same geographic area as existing wind projects considered in that analysis. In addition, the cumulative impact analysis has been updated to reflect the discontinuation of the Middle Mountain Project. The Middle Mountain Project, originally proposed by Hood River County as a small community scale wind project of around 10 MW, would have been located on the south side of the Columbia River, approximately 17 miles south of the Whistling Ridge Energy Project. However, on May 17, 2010, the Hood River County Commission decided to discontinue efforts to develop the Middle Mountain wind project and this project therefore has been removed from the cumulative impact analysis. Therefore, the only reasonably foreseeable development projects included in the cumulative impact analysis are the Oregon Department of Transportation bridge replacement projects along I-84.

~~The remaining six projects included transportation improvements, communications facilities, and power line improvements. Of these, only the Oregon Department of Transportation bridge replacements now in progress along I-84 were considered close enough to the project area to be included in the cumulative impact analysis. The other five transportation, communication, and power line improvement projects were considered to be too far from the Whistling Ridge project site to result in cumulative impacts.~~

~~Thus, the Middle Mountain Wind Project and the I-84 Bridge Replacement Project are the only two reasonably foreseeable future projects with a potential for cumulative impacts with the Whistling Ridge Energy Project. These two projects were analyzed in addition to the visual impacts of the ten existing wind projects.~~

1.8.2 RESULTS OF CUMULATIVE IMPACTS ANALYSIS

The cumulative effects of the Proposed Action, in combination with other the past, present, and reasonably foreseeable future actions (identified above) ~~would have on the various environmental resources~~ are discussed in Section 3.14 of this EIS. Cumulative impacts from the combination of these actions could occur for each of the environmental resources. However, the contribution of the Proposed Action to these cumulative impacts would vary, with the greatest contribution occurring in cumulative impacts on visual resources as constructing and operating the Whistling Ridge Energy Project would add a view of an additional wind power project to travelers in the Gorge. In addition to the existing and reasonably foreseeable future projects east of the Project Area, long-distance travelers in either direction along I-84 could see some elements of the Whistling Ridge Project, for approximately 12.5 miles traveling west and 6.5 miles traveling east. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road. As discussed in more depth below in Section 3.14.3.10, the visual impact of the Whistling Ridge Project along I-84 would be variable, with the number of turbine strings visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the Project Area (See Figure 3.9-1). This would constitute a small cumulative impact when considered in combination with views of other wind projects located from 35 to 70 miles to the east.

The proposed action would contribute incrementally, though in a minor way, on cumulative impacts to soil erosion and water quality in the Project Area, as well as to vegetation, terrestrial wildlife species, and bird and bat species in the region. Low levels of adverse cumulative impacts have also been identified for energy and natural resources from the use of steel, concrete and vehicle fuel for construction, and for transportation (traffic safety and increased risk of accidents during construction periods of the Whistling Ridge Energy Project and the I-84 bridge replacement projects, if they should overlap). Simultaneous construction projects may create a beneficial cumulative socioeconomic impact to local communities. Finally, by introducing up to 75 MW of clean renewable energy into the regional electrical grid, the Project would positively contribute to efforts to combat the cumulative impacts of climate change, and also contribute to efforts to improve air quality in the Columbia River Gorge vicinity.

1.9 ORGANIZATION OF THIS EIS

Much of the organization of this document is based on the SEPA EIS format and content specified in WAC 197-11-430 and 197-11-440, with adjustments made to ensure NEPA compliance as well. The remainder of this EIS is organized as follows:

- **Chapter 2, Proposed Action and Alternatives.** Chapter 2 describes the Proposed Action and alternatives, including the No Action Alternative and alternatives to elements of the proposed Project t evaluated in the EIS.

- **Chapter 3, Affected Environment, Impacts, and Mitigation.** Chapter 3 describes the existing environment without construction and operation of the Whistling Ridge Energy Project for each environmental resource. The chapter also includes analyses of the

environmental effects of constructing and operating the Whistling Ridge Energy Project and determines whether there is the potential for environmental impacts to occur for each environmental resource. If impacts could occur, they are evaluated to determine if they could be avoided. Mitigation measures to lessen or eliminate impacts also are listed as well as a section describing cumulative impacts for each environmental resource.

- **Chapter 4, Environmental Consultation, Review and Permitting Requirements.** This chapter describes the permits and approvals that must be obtained for the construction and operation of the Whistling Ridge Energy Project.

- **Chapter 5, Distribution List.** This chapter lists individuals and organizations that have received a copy of the Draft EIS.

- **Chapter 6, List of Preparers.** This chapter lists the individuals who contributed to the preparation of this EIS. It also includes their organization affiliation and a brief description of their professional backgrounds.

- **Chapter 7, Index.** This chapter contains an index for the EIS

- **Appendices.** The appendices provide supporting technical information to the EIS.

  - Appendix A: Application for Site Certification, as amended October 12, 2009;
  - Appendix B: Geotechnical Report;
  - Appendix C: Wildlife Reports;
  - Appendix D: Land Use Consistency Determination;
  - Appendix E: Agency Consultations
  - Appendix F: Consultant Disclosure Statements
  - Appendix G: Response to Comments
  - Appendix H: Comment Letters

1.10 REFERENCES

National Research Council (NRC). 2007. *Environmental Impacts of Wind-Energy Projects.* National Academies Press.

Northwest Power and Conservation Council (NPCC). 2009. Draft Sixth Northwest Power Plan. September. Accessed at: http://www.nwcouncil.org/energy/powerplan/6/default.htm.

Washington Utilities and Trade Commission and Department of Community, Trade and Economic Development WUTC and CTED). 2008. Green Power Programs in Washington: 2008 Report to the Legislature. December. Accessed at:

http://www.wutc.wa.gov/webdocs.nsf/0/547510a1319daa74882575d80057a2bf/$FILE/Green%20Power%20Report.pdf.

Washington Department of Community, Trade and Economic Development (Washington CTED). 2005. 2005 Biennial Energy Report - Issues and Analysis for the Washington State Legislature and Governor. January.

Washington State Department of Ecology (Ecology). 1998. State Environmental Policy Act Handbook. Publication # 98-114. September. Updated 2003.

West, Inc. 2008. Final Report, Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Prepared for Klickitat County Planning Department. October 30.

This page intentionally left blank.

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action, the No Action Alternative, and alternatives that were considered but eliminated from detailed study. This chapter also discusses the benefits or disadvantages of reserving Project approval for a later date, and provides a summary comparison of the alternatives.

The Proposed Action involves responding to requests from the Applicant for approvals of the Whistling Ridge Energy Project. Whistling Ridge Energy LLC is a limited liability corporation operating in the State of Washington that has been formed by S.D.S. Co., LLC, which is an affiliated entity of SDS. Under the Proposed Action, the state of Washington would approve the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and BPA would grant interconnection of the proposed Project to the Federal Columbia River Transmission System (FCRTS). Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Project, and/or BPA would not grant interconnection of the Whistling Ridge Energy Project to the FCRTS.

2.1 PROPOSED ACTION

This section describes the wind Project that has been proposed by the Applicant. The information presented in this section is primarily based on information provided by the Applicant in the Application for Site Certification Agreement (Application 2009-01) submitted to EFSEC on March 10, 2009, and amended on October 12, 2009 (Appendix A).

2.1.1 WIND POWER IN GENERAL

Wind power is a form of renewable energy - energy that is replenished daily by the sun. As the earth is heated by the sun, air rushes to fill the low pressure areas, creating wind power. The wind is slowed dramatically by friction as it brushes the ground and vegetation, so it may not feel very windy at ground level. The kinetic power in the wind, the energy of moving air molecules, may be five times greater at the height of a 40-story building (the height of the blade tip on a utility-scale wind turbine) than the breeze on your face. Meanwhile, the wind may be accelerated by certain types of land forms, so that certain areas of the country may be very windy while other areas are relatively calm.

Wind power is converted to electricity by a wind turbine. In a typical, utility-scale wind turbine, the kinetic energy in the wind is converted to rotational motion by the rotor—typically a three-bladed assembly at the front of the wind turbine. The rotor turns a shaft that transfers the motion into the nacelle (the large housing at the top of a wind turbine tower). Inside the nacelle, the slowly rotating shaft enters a gearbox that greatly increases the rotational shaft speed. The output (high-speed) shaft is connected to a generator that converts the rotational movement into electricity at medium voltage (a few hundred volts). The electricity flows down heavy electric cables inside the tower to a transformer, which increases the voltage of the electric power to distribution-level voltage (a few thousand volts). This distribution-level voltage power flows through underground lines to a collection point where the power may be combined with other wind turbines.

In some cases, the electricity generated by these wind turbines is sent directly to nearby farms, residences and towns where it is used. In most cases, however, the distribution-level voltage power is sent to a substation where the voltage is increased to transmission-level voltage power (a few hundred thousand volts) and sent through transmission lines many miles to distant cities and factories (AWEA 2007).

2.1.2 PROJECT OVERVIEW

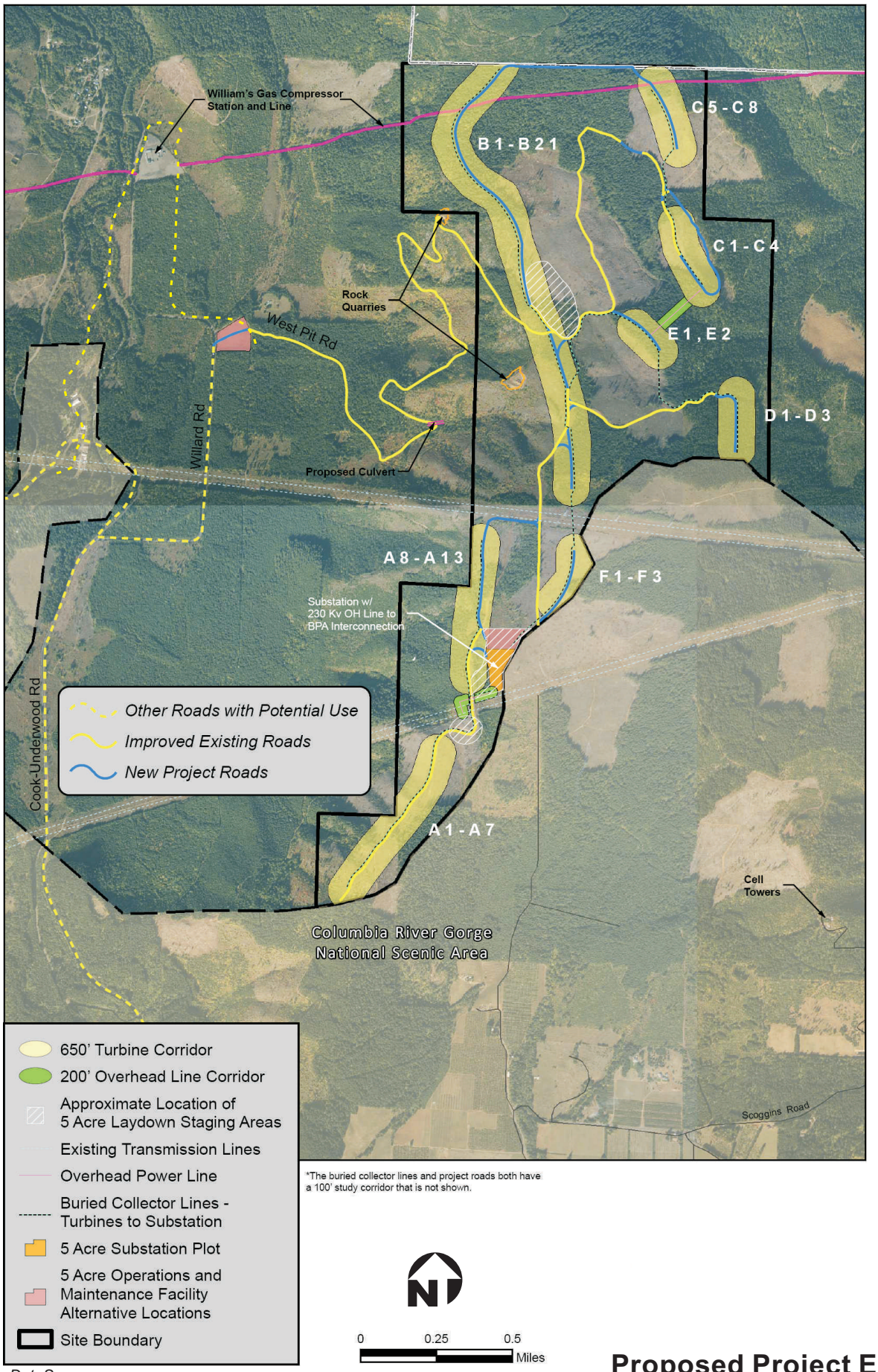
The proposed Whistling Ridge Energy Project would be located in south-central Washington on an approximately 1,152-acre site approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington (Figure 1-1). The Project would be located on commercial forestland owned by the Applicant in an unincorporated area of Skamania County, outside of the Columbia River Gorge National Scenic Area.

The proposed Project would generate up to 75 MW of electricity. The proposed Project layout is shown in Figure 2-1. As shown in this figure, Project components would include:

- Up to 50 wind turbines ranging from 1.2 to 2.5 MW in generating capacity;
- Electrical transformers;
- 34.5-kV collector lines and systems (primarily underground);
- A Project collector substation located adjacent to BPA's proposed substation and ~~to BPA's~~ existing North Bonneville-Midway 230-kV transmission line;
- An interconnection with BPA's existing North Bonneville-Midway 230-kV transmission line;
- One Operations and Maintenance facility (to be located at one of two locations, either adjacent to the substation within the Project boundary, or along West Pit Road);
- One permanent meteorological tower; and
- Approximately 2.4 miles of newly-constructed roads and 7.9 miles of improved roads to provide access to the wind turbine locations during construction and for operations and maintenance.

As shown in Figure 2-1, the proposed wind turbines generally would be located on the forested ridges of Saddleback Mountain. The final specific locations of the wind turbines and other related and supporting facilities would be established during the final design process, taking into account micro-siting aspects determined as a result of detailed geotechnical investigations and the EFSEC Site Certification process. As shown in Table 2-1, approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines.

33758687_113.cdr



Source: GeoDataScape.

Figure 2-1

Proposed Project Elements

URS

Whistling Ridge Energy Project
Skamania County, Washington

Table 2-1
Area of Development (acres)

Project Element	Area Proposed for EFSEC Certification and Micrositing	Impacts		
		Permanent	Temporary	Total
Project Area[a]	1,152			
Area to be Developed				
Wind Facility Footprint[b]	384	NA	NA	NA
Turbine String Corridor[c]	318	25.4	36.4	61.8
Roadway Corridor within Project Area[d]	48.4	15.2	13.3	28.5
Overhead Transmission Line Corridor within Project Area[e]	6.9	3.45	0	3.45
Underground Transmission Line Corridor within Project Area[e]	8.9	0.0	2.4	2.4
Operation and Maintenance Yard & Storage Area[f]	5.0	5.0	0.0	5.0
Substation Plot & Study Area[g]	7.1	7.1	0.0	7.1
Total Area to be Developed Within Project Area	NA	56.15	52.1	108.25
Impact Area Outside of Project Area				
Roadway Corridor Outside Project Area[h] (based on 2.5 miles of improved road)	0	5.22	1.74	6.96

[a] Project Area is the area shown on Figure 2-1 bordered in black, encompassing approximately 1,152 acres in Sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in Section 13 of Township 3 North, Range 9 East.
[b] Wind Facility footprint is the total area of all corridors and development study areas in the Project boundary with overlapping areas removed, in which development potentially could take place.
[c] Total area of 650-foot corridor measured on either side of an imaginary line connecting each turbine in a string. Permanent impacts based on turbine clearance zone and permanent infrastructure in corridor but outside of clearance zone. Temporary impacts based on infrastructure in corridor but outside clearance zone.
[d] Area encompassed by a 100-foot corridor along all roads within the Project Area minus any area that overlaps with 650-foot-wide turbine corridor, based on a roadway length of 7.8 miles.
[e] Total area encompassed by a 100-foot corridor on the overhead or underground transmission lines minus any area that overlaps with roadway, overhead or turbine string corridors.
[f] Area includes the 2-acre Operations and Maintenance site plus a 50-foot area around the perimeter.
[g] Area includes the 5-acre substation site plus a 50-foot area around the perimeter.
[h] Area based on 40-foot corridor (20-foot roadway: 12-foot existing, widened to 20 feet with 10 feet on either side) from Project Area boundary to an intersect point with Willard Road, based on a length of 2.5 miles.

County and private logging roads that extend north from SR 14 provide vehicle access to the Project Area. From SR 14, access would be provided via County roads (Cook-Underwood Road to Willard Road) and then via a new connection to West Pit Road, an existing private logging road. West Pit Road connects to a network of existing private logging roads (Figure 2-1). The private logging roads are on S.D.S. Co., LLC and Broughton Lumber Company property, and provide access to most areas where Project facilities would be located.

The construction phase is anticipated to last approximately one year, during which a total of approximately 330 workers would be employed. Eight to nine permanent full- or part-time Operations and Maintenance staff would be required should the Project become operational. The Whistling Ridge Energy Project is expected to function for at least 30 years.

2.1.3 PROJECT COMPONENTS

2.1.3.1 Wind Turbines

The Project would consist of up to 50 wind turbines generators that likely would range in size from 1.2- to 2.5-MW each. Each wind turbine would consist of four main aboveground components: the turbine tower, the nacelle, the rotor hub, and the blades. Depending on which manufacturer is selected, each turbine would be approximately 221 to 262 feet tall at the turbine hub, and with the nacelle and blades mounted, the total height of each wind turbine (to the turbine blade tip) would be up to approximately 426 feet. The turbines throughout the Project would all be the same model, although height may vary in response to terrain. The towers would be tapered, hollow tubular structures, approximately 14 feet in diameter at the base and weighing approximately 30 tons each. The towers would likely be painted a flat neutral gray or white color. A controller cabinet would be located at the base inside each tower. Cables and a ladder would ascend to the nacelle to provide access for turbine maintenance. A locked door would provide access to the base of the tower.

Each tower would be mounted on a concrete foundation with a diameter up to approximately 60 feet. Tower foundations would be spread footing or pier-type footings. Some of the towers would be furnished with blinking lights visible to aircraft. The need for turbine lights and the type of lighting would be determined in consultation with the Federal Aviation Administration.

The remaining three turbine components are all mounted at the top of each turbine tower. The nacelle of each wind turbine is encased in fiberglass, and is mounted at the top of the tower to house the gearbox, the generator, and the control system. The rotor hub is attached to the nacelle, and holds the blades in place. Each turbine has three laminated fiberglass blades, each approximately 129 to 164 feet long, depending on which turbine is selected. The diameter of the circle swept by the rotors would be approximately 264 to 320 feet, depending on which turbine is selected. Together, ~~each turbine's~~ the blades, hub, and nacelle of each turbine would weigh between 95 and 150 tons, depending on the turbine size and model selected.

Wind turbines would be grouped in "strings," each spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). The electrical output of each string would be connected to the Project substation by underground 34.5-kV collector cables, and from there would be directly interconnected with the adjacent BPA transmission system. The Project would be monitored and controlled from an Operations and Maintenance building located at one of two alternative sites, either next to the substation or adjacent to West Pit Road.

The wind turbines would operate at wind speeds from 9 to 56 mph, with a rotor speed range of 10 to 20 rpm. The turbines operate on a variable pitch principal in which the rotor blades rotate to keep them at the optimum angle to maximize output for all wind speeds. At speeds exceeding 56 mph, the blades feather on their axis and the rotor stops turning. Each turbine is equipped with a wind vane that signals wind direction changes to the turbine's electronic controller. The electronic controller operates electric motors (the yaw mechanism), which turn the nacelle and rotor so that each turbine faces into the wind.

2.1.3.2 Electrical Collector System

The Project would include an electrical collector system to collect energy generated at approximately 575 V from each wind turbine, transform the voltage of this energy to 34.5-kV using a pad-mounted transformer, and deliver the energy via underground cables to the proposed Project substation (Figure 2-1).

Each turbine's 575 V to 34.5-kV transformer would be located on a transformer pad adjacent to each tower, or enclosed in the nacelle, depending on the turbine model. From there, power would be transmitted via underground 34.5-kV electric cables. These cables would be buried by digging trenches up to 5 feet wide and approximately 3 to 4 feet deep, placing the cables in these trenches, and then filling the trenches back in with the excavated soils. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the proposed substation) multiple sets of cables would be installed within each trench where possible.

There would be approximately 8.5 miles of underground collector cable trenches. In areas where environmental constraints, geologic features, or cultural features necessitate, minor aboveground placement of collector cables may occur.

2.1.3.3 Project Substation and Interconnection

The Project would also include a collector substation to connect the proposed Project to the FCRTS. This substation would further transform the energy delivered by the Project's underground electrical collector system from 34.5-kV to 230-kV so that it would be suitable for delivery to the FCRTS at the proposed BPA substation. The proposed electrical interconnection to the FCRTS would provide the Applicant with access to the wholesale electric market for sales of power from the proposed Project.

The proposed collector substation would occupy a portion of a fenced 5-acre area at the northwest end of the Project Area, immediately adjacent to BPA's North Bonneville-Midway transmission line (Figure 2-1). A 50-foot cleared area would be maintained around the substation. The substation site would be a graveled, fenced area that would include the voltage transformers, switching equipment, and other electrical equipment, as well as an area to park utility vehicles. Transformers at the substation would be non-polychlorinated biphenyl oil-filled types.

The physical interconnection of the proposed Project to the FCRTS would consist of overhead lines located between the Project collector substation and BPA's North Bonneville-Midway 230-kV transmission line. To make this interconnection, a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation would be made. This loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line could cross underneath for this interconnection.

2.1.3.4 Operations and Maintenance Facility

A permanent Operations and Maintenance facility would be constructed on an approximately 5-acre area located at one of the following two locations: (1) adjacent to the proposed substation; or (2) west of the Project Area along West Pit Road (Figure 2-1). The entire 5-acre area would be fenced and have a locked gate.

The Operations and Maintenance facility would have approximately 3,000 square feet of enclosed space, including office and workshop areas, a kitchen, bathroom, shower, and utility sink. This structure would be constructed of sheet metal, and would be approximately 16 feet tall (to the roof peak). Water for the bathroom and kitchen would come from a new on-site well and would drain into an on-site septic system (see Section 2.1.3.6). A graveled parking area for employees, visitors, and equipment would be located adjacent to the building.

2.1.3.5 Meteorological Tower

One permanent meteorological tower would be located within the Project Area. The function of the permanent meteorological tower would be to collect wind speed and direction information at hub height as well as temperature, relative humidity and barometric pressure. These values are used to provide base data to compare the function of the individual turbine wind direction and speed sensing equipment. The data collected by the tower also serves as a historical basis for measuring wind facility actual performance vs. projected performance.

The location for the permanent meteorological tower would be determined during the micro-siting process. The selected site would be based on a meteorologist's recommendations for an on-site location that best represents the Project Area's meteorological conditions.

The basic design for the tower would depend on the style selected. Most towers are un-guyed lattice towers at heights equal to the hub heights of the proposed wind turbines. Depending on the wind turbine selected for the Whistling Ridge Energy Project, the wind turbine would be approximately 221 to 262 feet high at the turbine hub. The meteorological towers are fairly large at the base with either three or four corners and taper in size up to hub height. Monitoring equipment would be located at the top, with the data logger and power conversion equipment located at the base.

2.1.3.6 Water Supply and Wastewater

During construction of the proposed Project, approximately 1.7 million gallons of water would be consumed for road compaction, dust control, wetting concrete and other construction purposes. The construction contractor would supply water used during construction. Water needed for construction would be purchased by the Applicant's construction contractor from an off-site vendor with a valid water right and transported to the site in water-tanker trucks.

The Project would not be connected to a sewer system. Sanitary wastes would be collected in "portable toilets" during construction. Disposal of sanitary wastes would be managed through a contract with a portable toilet vendor. The contractor would incorporate applicable state capacity requirements based on the construction worker population in the Project Area at any given time. Collected wastes would be managed and disposed of by the contracted vendor.

Project operations would not require the use of any water for cooling or any other use aside from the limited needs of the Operations and Maintenance facility. Potable water intake would be in the form of a well accommodating the Operations and Maintenance facility's needs. Anticipated water use at this facility is expected to be less then 5,000 gallons per day for kitchen and bathroom use. The Applicant would seek and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and Ecology.

There would be no industrial wastewater stream from operation of the Project. Wastewater discharge would come from the Operations and Maintenance facility discharging to an on-site septic system. No wastewater would be used, discharged or recycled for wind turbine operations.

2.1.3.7 Access Roads

Access to the Project Area is provided by county and private logging roads that extend north from SR 14. From SR 14, access would be provided via County roads (Cook-Underwood Road to Willard Road) and then via a new connection to West Pit Road, an existing private dirt logging road that is located entirely outside of the National Scenic Area. Approximately 2.5 miles of roadway improvements would occur on West Pit Road, which currently varies in width between 20 and 26 feet. To create a drivable surface of 25 feet with 5 feet of clearing on each side, portions of the roadway and some corners would be widened. In addition, an existing culvert that runs along a portion of this road ~~that was upgraded during the summer of 2009. This culvert~~ may need some additional lengthening if the roadway is widened over the culvert. West Pit Road would continue to be used during the Project's operational phase.

West Pit Road connects to a network of existing private logging roads on S.D.S. Co., LLC and Broughton Lumber Company property, and provides access to most areas where Project facilities would be located (Figure 2-1). Because the Project Area already has an existing network of logging roads, relatively few new roads would need to be constructed. Approximately 7.9 miles of existing private logging roads would be improved. In areas where there are no existing logging roads near proposed wind turbine strings, approximately 2.4 miles of new gravel access roads would be constructed. All new roadway construction would occur on private lands owned by S.D.S. Co., LLC and Broughton Lumber Company.

The existing logging roads to be improved were originally built to allow large trucks and logging equipment to access the Project Area for ongoing commercial logging purposes. These roads are generally 8 to 12 feet wide, although some are currently as wide as 20 feet. Improvements to allow use by Project construction vehicles generally would involve widening and providing a gravel all-weather surface. Most of the roads used to provide access to the site by construction vehicles would be widened to approximately 25 feet (width of finished road), with an additional 5 feet of shoulder on either side.

Once assembled, the construction cranes required to erect turbines and tower sections require a 35-foot-wide road (of which 25 feet needs to be graveled). Therefore, the roads that run adjacent to turbine strings and roads that connect turbine strings to one of the central staging areas would be approximately 35 feet wide (25 feet plus 5 feet of shoulder on either side). Because cranes might be needed to maintain turbines over their operational life, the 35-foot-wide roads would be kept as maintenance access roads for the expected 30-year life of the Project.

All private roadway improvements required prior to hauling, and new private roadway construction in the proposed Project Area, would be designed and constructed under the direction of a licensed engineer, in accordance with the standards for the applicable road classifications as set forth in the Skamania County Private Road Guidelines and Development Assistance Manual (Skamania County 2008), as adopted by the County Resolution in 2008. All existing county roadways requiring improvements prior to hauling would be designed and constructed in accordance with the WSDOT *Design Manual* (WSDOT 2007) and *A Policy on Geometric Design of Highways and Streets* (AASHTO 2004). A detailed geotechnical investigation of the specific locations of all Project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other Project facilities, such as access roads (including improvements to West Pit Road), these facilities would be redesigned or relocated to avoid this risk.

In constructing permanent access roads, a gravel surface would be installed, compacted to meet all equipment load requirements, and maintained to reduce wind erosion and dust. Existing culverts across intermittent streams would be replaced with wider or stronger culverts as necessary, and drainage improvements would be made (pursuant to a Project Erosion Control Plan and National Pollutant Discharge Elimination System [NPDES] permit), as necessary to control runoff.

In addition to the permanent access roads described above, temporary access may be required for constructing some facilities. For example, constructing the underground collector cables would require that heavy equipment be able to access trench locations where they are not directly adjacent to roads. Generally, equipment would be driven across open ground to accomplish this construction; in some locations minor grading may be required to allow safe access to construction locations (construction locations would be determined only after final tower locations have been selected). These temporary access roads would be re-graded and reseeded as necessary to restore vegetation after the construction phase is over.

After the Project is constructed, use of the improved and new access roads on private lands would be limited to the landowner and to Project maintenance staff.

2.1.4 PROJECT CONSTRUCTION

2.1.4.1 Construction Activities

Construction of the proposed Project is expected to take approximately one year, and would likely occur from early spring through late fall. Construction of the Project would involve the following tasks:

- Harvesting trees in areas that are not already cleared;
- Constructing roads and turbine crane pads;
- Constructing foundations for turbine and meteorological towers;
- Trenching for underground utilities;

- Placing underground electrical and communications cables in trenches;
- Constructing the Project substation;
- Constructing the Operations and Maintenance building;
- Transporting tower sections to the site and assembling towers.;
- Transporting nacelle, rotor, and other turbine equipment to the site and installing the equipment on the assembled towers;
- Final testing; and
- Final road grading, final erosion control and site cleanup.

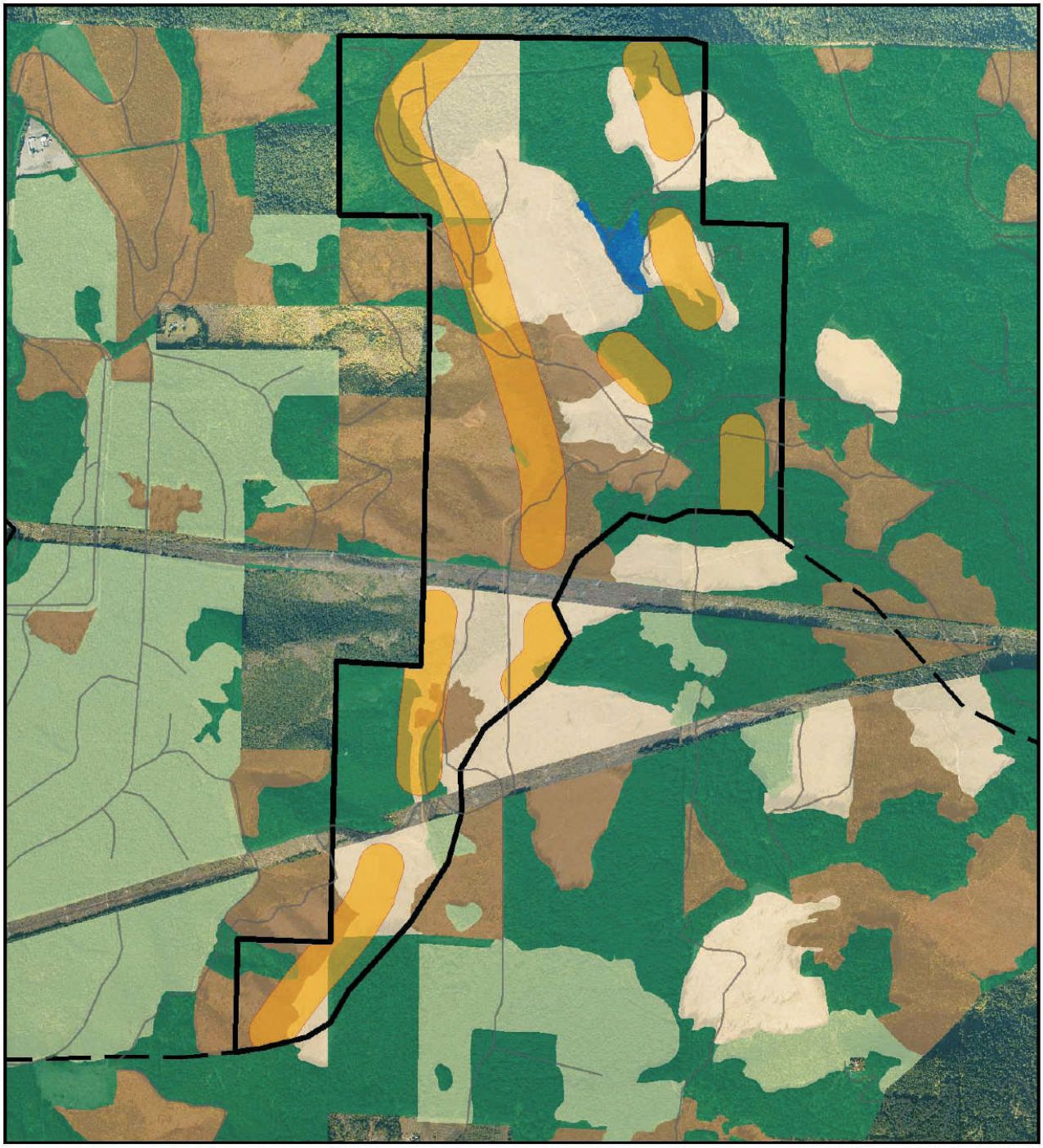
Staging and equipment lay-down areas would be used. These locations would be selected from sites that are accessible from existing roadways and are currently disturbed, or where disturbance could be minimized. Disturbances for staging and lay-down areas would be restored following construction.

In addition, the proposed transmission interconnection would be constructed between the Project substation and BPA's existing North Bonneville-Midway transmission line, which passes through the Project Area. Access for construction of the interconnection would be via existing access roads for the BPA transmission line, which are currently used for periodic inspection and maintenance of that line. The construction sequence for the transmission interconnection would include the following activities:

- **Stringing Conductors/Static Wires.** Conductor stringing involves a sequence of running pilot lines through pre-positioned pulleys located on each tower. A truck-mounted, spooled conductor would then be positioned at the beginning of the segment to be strung. Take-up spools, also truck-mounted, would be located at the end of the segment to be installed. Pilot lines would be pulled through with tension maintained and the conductors would follow and be left in position on the towers. Installation would be completed by connecting the conductors to the individual insulators and adjusting the conductor sag between towers to predetermined dimensions. In some locations, static wires also would be installed for protection of the transmission line. The static wires would be installed in a manner similar to the conductors. The conductor stringing operation would primarily involve the movement of wheeled vehicles along the access road.
- **Site Cleanup.** Following construction of the interconnection, all residual construction debris would be removed and disturbed areas would be restored as required.

After the Project has been constructed, trees on most of the site would be allowed to mature on a normal forest management schedule (according to the Applicant staff, trees in the Project Area grow about 2 feet per year on average). Figure 2-2 shows the current forest types in the Project Area.

33758687_98.cdr



Conifer Forest, Saw Timber 50+ft
Conifer Forest, Pole, 20-50ft
Brush/Sapling/Shrub, 4-20ft
Grass-Forb, 0-4ft.
Riparian
650' Turbine Corridor
Site Boundary
Columbia River Gorge National Scenic Area
Exisiting Roads

Aerial Photo: 2006 USDA NAIP Imagery
Forest Cover Source: SDS Lumber Company

0 0.25 0.5 Miles

Source: GeoDataScape.

Figure 2-2
Current Forest Types

URS

Whistling Ridge Energy Project
Skamania County, Washington

The exception would be in an area immediately surrounding the turbines and the access roads to the turbines. To allow for safe access to each tower for maintenance, to eliminate the potential for trees falling against the towers during storms, and for fire protection, an area extending approximately 150 feet from the center of each tower would be managed to maintain vegetation below approximately 15 feet in height. These dimensions may be adjusted during the final micrositing[2] process to best balance the interest of maximizing electrical generation, along with maximizing replanting of all trees to ensure the best possible operation of the site for ongoing commercial forestry purposes.

2.1.4.2 Construction Schedule

Assuming that the state of Washington approves the Applicant's application for a Site Certificate, and BPA grants the Applicant's interconnection request, the Applicant would then begin construction of the proposed Whistling Ridge Energy Project. Actual construction activities, from groundbreaking to commercial operations, are expected to take approximately one year (15 months). Although actual timing of Project approvals needed to start construction are not precisely known at this time, the Applicant anticipates Project permitting with EFSEC to be completed by the fall or winter of 2011 ~~by the end of 2010 or early 2011~~, with a Record of Decision (ROD) from BPA approving the requested interconnection being issued shortly thereafter. Under this schedule, the Applicant would conduct final Project engineering, equipment procurement, and contractor selection as early as the fourth quarter of 2011 ~~2010 and the first quarter 2011~~. Project construction and pre-operational testing could begin as early as the first quarter of 2012 ~~second quarter of 2011~~ and conclude in the fourth quarter of 2012 ~~to the second quarter 2012~~. If this schedule is met, the Applicant anticipates that the Whistling Ridge Energy Project would begin commercial power production by January 2013 ~~May 2012~~.

2.1.4.3 Construction Manpower and Truck Trips

The average size of the construction workforce would be about 110 workers, with a peak of approximately 265 workers in the seventh month of the construction period. Table 2-2 shows the approximate number of on-site construction workers by activity, which would vary month by month. Table 2-3 shows the on-site construction labor by month of construction.

Truck trips to and from the Whistling Ridge Energy Project for construction-related activities would average 30 trips during the AM peak hours and 10 trips during PM peak hours. During the peak month of construction activity (approximately eight months prior to commercial operation), traffic would increase to 390 vehicles along eastbound SR 14 at the east junction with Cook-Underwood Road.

[2] "Micrositing" is process of choosing the wind turbine and their exact positions within the project area. Micrositing will occur after permit approvals are obtained and all permit conditions are known.

Table 2-2
On-Site Construction Workers by Activity

Task	Approximate On-Site Manpower
Site Certification Agreement Approved	
Engineering/Design/Specifications/Surveys	15
Order/Fabricate Wind Turbines	0
Order/Fabricate Substation Transformer	0
Road Construction	50
Foundations Construction	50
Electrical Collection System Construction	50
Substation Construction	40
Wind Turbine Assembly and Erection	75
Plant Energization and Commissioning	25
Plant Substantial Completion	0
Construction Punchlist Clean-Up	25

Table 2-3
On-Site Construction Labor by Month

Month Before Commercial Operation	Project Management and Engineers	Field Technical Staff	Skilled Labor and Equipment Operators	Unskilled Labor	Total Approximate On-Site Manpower
14	5	10	0	0	15
13	5	10	0	0	15
12	10	8	58	14	90
11	10	8	58	14	90
10	17	15	114	44	190
9	17	15	114	44	190
8	22	21	158	64	265
7	17	16	133	49	215
6	12	11	103	39	165
5	15	16	120	39	190
4	8	11	61	20	100
3	8	11	61	20	100
2	8	11	61	20	100
1	3	5	17	0	25
0	1	1	10	13	25
Cleanup	1	1	10	13	25

2.1.4.4 Construction Costs and Fiscal Considerations

The total estimated construction cost of the Whistling Ridge Energy Project would be approximately $150 million, which includes the wind turbines and associated equipment.

Construction of the proposed Project also would result in fiscal contributions within the three-county area of Skamania, Klickitat, and Hood River counties. These contributions are anticipated to be approximately $13.2 million, or just under 10 percent of the total estimated $150 million in construction costs. The $13.2 million would include supplies purchased from local suppliers, as well as increased sales tax revenues from purchases (such as food, gasoline, and lodging) made by construction workers. In addition, Skamania County would be expected to experience an increase in sales tax revenue of approximately $6,600 due to sales tax on the construction contract.

2.1.5 PROJECT OPERATION

Once operational, the Whistling Ridge Energy Project would operate 24 hours per day, seven days per week. Project operations would require eight to nine permanent full-time and/or part-time staff. Positions required for Project operation include those listed in Table 2-4.

Table 2-4
Operations and Maintenance Staff

Staff Positions	Number of Operating Personnel
Plant Site Manager	1
Operations Manager	1
Operating Technicians	4 to 5
Administrative Manager	1
Administration Assistant	1
Total	8 to 9

The annual cost of Project operation would be approximately $3.75 million. Of this annual amount, approximately $1.5 million would be for labor costs, such as wages and benefits for employees. The remaining $2.25 million in annual costs would include expenditures for materials, supplies, equipment, insurance, and contracted maintenance labor.

Operation of the proposed Project also would result in permanent fiscal contributions to the regional economy. Skamania County would be expected to experience an increase in annual property tax revenue of approximately $731,500 due to the increase in assessed value of the parcels on which the Whistling Ridge Energy Project would be constructed. This would represent an annual increase of 7.6 percent compared to the amount of property tax collected for these parcels in calendar year 2007.

2.1.6 FOREST HARVEST DURING PROJECT CONSTRUCTION AND OPERATION

The Project Area is on land managed for commercial forestry by S.D.S. Co., LLC and Broughton Lumber Company. All of the parcels on which the Project is located are managed for a continual

cycle of growth, harvest, and replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the Project is proposed. Many of the remaining stands of trees on the sections of land that would have turbines on them are near maturity and S.D.S. Co., LLC and Broughton Lumber Company have recently implemented timber harvest plans on portions of these sections. Harvests have occurred in the Project Area over time, pursuant to long-established harvesting schedules (Figure 2-3).

Harvests have typically occurred approximately every 50 years; however, the harvest periods vary depending on the market and the demand for the type of timber. As a result, some harvests have occurred as frequently as every 40 years, and some have been up to every 65 to 70 years. Additional harvests are planned, subject to requirements of a Forest Practice Application.

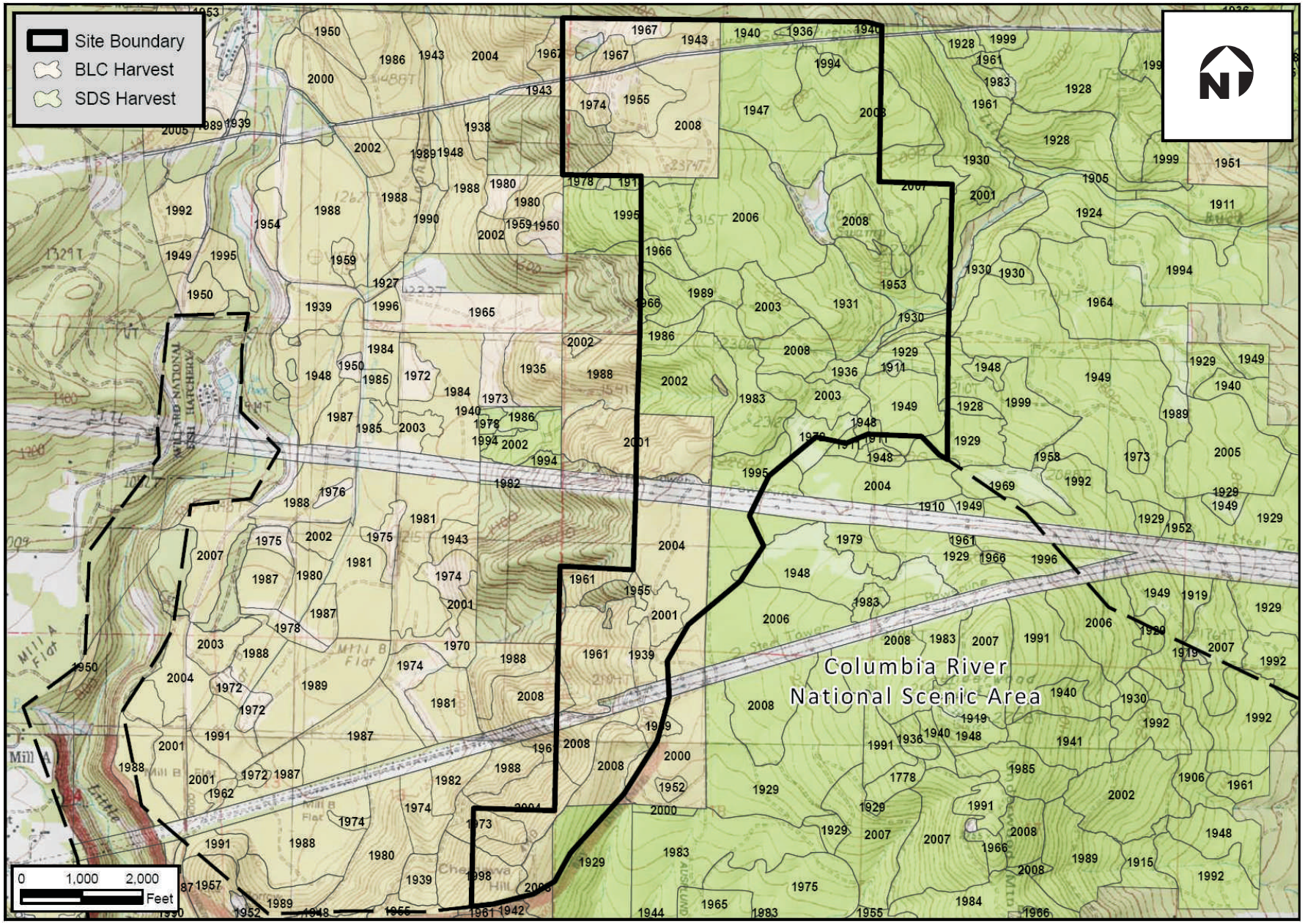
In areas surrounding the proposed wind turbines that have not been recently harvested, or that are not planned to be harvested before Project construction, trees would be harvested and the land would be replanted with seedlings. This clearing would allow for safe construction of the proposed Project, and would reduce the potential for tree growth to interfere with the wind resource on the site during the commercial life of the Project (that is, during the 30-year commercial life of the Project, trees that are planted at the time of construction in the cleared area would regrow at a rate that would not interfere with wind energy production).

Typically, the cleared area for the wind turbines would extend approximately 50 feet in all directions from each turbine. From a distance of approximately 50 feet to 150 feet from the base of the turbines, tree heights would be limited to a height of approximately 15 feet above the elevation of the base of the turbine. Extending from approximately 150 feet to 500 feet from the base of the turbines, there would be a restriction of approximately 50 feet in height above turbine foundation level for trees located within an area formed by a 90-degree angle centered on the prevailing wind direction and on the downwind side of the prevailing wind direction. Final locations and dimensions would be determined during the final design, micrositing and construction process (Figure 2-4).

In addition to clearing around the turbines, there would be an approximately 100-horizontal-foot limitation placed on trees along any overhead electrical cable corridors, or such standards as are determined by the Project engineers in consultation with BPA or others, as applicable. The permanently disturbed, cleared area described above would be considered a “forest conversion” under the Washington Forest Practices Act, because it is being implemented for the purpose of the Project. However, to the extent feasible for the Project, cleared areas would be reforested in accordance with typical commercial forestry management practices.

The areas where tree clearing is required would be clear-cut using crawler tractors, rubber-tired skidders, and mobile feller-bunchers, as has been done on other stands on the property. Logs would be transported by truck to SDS facilities in Bingen, Washington. Except for areas to be maintained and permanently cleared for the construction of permanent improvements and ongoing operations and maintenance access needs (which would be replanted with appropriate native grasses and low-growing shrubs), cleared areas would be replanted with trees within one year after completion of construction (tree planting is done in the spring of each year).

33758687_104.cdr



Source: SDS Lumber

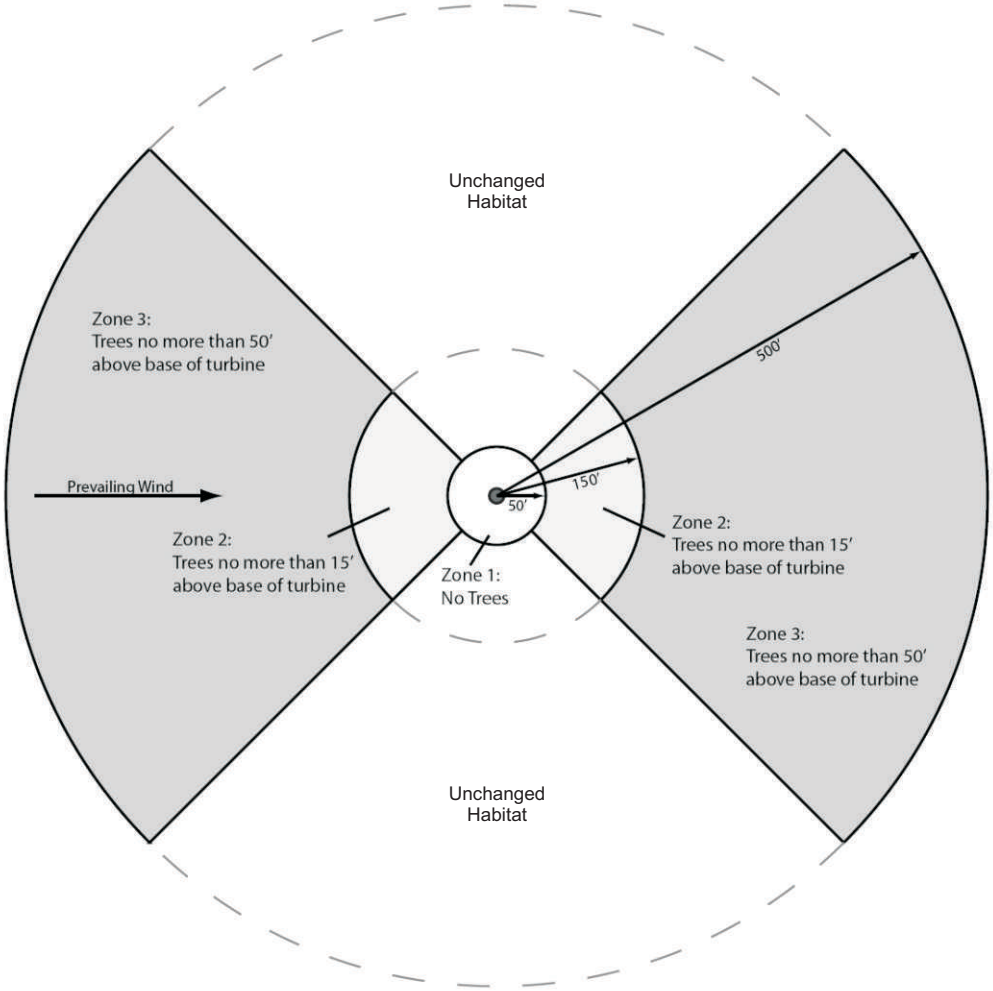
Figure 2-3

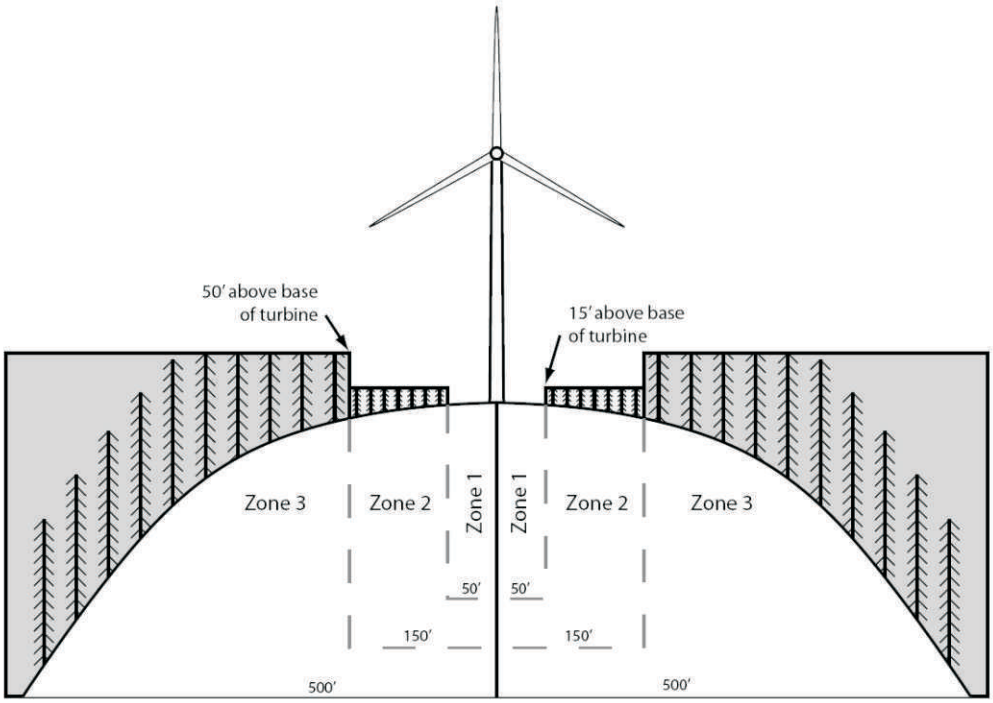
Harvesting Schedule

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_74.cdr





Source: GeoDataScape.

Figure 2-4

Turbine Timber Buffer

URS

Whistling Ridge Energy Project
Skamania County, Washington

2.1.7 PROJECT DECOMISSIONING

For financial evaluation and contractual purposes, the Whistling Ridge Energy Project is expected to have a useful life of at least 30 years. While some Project elements may have a typical lifespan of only about 30 years, the trend in the wind energy industry has been to "repower" older wind energy projects by upgrading equipment with more efficient turbines. It therefore is likely that the Project would be upgraded with more efficient equipment and have a useful life longer than 30 years.

However, if the Project were terminated, the necessary authorization from the appropriate regulatory agencies would be obtained to decommission the facilities. All aboveground facilities would be removed from the site, and unsalvageable material would be disposed of at authorized sites. To avoid unnecessary future ground disturbance and related environmental impacts, the turbine foundations would likely be removed to a depth of 3 to 4 feet below ground surface (bgs), and underground electrical cables would likely be abandoned in place. The soil surface would be restored as close as reasonably possible to its original condition. Reclamation procedures would be based on site-specific requirements and forest management techniques commonly employed at the time the area would be reclaimed, and would include re-grading, adding topsoil, and replanting all disturbed areas. Decommissioned roads would be reclaimed or left in place based on landowner preference, and right of way would be surrendered to the landowner.

In compliance with WAC 463-72, Site Restoration and Preservation, Whistling Ridge Energy LLC would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project were suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project that assesses potential impacts from restoration activities and would be subject to appropriate environmental review.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and/or BPA would not grant interconnection of the Project to the FCRTS. As a result, the proposed Whistling Ridge Energy Project would not be constructed or operated under this alternative. This alternative would not help utilities seeking renewable energy resources in states with RPSs, such as ~~the state of~~ Washington, Oregon, and California, in achieving the renewable energy goals mandated by each ~~the~~ state's RPS. Furthermore, this alternative would not help to meet the region's need for additional power in coming years. If the proposed Project is not constructed, it is likely that this need would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources.

In addition, it is reasonably expected that under the No Action Alternative, the proposed Project site would continue to be used for logging and other timber harvest activities. This site has been in commercial forestry use for the last century, during which the site has been logged over a

series of approximately 50-year logging rotations. If the proposed Project is not approved and built, the Applicant and others would continue to use the site for commercial forestry production. Ongoing timber management activities within the Project Area under this alternative would include regular tree clearing, harvesting, replanting, and development of additional access roads as necessary.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

The Applicant has proposed a wind generation facility at the site discussed in Chapter 1 ~~a specific site~~. The lead agencies, Washington EFSEC and BPA, must respond to the Applicant's requests for authorizations and approvals for the proposed wind project at this site. While this EIS focuses on the alternatives of either granting or not granting the Applicant's requests, various other alternatives have been considered for the proposed Project. These alternatives include alternative locations for the proposed Project, different Project sizes, alternative wind generation technologies, and different Project configurations. For potential alternatives, the Applicant has identified a number of criteria that must be met in order for the Applicant to have a technically and economically feasible project:

- The Project must be located in an area with a steady supply of robust wind power, and on a site on which construction could reasonably occur (no significant geotechnical constraints);

- To reduce startup costs, the Project must be located on land the Applicant owns and controls, and land that can serve a dual purpose of commercial forestry and power production;

- To enable the power to reach urban markets and eliminate the cost and time required to construct new transmission lines, the Project must be located in proximity to existing high-voltage transmission lines;

- The costs of construction must be outweighed by the potential return on investment, requiring a minimum number of potential megawatts to be achieved by the Project; and

- The Project output must be at a competitive price and of adequate supply to be attractive to utilities looking to fulfill their Renewable and Alternative Energy Portfolio Standards.

The following sections describe alternatives that were considered but eliminated from detailed study in this EIS because of technical or economic feasibility issues, not meeting the identified purpose and need for proposed action, or clearly greater environmental impacts.

2.3.1 ALTERNATIVE PROJECT LOCATIONS

The Applicant owns approximately ~~and manages~~ 70,000 acres of timberland in Washington and Oregon and manages its forestlands with the objective of producing ~~as much~~ high quality wood ~~as possible~~ without compromising the future economic and environmental benefits of their forests. In reviewing its lands for a potential location of a wind project, the Applicant sought:

- Areas of Applicant-owned property found to have a steady source of robust wind;
- Applicant-owned land that contained high ridges on which to place wind turbines with little impact to the continued underlying use of the land for commercial forestry; and
- Land in proximity to existing high voltage transmission lines.

To further clarify turbine string site selection, six suitability requirements were considered. They are as follows: lands owned by the Applicant or Broughton Lumber; within three miles of BPA transmission lines; outside of CRGNSA boundary; suitable terrain; road access; and contains at least 1,000 "suitable" lands. Furthermore, "suitability" is described as follows:

- Low suitability properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 200 and 500 feet, and have road access. These parcels are designated in yellow on the "Tract Suitability Analysis" map (see Figure G-1in Appendix G).
- Potentially suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 500 and 1,000 feet, and have road access. It should be noted that these parcels could be ruled out as being unsuitable based on other factors not assessed in this analysis, such as slope direction or parcel size. These parcels are designated in brown on the "Tract Suitability Analysis" map (see Figure G-1 in Appendix G).
- Suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 500 and 1,000 feet, and has what appear to be better road access than properties identified as "potentially suitable". These parcels are designated in dark pink on the "Tract Suitability Analysis" map (see Figure G-1 in Appendix G).
- Highly suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have terrain differences between 1000 and 2000 feet above surrounding terrain and contain the highest hills/ridgelines within the study area, and have good road access. These are the best possible locations within the study area for wind facility development. Of the analyzed parcels, only 1 parcel fell into this category. These parcels are designated in blue on the "Tract Suitability Analysis" map (see Figure G-1 in Appendix G).
- The proposed Whistling Ridge Energy Project site was selected for its location within the "highly suitable properties". This site was then forwarded for further environmental analysis including wildlife surveys.

No other sites were identified that are under the ownership of the Applicant or as close to existing transmission infrastructure facilities.

2.3.2 LARGER OR SMALLER GENERATION FACILITY SIZE

During the Project planning process, the Applicant considered the feasibility of constructing and operating a larger generation facility, both in terms of more wind turbines and a larger area, involving the proposed Project Area. Regarding more turbines, the site does contain a series of ridge lines that are conducive to locating wind turbines but at the same time are limiting as to where those turbines could be placed. In general, placement of turbines in areas substantially below the ridge lines would not effectively make use of the wind resource within the Project Area, thereby compromising the economic feasibility of the proposed Project. Accordingly, the constrained topography has necessitated a restricted power plant design.

Regarding a larger area for the proposed Project, the Project Area is located between the National Scenic Area on the south and land owned by Washington DNR on the north. While the Applicant did not consider locating turbines within the National Scenic Area due to its sensitivities, consideration was given to locating turbines on the DNR lands directly north of the site. These lands have similar topographical characteristics as the proposed Project site, and also have been logged through commercial forestry activities. However, use of these lands for Project turbines was rejected from further consideration due to comments from the public and DNR's own reluctance to consider leasing the site to the Applicant.

Lands east and west of the proposed Project Area also were considered but were rejected from further evaluation because these lands were at a lower elevation and did not include the north-trending ridge lines suitable for wind turbine placement that exist on the proposed site.

The Applicant also considered the feasibility of a smaller generation facility in the proposed Project Area, either by removing turbines or utilizing a smaller Project Area. However, the Project is proposed as an "integrated whole," as a single power plant, not pieces of a whole, where some turbines may be eliminated. The Project proposes a defined output, based on site and design characteristics and market demand and Applicant objectives. These objectives include providing a minimum level of generation to be attractive to utilities seeking to fulfill their RPS requirements, as well as providing a return on investment to the Applicant. In order to provide this return, the Applicant has determined that the Project must be capable of producing a minimum of 70 MW. The number of wind turbines in the Project Area has already been minimized to the extent practicable in light of the Applicant's objectives. Accordingly, if any turbines are removed from the Project design, other locations must be found to replace those turbines to maintain the minimum necessary capacity. The constrained site location and topography limits the ability to relocate turbines within the Project Area.

In sum, the Project size was selected to optimize Project energy output and economic feasibility. A smaller wind turbine facility would be unlikely to offset Project development costs. A larger project would require additional infrastructure capacity and transmission capacity.

2.3.3 ALTERNATIVE WIND GENERATION TECHNOLOGIES

Consideration was given to alternative technologies for the generation of power from a wind resource. Several types of wind energy conversion technologies have been developed over the past three decades and include (1) vertical axis Darrieus wind turbines,(2) two-bladed downwind wind turbines, (3) smaller three-bladed upwind wind turbines (500 to 750 kW), and (4) larger 3-bladed upwind wind turbines (1 to 3 MW). The three-bladed, upwind, horizontal axis is currently the preferred technology, based on proven reliability and commercial viability.

2.3.4 ALTERNATIVE PROJECT CONFIGURATIONS

As discussed above, the proposed Project Area contains a series of ridge lines that are conducive to locating wind turbines but at the same time are limiting as to where those turbines could be placed. This means that there are limited options for locating wind turbines within the site. Alternative turbine configurations were considered, but were eliminated from further study because they either did not appropriately utilize the wind resource present at the site or compromised the economic feasibility of the proposed Project.

2.3.5 ALTERNATIVE INTERCONNECTIONS

Alternatives for interconnecting with BPA's existing high voltage transmission lines that currently cross the proposed Project Area were considered. The currently proposed location of the substation was chosen because it is a relatively clear and low-elevation area that is adjacent to the proposed site of the Operations and Maintenance facility.

Initially, an option of providing interconnection to the FCRTS at a point along the North Bonneville-Midway 230-kV transmission line within the Project Area and directly east of the currently proposed interconnection point was identified. This alternative interconnection point was located between structures 22/6 and 23/1 on the North Bonneville-Midway 230-kV transmission line. However, this option would have required the development of interconnection facilities within the National Scenic Area because structure 22/6 is on the border of, and structure 23/1 within, the Scenic Area. Given the high sensitivity of the Scenic Area, construction of an interconnection alternative within its boundaries was eliminated from further study.

An alternative interconnection also was considered off of the Project Area, approximately 1.5 miles west of the currently proposed interconnection point. BPA's transmission engineers identified a potential alternative interconnection site between structures 21/4 and 22/1 on the North Bonneville-Midway 230-kV transmission line. This site was located in a relatively flat, lower-elevation area that may have easier access in the winter than the currently proposed interconnection site. However, this alternative would have required the Applicant to construct and operate a new 1.5 mile section of 230-kV transmission line from the Project Area to this interconnection point. Development of such a new line would have required the clearing of an approximately 125-foot-wide right-of-way corridor for the line, as well as the clearing and construction of additional new transmission line access roads. This corridor would be located in steep terrain, and would require timber harvesting, new access roads, and vegetation control in areas where slopes approach 100 percent in places. In addition to potential additional impacts to plants, wildlife, cultural resources, aquatic areas, and wetlands that could be avoided by siting the Project substation within the Project Area, this alternative likely would have greater visual

and geological impacts due to the new transmission line corridor's location on steep, more visible slopes.

The Applicant also has stated that the additional costs of constructing the new line associated with this alternative line likely would make the Project no longer economically viable. In additional to the substantial additional costs of constructing this additional line, timber harvesting operations on the steep terrain that exists in the potential narrow corridor for the new line under this alternative would be impossible to conduct economically adjacent to the existing BPA system unless a much larger area was harvested at the same time. Because of the much greater potential for environmental effects as compared to merely developing the currently proposed interconnection within the already planned Project Area, as well as the significant additional cost implications, this alternative was considered but eliminated from detailed study in this EIS.

Finally, an interconnection with the other existing BPA transmission line that crosses the Project Area also was considered. However, this alternative was rejected from further study because the other existing BPA line is a 115-kV transmission line that does not have sufficient capacity to transmit the energy from the Whistling Ridge Energy Project.

2.3.6 ALTERNATIVE ACCESS ROADS

During Project planning, different alternatives for accessing the proposed Project Area were assessed. There are three potential ways to access the Project Area. All are via County roads from SR 14 to Cook-Underwood Road. In addition to the proposed access route that is included as part of the Proposed Action, from Cook-Underwood Road, the Project Area could be accessed by:

- **Route 1:** Ausplund Road to a private logging road vacated by Skamania County in 1987, which crosses private property (not owned by the Applicant) that is currently used for residential, agricultural orchards, and commercial timber production and harvest.

- **Route 2:** Kollock-Knapp Road to Scoggins Road to a private logging road called the CG2930 road on County Assessor's maps, which crosses property owned by the Applicant that is currently used for commercial timber production and harvest.

The private logging road in Route 1 was made a County right of way in 1923. It was vacated for public use in 1987 by resolution of the Skamania Board of County Commissioners; however, the rights to use the road by abutting property owners remain. Additionally, road improvements to this route would be required for access to construct the wind energy facility and for ongoing operations and maintenance traffic. Impacts to a non-project landowner from these activities would occur if Route 1 were used. Therefore, Route 1 has been eliminated as a construction roadway access alternative.

Route 2 would require minor roadway improvements that would not directly impact any non-project landowners. However, these roadway improvements would require construction within the National Scenic Area. Therefore, Route 2 has been eliminated as a construction roadway access alternative.

2.4 BENEFITS AND DISADVANTAGES OF DELAYING PROJECT IMPLEMENTATION

The Washington SEPA Rules require that an EIS discuss the benefits and disadvantages of reserving for some future time the implementation of a proposal, as compared with possible approval at this time. See WAC 197-11-440(5)(c)(vii). The benefits of deferring action on the proposal would include:

- Delaying or deferring construction-related traffic, noise and dust impacts during the Project construction period.
- Delaying or deferring potential impacts related to visual resources from Project operation. These impacts would occur primarily due to the visibility of proposed Project wind turbines from various vantage points in the Project vicinity, including some viewpoints within the Columbia River Gorge National Scenic Area.
- Delaying or deferring potential increased noise levels from wind turbine operation at nearby noise-sensitive receivers.
- Delaying or deferring permanent removal of approximately 60.7 acres of vegetation and potential wildlife habitat for Project facilities.
- Delaying or deferring potential mortality to birds and bats due to turbine collision and displacement.
- Delaying or deferring use and consumption of fuels, water, and other natural resources that would be required for Project construction and operation.
- ~~Delaying or deferring construction impacts of traffic, noise and dust~~
- ~~Delaying or deferring potential operational impacts on noise, visual resources, and wildlife~~

The disadvantages of deferring action on the proposed Project would include the following:

- Delaying approval of the Whistling Ridge Energy Project would not help utilities seeking renewable energy resources in states with RPSs, such as Washington, Oregon, and California, in achieving the short-term renewable energy goals mandated by each state's RPS; however, depending on the length of the approval delay, the Project could be available for meeting the longer term goals of these RPSs. ~~The Whistling Ridge Energy Project would not help the state of Washington in achieving the renewable energy goals mandated by the state's RPS.~~
- Deferring the Whistling Ridge Energy Project would not help to meet the region's need for additional power in near-term coming years, but approval at some future time could make the Project available for longer-term power needs. Regardless, if the proposed Project is not constructed, it is likely that these needs would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources.

- It is reasonably expected that if the proposed Project is deferred, the proposed Project Area would continue to be used for logging and other timber harvest activities so there would be continued impacts from access, timber cutting, and replanting over time. This site has been in commercial forestry use for the last century, during which the site has been logged over a series of approximately 50-year logging rotations. If the proposed Project is not approved and built, or if approval is deferred, the Applicant and others would continue to use the site for commercial forestry production. Ongoing timber management activities at the Project Area would include regular tree clearing, harvesting, replanting, and development of additional access roads as necessary.
- During the period of any delay or deferral, the Applicant would be denied the ability to create new business and job opportunities through diversifying and maximizing the use of its existing holdings.
- During the period of any delay or deferral, up to a peak of 265 new construction jobs in Skamania County would not be created.
- If Project approval is delayed, eight to nine new operation jobs in Skamania County would not be created starting in about 2012 when the Applicant hopes to begin commercial power production; however, these jobs could be created in the future if the Project is deferred but approved at some later time.
- A new revenue source to Skamania County and the state of Washington from the payment of sales and business taxes would be deferred or eliminated.

2.5 COMPARISON OF ALTERNATIVES

Under the Proposed Action, the state of Washington would approve the Applicant's application for a Site Certificate for the proposed Whistling Ridge Energy Project, and BPA would grant interconnection of the proposed Project to the FCRTS. Under the No Action Alternative, the state of Washington would deny the Applicant's application for a Site Certificate for the proposed Project, and/or BPA would not grant interconnection of the Whistling Ridge Energy Project to the FCRTS.

Table 2-5 compares BPA's Proposed Action (granting the proposed interconnection) and the No Action Alternative (not granting the proposed interconnection) to the BPA purposes identified in Chapter 1 of this EIS. Table 1-1 in Chapter 1 of this EIS summarizes the potential overall environmental impacts and mitigation for the proposed Project and interconnection, as well as alternatives including the No Action Alternative. Detailed analysis of potential impacts is contained in Chapter 3 of this EIS.

Table 2-5
Comparison of Alternatives to BPA Purposes

Purpose	BPA Proposed Action	No Action Alternative
Maintain the electrical stability and reliability of the FCRTS	The physical interconnection of the Whistling Ridge Energy Project would be designed to ensure that the electrical stability and reliability of BPA's transmission system is maintained, and contractual terms would be put in place to ensure that Project operations do not adversely affect electrical stability and reliability.	Not granting an interconnection would have no effect on the electrical stability and reliability of BPA's transmission system.
Continue to meet BPA's statutory and contractual obligations	The Proposed Action would further BPA's efforts to provide open access to its transmission system consistent with its Tariff, and would not be expected to interfere with BPA's other existing contractual obligations or compliance with any statutory requirements.	The No Action Alternative would not further BPA's efforts concerning transmission open access, and would not interfere with other existing contractual obligations or compliance with any statutory requirements.
Act consistently with BPA's environmental and social responsibilities	Through this EIS and other environmental processes, BPA is ensuring compliance with NEPA and other applicable environmental laws for its Proposed Action. Allowing interconnection of the Wind Project would increase the availability of desired renewable resources in the region through a project that has been designed to minimize or avoid environmental impacts to the extent practicable.	By not allowing the requested interconnection of the Project under the No Action Alternative, BPA would deny this renewable resource access to the energy market. Although this alternative would avoid the environmental impacts of the Project, the proposed Project Area would continue to be used for commercial forestry and environmental impacts from access, timber cutting, and replanting would be expected to continue over time.
Provide for cost and administrative efficiency	The Proposed Action would involve providing an interconnection to BPA's transmission system at a reasonable cost, and contractual arrangements would ensure efficient administration of management and operation of this interconnection.	The No Action Alternative would not have long-term interconnection cost or administration implications for BPA.

2.6 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2004. *A Policy on Geometric Design of Highways and Streets*. 5th Edition

American Wind Energy Association (AWEA). 2007. Wind Power Today. Available at: http://www.awea.org/pubs/factsheets/windpowertoday_2007.pdf.

Skamania County. 2008. Skamania County Private Road Guidelines and Development Assistance Manual.

Washington State Department of Transportation (WSDOT). 2007. *Design Manual*. Publication M 22-01.05.

This page intentionally left blank.

3.0 AFFECTED ENVIRONMENT, IMPACTS AND MITIGATION

This chapter describes the existing environmental resources in the vicinity of the proposed Project and the potential impacts that the Proposed Action and the No Action Alterative would have on those resources. The potential impacts described were determined through research and field observation by environmental specialists and information provided by agency and public comments. More specific information on methodology for each resource is provided as appropriate. Each resource lists the mitigation measures that would lessen impacts, and the impacts that would be unavoidable.

Toward the end of the chapter, cumulative impacts are described, followed by discussions of intentional destructive acts, relationship between short-term uses of the environment and long-term productivity, and irreversible or irretrievable commitments of resources.

3.1 EARTH

This section discusses the existing setting and potential Project impacts related to geology, soils and topography. This analysis includes potential impacts of the Proposed Action on resources, and potential impacts of geologic hazards such as earthquakes or landslides on the Project. This section includes information submitted as part of the Application for Site Certification (Appendix A) and the background data to that document (Appendix B Geotechnical Report).

3.1.1 AFFECTED ENVIRONMENT

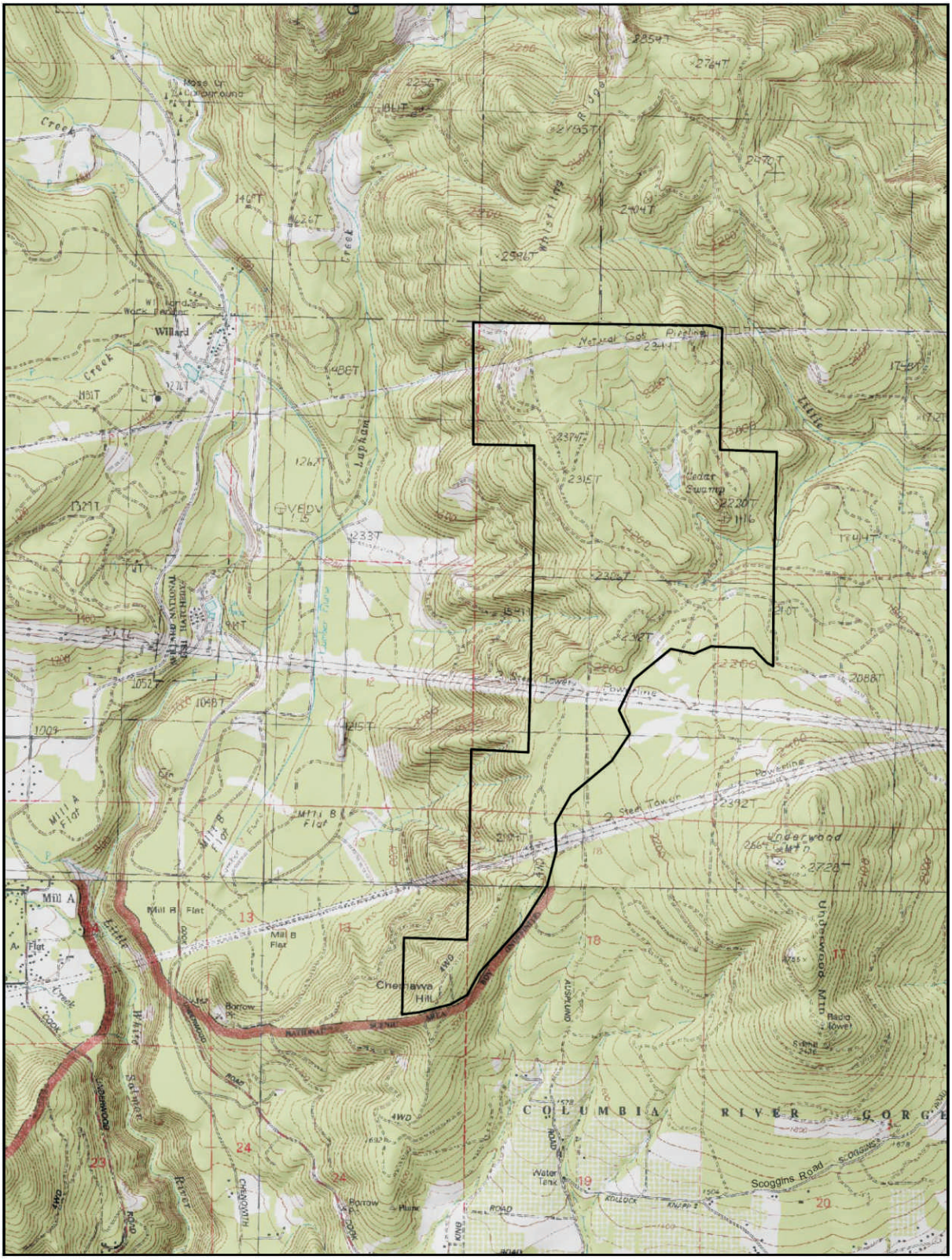
3.1.1.1 Topography

The 1,152-acre proposed Project Area is situated on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet above mean sea level (msl). The land west of the proposed Project Area drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. The topography northeast of the site drops gradually toward the White Salmon River or climbs gently up the northeast flank of Underwood Mountain at 2,728 feet above msl. To the south, the topography drops to a terrace of largely agricultural use and then toward the Columbia River. Figure 3.1-1 shows the site topography.

3.1.1.2 Regional Geology

The White Salmon, Washington, area is located within the Cascade Range and the Columbia Intermontane Physiographic Province. The Project Area is located just within the western boundary of the Columbia Plateau, which is located at the western edge of the Columbia Intermontane Physiographic Province. This lowland province is surrounded on all sides by mountain ranges and highlands, and covers a vast area of eastern Washington and parts of northeastern Oregon and western Idaho.

33758687_115.cdr



Source: GeoDataScape.

Figure 3.1-1
Site Topography

URS

Whistling Ridge Energy Project
Skamania County, Washington

The Columbia Plateau is underlain by a series of layered basalt flows extruded from vents (located mainly in southeastern Washington and northeastern Oregon) during the Miocene epoch (between 5.3 and 23.8 million years before present [BP]). Individual basalt flows ranged in thickness from a few millimeters to as much as 300 feet. Where significant time elapsed between successive flows, interflow zones developed. The interflow zones are characterized by the presence of highly weathered basalt and paleosols. These interflow zones are generally significantly weaker than the surrounding basalt and sometimes form basal failure surfaces for large landslide complexes.

Above the basalts are a variety of younger volcanic rocks and sedimentary materials that range from Pliocene (1.8 to 5.3 million years BP) to Holocene (less than 10,000 years BP). Sedimentary rocks are generally thought to underlie the basalts.

Individual geologic units in the general area are primarily Underwood Mountain Basalt., as described in Section 3.1 of the Application for Site Certification (Appendix A). Near-surface rock consists of yellow-gray volcanoclastic rocks, medium to dark gray, fine-grained to medium-grained basalt and andesite, which is fractured into angular gravels, cobbles, and boulders.

Regional geologic maps indicate the presence of Quaternary-age mass wasting landslide deposits located north of Underwood Mountain (Figure 3.1-2). These deposits are mapped as a large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long. However, based on field work conducted in 2007, there is no obvious evidence to suggest the presence of a landslide as mapped on the 1:100,000 scale geologic map. If landslide deposits are present, they have been exposed long enough that most or all of the geomorphic evidence has been removed by erosion.

3.1.1.3 Local Geology and Soils

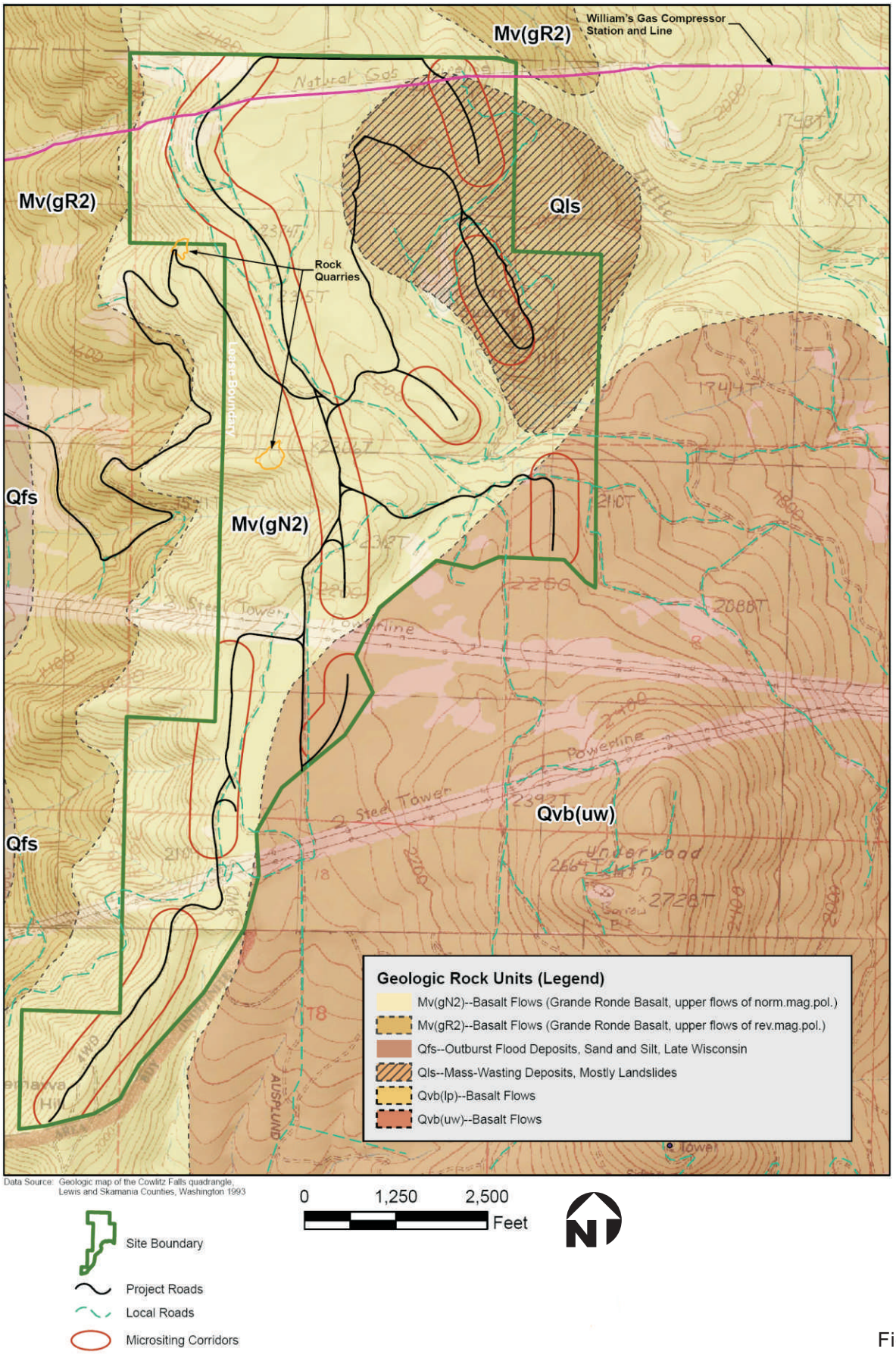
Geology

The proposed Project Area is located within the northern boundary of the Hood River Valley, which extends a few miles into southern Washington. In general, the geology of the area consists of basalt flows extruded from local vents, layered with conglomerate, tuff, tuff breccias, and other volcanoclastic deposits (Figure 3.1-2).

The bedrock underlying the proposed Project Area consists of Grande Ronde Basalt of the Columbia River Basalt Group and Quaternary basalt of Underwood Mountain—a shield volcano that lies approximately midway between the lower reaches of the Little White Salmon and White Salmon Rivers. Its southern slopes drain to the Columbia River.

In the Project Area, these basalt formations are typically overlain by silt and clay soil of varying thickness. Unconsolidated deposits are thin to absent with surface materials consisting primarily of a veneer of brown, silty topsoil that is likely derived from forest duff and wind-blown deposits. The thickness of this material varies across the site from a few inches to three feet. In several areas, bedrock and talus can be observed at the ground surface.

33758687_116.cdr



Source: Korosec, 1987.

Figure 3.1-2

Site Geology

URS

Whistling Ridge Energy Project
Skamania County, Washington

Soils

Soil Types. Figure 3.1-3 shows soils in the Project Area. The Natural Resources Conservation Service (NRCS) describes the soils in the Project vicinity as follows (USDA NRCS 2003):

- ***McElroy Series.*** The McElroy series consists of very deep soils (up to 5 feet) formed in colluvium and residuum from basalt with a mantle of volcanic ash that influences soils in the top 9 to 13 inches. The soils exist on the footslopes and backslopes of mountains on slopes from 5 to 90 percent at elevations from 400 to 2,600 feet in eastern Skamania County and western Klickitat County. McElroy Soils are well drained with medium to rapid runoff and moderate permeability. The series was established in 1981 following the introduction of volcanic ash from the eruption of Mt. St. Helens.

- ***Timberhead Series.*** The Timberhead series consists of very deep soils (up to 5 feet) formed in residuum and colluvium from basalt mixed with volcanic ash. The soils exist on mountain ridges between 5 and 30 percent at elevations from 2,000 to 3,600 feet in Skamania County and western Klickitat County. Timberhead Series soils are well drained with medium to rapid runoff and moderately high to high permeability.

- ***Underwood Series.*** The Underwood series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 2 and 50 percent at elevations between 500 and 2,700 feet in southeast Skamania County and west Klickitat County. Underwood Series soils are well drained with slow to medium runoff and moderately high permeability.

- ***Undusk Series.*** The Undusk series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 5 and 65 percent at elevations between 2,000 and 2,800 feet in southeast Skamania County and west Klickitat County. Undusk Series soils are well drained with slow to medium runoff and moderately high permeability.

Based on the current test pits and field observations, the site soil is best represented as Soil Site Class D (stiff soils). Rock with varying strength and weathering characteristics was encountered at depths ranging from 3 to 12 feet bgs.

Soil Erosion Potential. Erosion is the breakdown and transport of soils and bedrock by natural processes, including water, wind, and glaciation. The susceptibility of any material to erosion depends on chemical and physical characteristics; topography; the amount and intensity of precipitation and surface water; the intensity of wind; and the type and density of vegetative ground cover, if present.

Erosion potential was assessed for the Application for Site Certification, principally based on the erosion potential specified for surficial soils by the NRCS. These erosion factors indicate that the Underwood loam has a high potential for erosion by water and the McElroy, Timberhead, and Undusk units have a medium potential, with the remaining soil types having a low potential. Most soils found in the site vicinity are classified as having a low susceptibility to wind erosion.

33758687_108.cdr

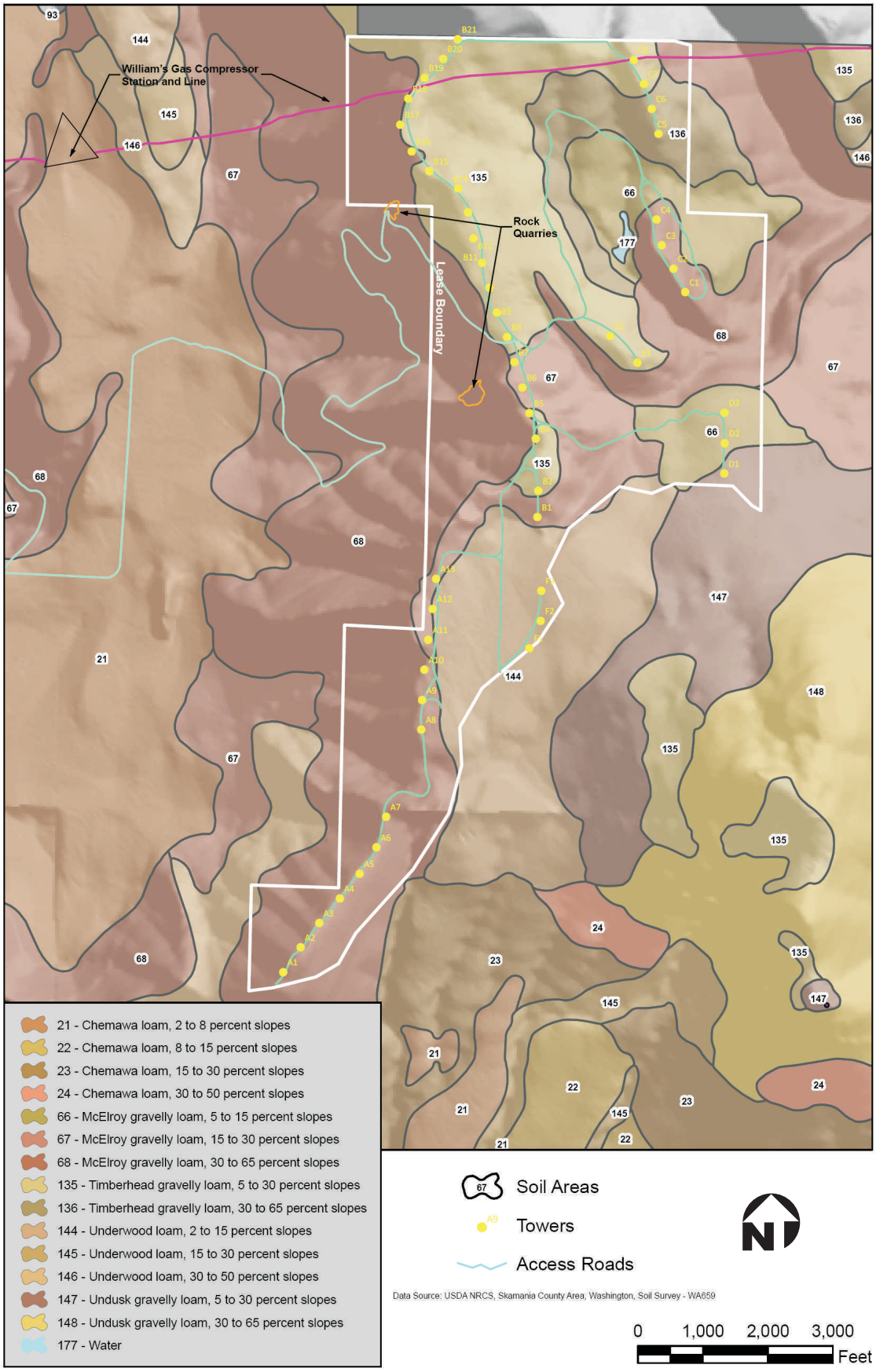


Figure 3.1-3

Soil Classifications

Data Source: USDA NRCS, Skamania County Area, Washington, Soil Survey - Wa659.

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.1.1.4 Geologic Hazards

Earthquakes

Earthquakes are the result of sudden releases of built-up stress within the tectonic plates that make up the earth's surface. Stress accumulates where movement between plates or on faults produces friction. No faults are mapped within the footprint of the proposed Project Area. However, faults are mapped approximately 1.5 miles to the southwest and northeast. (Pezzopane 1993 and Geomatrix 1995) Many of these faults are inferred, and shown as dotted lines buried by younger surficial deposits. While the activity of the area faults is unknown, a review of aerial photography showed no indication of recent movement along the trace of the inferred faults.

There have been no surface-rupture earthquakes on any fault within northwestern Oregon or southwestern Washington in historic times, and investigations of the regional faults have been limited.

According to the updated National Seismic Hazard Maps published by the US Geological Survey (USGS) in 2008 (Petersen et al. 2008 and USGS 2009), the peak ground acceleration estimated for the area of the Whistling Ridge site is 0.18g for a 475-year return period earthquake (i.e., ground motion with a 10 percent chance of being exceeded in 50 years) and 0.40g for a 2,475-year return period earthquake (i.e., ground motion with a 2 percent chance of being exceeded in 50 years).

Large earthquakes at more distant faults could cause prolonged ground movement in the Project Area. Information on historic large earthquakes can be found in the Application for Site Certification Section 3.1 (Appendix A).

Landslides

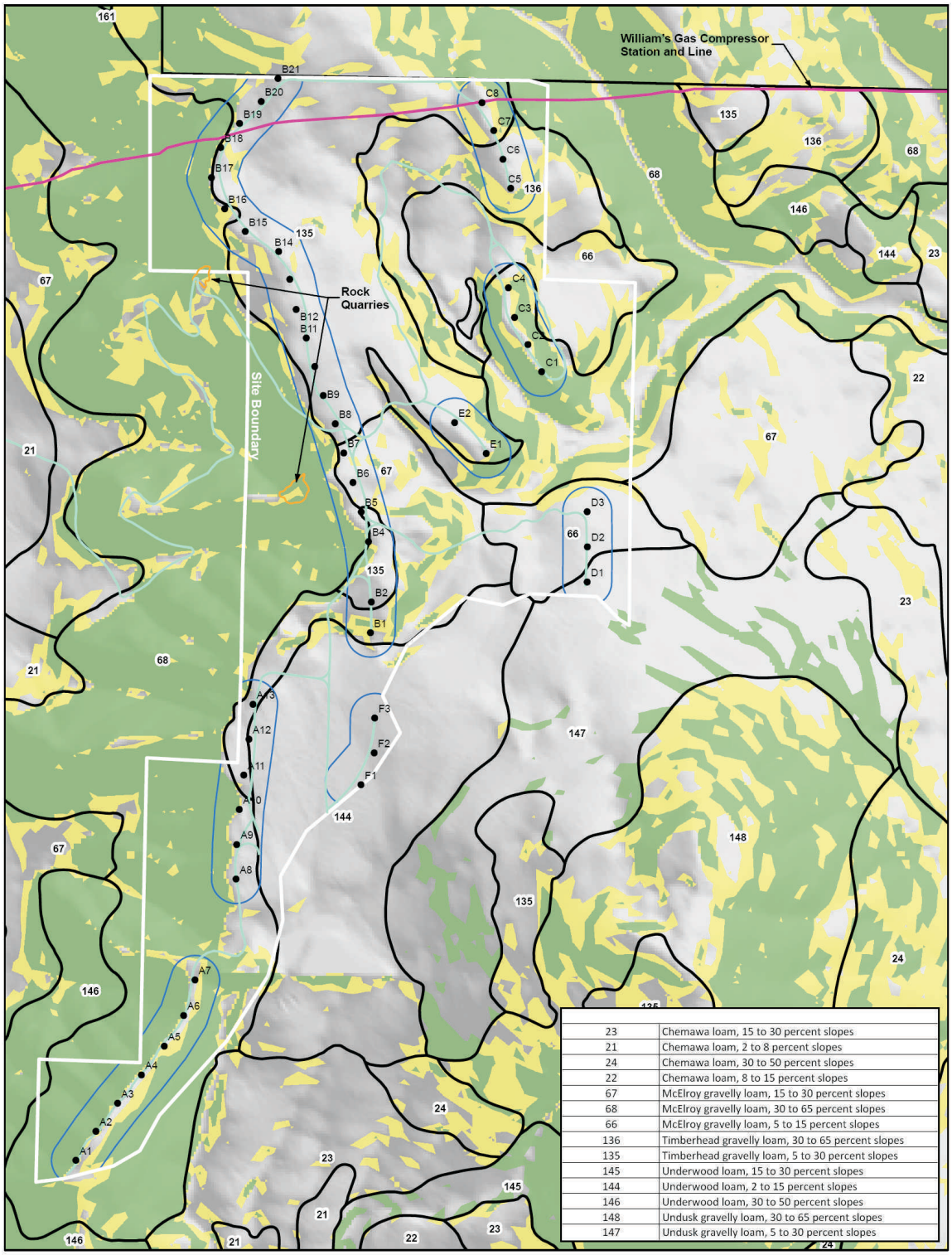
As part of the Application for Site Certification, a preliminary landslide hazard evaluation of the Project Area was conducted by a licensed geologist pursuant to Skamania County Code (SCC) Title 21A, Chapter 21A.06 - Landslide Hazard Areas (LHAs), which are shown on Figure 3.1-4. Skamania County recognizes three classes of LHAs.

- Class I (Severe) LHAs are considered to present a severe landslide hazard and are distinguished as areas of known mappable landslide deposits that have been designated by the local legislative body.

- Class II (High) LHAs are areas with slopes between 20 and 30 percent that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than 30 percent.

- Class III (Moderate) LHAs are areas with slopes between 20 percent and 30 percent not included in Class II.

33758687_110.cdr



23	Chemawa loam, 15 to 30 percent slopes
21	Chemawa loam, 2 to 8 percent slopes
24	Chemawa loam, 30 to 50 percent slopes
22	Chemawa loam, 8 to 15 percent slopes
67	McElroy gravelly loam, 15 to 30 percent slopes
68	McElroy gravelly loam, 30 to 65 percent slopes
66	McElroy gravelly loam, 5 to 15 percent slopes
136	Timberhead gravelly loam, 30 to 65 percent slopes
135	Timberhead gravelly loam, 5 to 30 percent slopes
145	Underwood loam, 15 to 30 percent slopes
144	Underwood loam, 2 to 15 percent slopes
146	Underwood loam, 30 to 50 percent slopes
148	Undusk gravelly loam, 30 to 65 percent slopes
147	Undusk gravelly loam, 5 to 30 percent slopes

Class II Areas
Class III Areas
Soil Areas
Micrositing Corridor
Access Roads
Approximate Turbine Locations

0 1,250 2,500 Feet

N

Figure 3.1-4

Landslide Hazard Areas

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

The preliminary landslide hazard evaluation concluded that there do not appear to be any areas in the site that meet Skamania County's criteria for a Class I LHA. Figure 3.1-4 shows Class II LHAs in green. The Class II LHAs at the site are predominantly associated with the steep slopes west of proposed Tower Lines A and B. There are also steep slopes to the east of the seven southernmost Tower Lines A towers, and on both sides of Tower Line C. The Class II areas are generally bordered by smaller areas of Class III.

Volcanic Eruption

The Cascade Mountains of the Pacific Northwest region contain sixteen major volcanoes, which extend from Mount Garibaldi in British Columbia to Lassen Peak in California (Harris 1988). Four of the volcanoes within Washington and Oregon have experienced activity within historic time: Mount Baker, Mount Rainier, Mount Hood, and Mount St. Helens. Mount Adams is the closest volcano to the Project Area, situated approximately 30 miles due north, but is not historically active. Mount St. Helens is the closest historically active volcano to the Project Area, situated approximately 42 miles to the northwest.

3.1.2 IMPACTS

3.1.2.1 Proposed Action

Construction

Construction would involve approximately 108 acres of earth-disturbing activities (56 acres of permanent disturbance and 52 acres of temporary disturbance). Activities that would involve earth disturbance include tree harvesting in areas not already cleared; constructing roads and turbine crane pads; constructing foundations for turbine and meteorological towers; trenching for underground utilities; clearing and grading for the substation placement; and clearing and excavating for the foundation for the Operations and Maintenance facility at either of the two alternative locations. Approximately 50 percent of excavated soils are anticipated to be too large for re-use as backfill at foundations. Based on preliminary calculations and depending on the type of foundation design used, approximately 20 cubic yards of excavated soil would remain from each turbine foundation excavation.

Roadway improvements would be necessary to accommodate the heavy and long loads associated with the turbine towers. Improvements would be made to approximately 7.9 miles of existing roads, and 2.4 miles of new road would be built. Most of these improvements would be made in the Project Area, with the exception of off-site improvements to West Pit Road. For areas with steep slopes, it may be necessary to flatten and rebuild the slopes to allow access for the long loads required. Some steep sections of existing or new roads may be graded to create shallower grades, and some tight-radius turns may require localized rerouting of existing roads. West Pit Road would require permanent widening to accommodate long loads. Widening could include removal of trees and other vegetation, along with engineered cut and fill sections (cut and fill volumes would be calculated during final design). The road would not require paving, but would require an all-weather driving surface.

The primary impacts during construction would be potential for erosion, landslides, soil compaction and changes to topography.

Soils

Because some surface soils in the Project Area are moderately susceptible to erosion, there is some potential for adverse impacts on the site soil in areas of steep topography during grading and foundation construction, as shown on Figure 2.15-1, Landslide Hazard Classifications, in Section 2.15 of the Application for Site Certification (Appendix A).

Topography

Changes to the topography would include grading turbine foundations and access roads. The changes to topography would be minor to moderate depending on location.

Erosion

The potential for erosion or aggradation would be greatest during the construction process. The NRCS classifies surficial soils at the site as generally having medium erosion potential. During the dry season, soils that are disturbed and stripped of vegetative cover may be susceptible to wind erosion. The potential for erosion by wind and water would be minimized through the use of best management practices (BMPs).

Operation

Once the Project is constructed, the primary risks would be associated with earthquakes, volcanic activity, and landslides.

Earthquakes

Liquefaction. Liquefaction is a phenomenon whereby soils undergo significant loss of strength and stiffness when they are subjected to vibration or large cyclic ground motions produced by earthquakes. Saturated soils without cohesive fines (i.e., gravels, sands, and silts) are most susceptible to liquefaction. Other factors affecting the potential for liquefaction in soils are density, amplitude of loading, confining pressure, past stress history, age of soil deposit, the size, shape and gradation of particles, and the soil fabric structure. In earthquakes, liquefaction-induced ground settlement and lateral spreading have been the primary cause for extensive damage to aboveground structures, foundations, and pipelines.

Field investigation concluded that the potential for liquefaction is very low at this site. Test pits excavated at the Project Area encountered shallow bedrock covered with a combination of cohesive and cohesionless soil. No groundwater was observed in any of the test pits.

Structure failure could occur with enough ground shaking even without liquefaction. However, this hazard would be mitigated by adhering to seismic building codes.

Settlement. Field investigation concluded that settlement and lateral spread induced by a seismic event would be minimal, due to the low liquefaction potential.

Surface Rupture. Surface rupture occurs when a fault breaks to the land surface during an earthquake. Surface rupture is usually associated with moderate to large earthquakes (M_w 6.5 or greater) or rarely during smaller, very shallow events. There are no mapped faults crossing the site. Therefore, the potential for primary surface rupture in the proposed Project Area is small.

Volcanic Activity

Effects of volcanic activity are unavoidable and may include lava flows, mudflows, pyroclastic flows, and ash-fall. Volcanic flows are typically limited to the flanks of the volcano and major drainage channels extending from the volcano, which for all known volcanoes in the area are located outside the Project Area. The largest potential impact to the site from volcanic activity would be ash carried aloft that subsequently falls to the land surface. Based on prevailing wind patterns, the USGS (Wolfe and Pierson 1995) estimates that there is between a 0.02 and 0.1 percent annual probability that there would be 4 inches (10 cm) or more of ash deposited at the site from eruptions throughout the Cascade Range (Figure 2.15-2 in the Application for Site Certification). The adverse effects on wind turbines from ash fall would be mitigated through appropriate design.

Landslides

The landslide evaluation conducted for the Application for Site Certification concluded that the Project could be constructed and operated without danger to human life or the surrounding environment due to landslide hazards.

Although none of the proposed turbines are located within Class II LHAs, several of the towers along the western side of the Project Area (Tower Lines A and B) are located along ridgelines with descending slopes that are locally greater than 35 degrees (70 percent). Based on studies conducted for the Application for Site Certification, it appears that the primary concern for towers located adjacent to the Class II LHAs is the potential for headward erosion of the steep drainages by debris or earth flow processes. Erosion rates of these drainages are unknown, but no obvious recent mass wasting features were observed in the aerial photos or during the site reconnaissance. Further subsurface investigation in support of final tower foundation design would help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock underlying the ridgelines.

Class III LHAs were delineated adjacent to proposed wind turbines along the southern Tower Line A and along Tower Line C. Class III LHAs are not anticipated to have any impact on the proposed facilities due to the robust nature of the proposed foundation designs.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days from notification of Project termination. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to soils, topography, or erosion. If impacts to earth are anticipated to

occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.1.2.2 No Action Alternative

Under the No Action Alternative, no structures would be built and there would be no road construction or improvement. Potential impacts to the site from geologic hazards would continue as under present conditions. Some potential for erosion could continue from ongoing logging activity, as mitigated by Washington State requirements and BMPs.

3.1.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts of the proposed Project related to geology, soils, topography, and geologic hazards.

- Prior to Project construction, confirm subsurface soil and rock types and strength properties through a detailed geotechnical investigation of the specific locations of all wind Project elements, including wind turbines, access roads, underground trenching corridors, electrical grounding systems, and the substation and Operations and Maintenance facility locations.

- If detailed geotechnical investigations indicate potential for slope instability at Project facilities, ensure that design of these facilities included proper engineering to account for this risk or relocate the facilities on-site to avoid this risk.

- Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), Erosion and Sedimentation Control Plan, and Environmental Protection Control Plan to lessen soil erosion and improve water quality of stormwater run-off through stabilization practices, structural practices, and stormwater management. These Plans would be developed and approved by EFSEC prior to construction or modification of any roads or facilities. EFSEC may require the Applicant to obtain coverage under Ecology's Construction Stormwater General Permit because the Project would disturb more than 1 acre of land.

- Build all structures on the site in accordance with the seismic design provisions of the 2006 version of the International Building Code, and the American Society of Civil Engineers 07-05 standard. Foundations and buildings would be designed for Seismic Zone 2, and the values listed in Table 3.1-1 would be used for seismic design of the Project in accordance with Section 1613.5.3 of the 2006 International Building Code. The occupancy category of the proposed structure is assumed III as per Section 1613.5.6 of the 2006 International Building Code.

Table 3.1-1
2006 International Building Code Seismic Design Values

Parameter	Value	2006 IBC/ASCE 7-05 Reference
Soil Profile Site Class	C	Table 1613.5.2
0.2 Second Spectral Acceleration S_s	0.60 g	Figure 1613.5 (1)
1.0 Second Spectral Acceleration S_1	0.20 g	Figure 1613.5 (2)
Peak Ground Acceleration ($0.4S_{DS}$)	0.186 g	ASCE 7-05 equation 11.4-5
Site Coefficient F_a	1.16	Table 1613.5.3 (1)
Site Coefficient F_v	1.6	Table 1613.5.3 (2)
Seismic Design Category[a]	D	Tables 1613.5.6 (1) & (2)

ASCE – American Society of Civil Engineers
IBC – International Building Code
[a] Assumes Seismic Use Group III

- Conduct a visual inspection of Project facilities following any abnormal seismic activity. These inspections would look for signs of incipient mass movement in areas identified as potentially susceptible to such failures.

- Implement all stormwater pollution prevention activities prior to any clearing and site preparation. Measures would include installation of a stabilized construction entrance, wheel wash, silt fences, hay bales, temporary and/or permanent water conveyance systems, and installation of temporary and/or permanent retention ponds. Dust would be controlled as needed by spraying water on dry, exposed soil.

- Limit clearing, excavation and grading to those areas of the Project Area absolutely necessary for construction of the Project. Areas outside the construction limits would be marked in the field and equipment would not be allowed to enter these areas or to disturb existing vegetation.

- Inspect any installed run-off and erosion control structures at a frequency sufficient to provide adequate environmental protection. Such inspections would increase in frequency during rainfall periods.

- Store additional erosion control supplies, including sandbags and channel-lining materials, on site for emergency use.

- Divert surface runoff around and away from cut and fill slopes using pipes and/or protected channels. If the runoff is from disturbed areas, it would be directed to a sediment trap prior to discharge.

- Construct all Project roads to be gravel surfaced with a low profile. Road construction would be performed in multiple passes starting with the rough grading and leveling of the roadway areas, if necessary. Once rough grade is achieved, a fabric layer would be installed, base rock would be trucked in, spread and compacted to create a road base. A capping rock would then be spread over the road base and roll-compacted to finished grade.

- Placement of all spoils piles would be regulated by the conditions of the stormwater permits.

- Spread soil and rock that is excavated through grading across the site to the natural grade and reseed with native grasses or seeds to control erosion by water and wind.

- Crush larger cobbles into smaller rock for use as backfill or road material or dispose of materials offsite. Those materials that cannot be reused on site would be disposed of in accordance with Skamania County and Ecology regulations for clean fill materials.

3.1.4 UNAVOIDABLE ADVERSE IMPACTS

The primary unavoidable impacts are the potential for landslide and erosion. Both can be mitigated through appropriate design and the application of mitigation measures, but some erosion would nonetheless occur.

3.1.5 REFERENCES

Geomatrix Consultants (Geomatrix). 1995. Seismic design mapping for the State of Oregon. Unpublished final report prepared for the Oregon Department of Transportation.

Harris, S.L. 1988 *Fire and Ice: The Cascade Volcanoes.* The Mountaineers and Pacific Search Press. Seattle, Washington.

Petersen, M.D., A.D. Frankel, S.C. Harmsen, C.S. Mueller, K.M. Haller, R.L. Wheeler, R.L. Wesson, Y. Zeng, O.S. Boyd, D.M. Perkins, N. Luco, E.H. Field, C.J. Wills, and K.S. Rukstales. 2008. Documentation for the 2008 Update of the United States National Seismic Hazard Maps. *USGS Open-File Report* 2008-1128.

Pezzopane, S.K. 1993. Active faults and earthquake ground motions in Oregon. Ph.D. Thesis, University of Oregon, 208 p.

United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2003. *Skamania County Area, Washington, Soil Survey - WA659.*

US Geological Survey (USGS). 2009. Siesmic Hazard Maps and Data. Accessed at: http://earthquake.usgs.gov/research/hazmaps/.

Wolfe, E.W. and T.C. Pierson. 1995. Volcanic-Hazard Zonation for Mount St. Helens, Washington. USGS I 95-497.

3.2 AIR QUALITY

This section describes the existing air quality conditions in the Project Area, the potential for impacts to air quality from the proposed Project, and mitigation measures designed to avoid or minimize those impacts.

3.2.1 AFFECTED ENVIRONMENT

Regulatory Overview

The Clean Air Act (CAA) is the primary federal statue governing air quality. The CAA establishes National Ambient Air Quality Standards for six "criteria pollutants," and local agencies may establish Ambient Air Quality Standards themselves, provided that these are at least as strict as federal standards. Local air quality is measured against these national and state standards, and areas that do not meet the standards are designated as "non-attainment" areas. Skamania County does not have any non-attainment areas for air quality[3].

New stationary sources of air emissions in nonattainment areas must undergo more rigorous permitting than equivalently sized sources in attainment areas, in an effort to bring the nonattainment area back into compliance with the air quality standards. The state of Washington has established rules through Ecology for permitting new sources in both attainment and nonattainment areas of the state, and additional requirements may be imposed by local air authorities. EFSEC issues authorizations for air emissions for sources under its jurisdiction. In general, if potential emissions from stationary sources exceed certain thresholds, approval from the appropriate permitting authority is required before beginning construction.

Under the CAA, new industrial sources of air pollution must receive an air quality permit prior to operation. The two most common permits associated with industrial activity emitting regulated air pollutants are Notice of Construction (NOC)/New Source Review approvals and Prevention of Significant Deterioration (PSD) permits. WAC Chapters 463-39 and 173-400 establish the requirements for review and issuance of NOC approvals for new sources of air emissions under EFSEC jurisdiction. PSD regulations apply to proposed new or modified "major" sources located in an attainment area that have the potential to emit criteria pollutants in excess of predetermined *de minimus* values (40 Code of Federal Regulations [CFR] Part 51). For new generation facilities, these values are 100 tons per year of criteria pollutants for 28 specific source categories, or 250 tons per year for sources not included in the 28 categories.

The Project is not required to go through these permitting processes. A NOC is not required for the proposed Project because there would be no permanent sources of regulated air emissions, and no backup generation or spinning reserves would be required as part of the proposed Project. A PSD permit would not be required; the generation of electricity with wind turbines does not produce air emissions because no fuel is being burned to produce energy.

Although construction emissions are not included in permitting of stationary sources, mobile sources (such as construction equipment and maintenance pickups) are regulated separately under the federal CAA. In addition, Washington State also regulates emissions generated by various construction activities. According to WAC 173-400-300, fugitive air emissions are emissions that "do not and which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening." These emissions include fugitive dust from unpaved roads, construction sites, and tilled land. Fugitive emissions are considered in determining the level of air permitting required only for a certain subset of sources, not including wind power

[3] See: http://www.ecy.wa.gov/programs/air/other/namaps/web_map_intro.htm.

projects. However, pursuant to WAC 173-400-040(8)(a), *"The owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions."*

Other Washington state regulations that apply to nuisance emissions, including fugitive dust, and various equipment used during construction include the following:

- ***WAC 173-400-040(2) Fallout*** states that no person shall cause or allow the emission of particulate matter from any source to be deposited beyond the property under direct control of the owner or operator of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

- ***WAC 173-400-040(3–3a) Fugitive emissions*** states that the owner or operator of any emissions unit engaging in materials handling, construction, demolition, or other operation which is a source of fugitive emissions, if located in an attainment area and not impacting any non-attainment area, shall take reasonable precautions to prevent the release of air contaminants from the operation.

- ***WAC 173-400-040(4) Odors*** states that any person who shall cause or allow the generation of any odor from any source that may unreasonably interfere with any other property owner's use and enjoyment of his property must use recognized good practice and procedures to reduce these odors to a reasonable minimum.

- ***WAC 173-400-040(8a) Fugitive dust*** states that the owner or operator of a source of fugitive dust shall take reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions.

- ***WAC 173-400-035 Portable and Temporary Sources*** states that for portable sources that locate temporarily at particular sites, such as rock crushers and batch plants, the owner(s) or operator(s) shall be allowed to operate at the temporary location providing that the owner(s) or operator(s) notifies Ecology or the local air quality authority of the intent to operate at the new location at least 30 days prior to starting the operation, and supplies sufficient information to enable Ecology or the local air quality authority to determine that the operation would comply with the emissions standards for a new source, and would not cause a violation of applicable Ambient Air Quality Standards and, if in a non-attainment area, would not interfere with scheduled attainment of ambient standards. The permission to operate shall be for a limited period of time (one year or less) and Ecology or the local air quality authority may set specific conditions for operation during that period. A temporary source shall be required to comply with all applicable emission standards.

Greenhouse Gases

Greenhouse gases are gases that trap heat in the atmosphere, and are implicated in potential global climate change. Some greenhouse gases such as carbon dioxide occur through both natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are

created and emitted solely through human activities. The most abundant greenhouse gasses are water vapor, carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons[4]. However, because different gasses have different heat-trapping effects, the most abundant greenhouse gasses are not necessarily the largest contributors to potential climate change.

Greenhouse gases are discussed in this section because in the United States, energy-related activities account for 75 percent of human-generated greenhouse gas emissions, mostly in the form of carbon dioxide emissions from burning fossil fuels. Half of all emissions from energy-related activities come from large stationary sources such as power plants (USEPA 2009).

Largely because of the contribution of hydropower, energy generation in the Pacific Northwest, including the Federal Columbia River Power System, produces less carbon dioxide per MW-hour than any other region in the United States. The Federal Columbia River Power System alone produces about 7,000 average MW of hydro-electricity even in a dry water year, enabling the region to sustain its relatively small carbon footprint.

Like hydropower, production of electricity from wind produces no direct emissions of greenhouse gasses or other air pollutants. The generation of wind energy also displaces generation from individual fossil-fuel-fired power plants or units, thereby reducing fuel consumption and the resulting air emissions that would have otherwise occurred.

State Regulation of Greenhouse Gasses

In Washington State, greenhouse gasses are regulated by RCW Chapter 80.80, which establishes goals for statewide reduction of greenhouse gas emissions. The statute aims to reduce overall greenhouse gas emissions to 1990 levels by 2020, and to 25 percent below 1990 levels by 2035. By 2050, the state intends to reduce overall emissions to fifty percent below 1990 levels. Goals also include fostering a clean energy economy by increasing the number of jobs in the clean energy sector to 25,000 by 2020, from just over 8,000 jobs in 2004. Ecology has proposed regulation (Chapter 173-441 WAC)[5], which would establish an inventory of greenhouse gas emission through a mandatory greenhouse reporting rule for owners or operators of:

- A fleet of on-road motor vehicles that as a fleet emit at least 2,500 metric tons of greenhouse gases annually in the state
- A source or combination of sources that emit at least 10,000 metric tons of greenhouse gases annually in the state

Since wind power projects would not emit greenhouse gasses during operations, these regulations are unlikely to apply to the Project.

Bonneville Power Administration Greenhouse Gas Initiatives

In 2008, BPA adopted new initiatives related to climate change, and included the issue in their strategic objectives and key agency performance targets. One of BPA's first steps was to prepare

[4] See: http://en.wikipedia.org/wiki/Greenhouse_gas#cite_note-kiehl197-6; accessed December 2009.

[5] See: http://www.ecy.wa.gov/laws-rules/activity/wac173441.html; accessed December 2009.

an initial climate change roadmap (BPA 2008)[6] intended as a step toward subsequent, more robust plans for managing greenhouse gas emissions. This document identifies near-term and long-term potential actions to meet agency targets and contribute to national and regional greenhouse gas reduction goals. As a first step in managing greenhouse gas emissions, BPA has collected data in 2009 to inventory BPA's greenhouse gas footprint, which were reported in 2010.

Background Air Quality

The Dalles, Oregon is the closest city with an air monitoring station. The Oregon Department of Environmental Quality (ODEQ) reports air quality data using an air quality index based on particulate matter 2.5 micrometers diameter and smaller ($PM_{2.5}$). ODEQ's 2008 report for The Dalles shows 339 days with good air quality, 25 days with moderate air quality, and no days with unhealthy air quality (ODEQ 2009).

While air quality in the Project Area is generally good, haze is a well-documented problem in the Columbia Gorge and the causes are being studied by the Southwest Clean Air Agency. In a 2008 Report, the agency found that haze was largely caused by winter stagnations that trap pollutants and fog (SWCAA 2008). In the summer, winds flow predominantly from the west, transporting emissions from the Portland metropolitan area into the Gorge. Wildfires also contribute to the haze when smoke is blown into the Gorge. There is no single source that is primarily responsible for haze; however, man-made sources are important contributors (ODEQ 2008). The most significant man-made sources contributing to haze in the Gorge include:

- Power plant emissions
- Woodstoves
- Motor vehicles
- Non-road emissions (e.g. ships, trains, trucks)
- Agricultural sources of ammonia

The Skamania Fish Hatchery, located west of the Project Area, collected climatological data in the Project Area for 1965–2005. Average temperatures ranged from a minimum of 38.2 degrees Fahrenheit to a maximum of 61.8 degrees Fahrenheit. Average precipitation was 84.06 inches, and there was an average of 9 inches of snow per year.[7]

---

[6] Bonneville Power Administration, http://www.bpa.gov/corporate/pubs/Climate_Change_2008_Initial_Roadmap_final.pdf; accessed December 2009.

[7] Columbia Gorge Economic Development Association, http://www.cgeda.com/environment/quclimat.shtml.

3.2.2 IMPACTS

3.2.2.1 Proposed Action

The potential environmental consequences of the proposed Project include those from construction and operation. Impacts to air quality would not differ between the two alternative locations for the Operations and Maintenance Facility. Potential impacts include emissions, odors and dust.

Construction

Emissions

Construction of the Project would result in temporary air emissions from the following sources:

- Exhaust from the diesel construction equipment used for Project Area preparation (including logging), grading, excavation, and construction of on-site structures
- Exhaust from water trucks used to control construction dust emissions
- Exhaust from diesel trucks used to deliver equipment, concrete, fuel, and construction supplies to the construction site
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site and from vehicles used by workers to commute to the construction site
- Exhaust from diesel-powered welding machines, electric generators, air compressors, etc.
- Emissions from one or more portable rock crushers and one or more portable concrete batch plants, which would be used as necessary to supply the large amounts of gravel and concrete needed for the Project

The primary air pollutants from diesel-powered equipment would be nitrogen oxides, hydrocarbons, carbon dioxide, particulate matter (PM) and sulfur dioxide. In addition to these, the rock crusher and batch plant(s) would produce additional PM. These emissions would be similar in nature to those produced by any construction project that involves heavy equipment and transportation of materials to the Project Area. These construction emissions would be temporary and would be limited to the areas adjacent to the construction site. They would not affect a substantial number of persons or persist for an extended period of time and would not result in exceedance of any air quality standards.

Odors

Project construction would produce limited odors associated with exhaust from diesel equipment and vehicles, and painting the Operations and Maintenance facility, turbine towers, and other structures. The effect of odors would be temporary, and would be limited to the areas adjacent to the construction site and along haul routes to the batch plant(s) and rock crusher. Odors would not affect a substantial number of persons or persist for an extended period of time. An

occasional small amount of diesel exhaust may be noted from trucks entering or leaving the site from public roadways.

Dust

Project construction would create fugitive dust from construction and re-construction of gravel roads, including from rock crushing and/or a concrete batch plant. Small amounts of dust would be created by construction-related traffic and additional wind-blown dust as a result of ground disturbance. The presence and impact of dust would be temporary, and would be limited to areas adjacent to the construction site and along haul routes. Dust would not affect a substantial number of persons or persist for an extended period of time. A small amount of dust may be noted from trucks entering or leaving the site from public roadways.

Operation

Emissions

Since the fuel source for the proposed Project would be wind, there would no emissions from the operation of the turbines. Project operation would not produce visible plumes, fogging, misting, icing, or impairment of visibility, or changes in ambient levels of pollutants. Emissions would occur from Operations and Maintenance vehicles. Travel on the Project access roads would produce minor exhaust emissions.

Avoided Emissions

Project operation would avoid the use of fossil fuel to meet the energy needs of the region. The Project's annual electricity production is estimated at 197,000 megawatt hours (MWh). This energy is equivalent to 114,000 barrels of crude oil or 654 million cubic feet of natural gas. Total electricity production can be used to estimate the emission displaced by a fossil-fuel alternative. Table 3.2-1 shows emission rates for carbon dioxide and sulfur dioxide for fossil-fuel-based power plants in the Northwest Power Pool, along with estimated emissions avoided from the operation of the wind power plant. This table also shows the displaced emissions from the Project as a percentage of Washington State emissions for 2004.

Table 3.2-1
Air Pollutant Emissions Displaced by the Project

Air Pollutant	Emission Rates[a] (lb/MWh)	Tons Displaced by Project[b]	Washington State Emissions 2005	Project as % of Washington Emissions
Carbon dioxide	1334[c]	131,466	16,882,540[c]	0.7
Sulfur dioxide	1.573	155	4,525	3.4

[a] Non-baseload output emission rates for Northwest Power Pool Western Electric Coordinating Council Northwest Region. A non-baseload emission factor was used to calculate the avoided emissions from the Project, based on guidance from the US Environmental Protection Agency that *"Annual non-baseload output emission rates … can be used to estimate GHG emissions reductions from reductions in electricity use. These output emission rates, called annual non-baseload emission rates, are the annual output emission rates for plants that combust fuel and have capacity factors less than 0.8. These new data values are derived from plant level data and supplement, rather than replace, the fossil fuel output emissions rates, which are sometimes used as a rough estimate to determine how much emissions could be avoided if energy efficiency and/or renewable energy displaces fossil fuel generation. These non-baseload output emission rates would somewhat improve this rough estimate by factoring out baseload generation, which is generally unaffected by measures that affect marginal generation"* (USEPA 2007).
[b] Estimated annual electricity production multiplied by emission rate, for example, for carbon dioxide (1,334) x [(75 MW) x (0.30 capacity factor) x 24 x 365]/2000 = 131,465.7 tons
[c.] 2005 value; values for 2005 were not available for the other pollutants listed.

By avoiding the need for fossil-fuel-powered plants, the Project would contribute to air quality by avoiding emissions associated with burning fossil fuels, including greenhouse gasses. Using wind power also likely would have a beneficial effect on visibility, since the same pollutants that affect visibility also affect air quality (ODEQ 2008).

Greenhouse Gas Emissions from the Project

Greenhouse gasses would be emitted during construction of the Project, as a result of burning fossil fuels in the construction equipment and vehicles. The amount of these emissions has not been quantified, but would be directly proportional to the number of workers and vehicles on the site. Some emissions of greenhouse gases would take place during the design, manufacture, transport of the wind turbines. During operation, greenhouse gas emissions would be the result of vehicles used for regular maintenance activities and would be much lower than during construction. Production of electricity itself would not release greenhouse gasses or other pollutants. ~~The American Wind Energy Association estimates that including generation from all sources, wind energy's carbon dioxide emissions are on the order of 1 percent of coal or 2 percent of natural gas per unit of electricity generated (AWEA 2009).~~

While greenhouse gas emissions from the Project would be low, several of the mitigation measures mentioned in Section 3.2.3 would reduce such emissions. These include limiting idling times of equipment and encouraging carpooling among construction workers.

Odor

Operation of the turbines would create no odors, as no combustion is involved and no odor-producing materials would be used in Project operations. Travel on the Project access roads would produce insignificant amounts of odor from exhaust. Maintenance of the substation and Operations and Maintenance building would produce occasional minor odors from painting.

Dust

Operation of the Project would result in minor increases in dust during regular maintenance of gravel access roads. Project-related increases to traffic on these gravel roads would generate

small amounts of additional fugitive dust. This increased traffic would consist largely of weekly or less frequent trips to turbines in service vehicles for maintenance and repair activities.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential emissions or impacts to air quality. If impacts to air quality are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.2.2.2 No Action Alternative

Under the No Action Alternative, the Project would not be built. The Project Area would continue to be used primarily for timber harvests. If the No Action Alternative is selected, the growing electricity needs of the region would continue to be met through a combination of other renewable development and combustion of additional fossil fuels. In recent years, several of the new power plants proposed and constructed in the Pacific Northwest have been fossil-fuel-powered plants, primarily using natural gas as fuel in combined-cycle combustion turbines.

~~Fossil fuel power plants, in contrast to wind power projects, emit significant quantities of carbon dioxide, an important greenhouse gas linked to potential climate change. Natural-gas-powered plants also emit sulfur oxides and nitrogen oxides, which contribute to both ground-level air quality problems and acid rain. According to the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006* (USEPA 2008), air emissions from fossil fuel combustion for electricity production are a leading source of air pollution nationally, accounting for:~~

- ~~67 percent of sulfur dioxide emissions;~~
- ~~28 percent of nitrogen oxide emissions;~~
- ~~36 percent of carbon dioxide; and~~
- ~~3 percent of mercury.~~

3.2.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential construction-related air emissions and dust impacts:

- Ensure that all vehicles used during construction comply with applicable Federal and state air quality regulations.

- Implement operational measures, such as limiting engine idling time and shutting down equipment when not in use, to reduce air emissions.

- Implement active dust suppression on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations.

- Implement a dust control program to minimize any potential disturbance from construction-related dust. Dust suppression would be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin. The use of a dust palliative such as lignin (a non-toxic, non-hazardous compound derived from trees) would result in the use of substantially less water for dust suppression and therefore less traffic from water trucks to the construction site. The final decision regarding dust suppression techniques would be made by the Construction Contractor in consultation with local authorities.

- Limit traffic speeds on unpaved Project roads to 25 mph to minimize dust.

- Encourage carpooling among construction workers to minimize construction-related traffic and associated emissions.

- Replant or gravel disturbed areas to reduce wind-blown dust.

- Implement erosion control measures to limit deposition of silt to roadways.

3.2.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed Project would produce minor and temporary impacts to air quality during construction activities, similar to existing logging operations.

3.2.5 REFERENCES

American Wind Energy Association (AWEA). 2009. *Wind Energy and the Environment*. Accessed December 2009 at: http://www.awea.org/faq/wwt_environment.html.

Bonneville Power Administration (BPA). 2008. Climate Change, BPA's Initial Roadmap. December. Accessed December 2009 at: http://www.bpa.gov/corporate/pubs/Climate_Change_2008_Initial_Roadmap_final.pdf.

Oregon Department of Environmental Quality (ODEQ). 2008. *Columbia River Gorge Air Study and Strategy*, Oregon DEQ and Southwest Clean Air Agency, Draft, February 29. Accessed October 2009 at: http://www.deq.state.or.us/aq/gorgeair/docs/GorgeStrategyDRAFT.pdf.

———. 2009. 2008 Oregon Air Quality Data Summaries. June. http://www.deq.state.or.us/aq/forms/2008AQreport.pdf.

Southwest Clean Air Agency (SWCAA). 2008. *Columbia River Gorge Air Quality Study, Science Summary Report, Columbia River Gorge National Scenic Area.* Final Report. February 8. Accessed October 2009 at http://www.swcleanair.org/gorgedata/FinalScienceSummaryReportFeb8-08.pdf.

United States Environmental Protection Agency (USEPA). 2009. *Climate Change*. Accessed December 2009 at http://www.epa.gov/climatechange/basicinfo.html.

———. 2007. *The Emissions & Generation Resource Integrated Database for 2006 (eGRID2006) Technical Support Document.* April.

———. 2008. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*. April.

3.3 WATER RESOURCES

This section describes the existing water resources in the Project Area, the potential for impacts to water resources from the proposed Project, and mitigation measures designed to minimize or avoid those impacts. Information in this section is taken primarily from the Application for Site Certification and the visual assessment completed for that document.

3.3.1 AFFECTED ENVIRONMENT

3.3.1.1 Surface Water

The Columbia River flows south of the Project Area and receives runoff via the White Salmon Basin from the east portion of the Project Area and via the Little White Salmon Basin from the west portion of the Project Area. Surface water resources in and near the Project Area are shown on Figure 3.3-1 and include the following:

One wetland labeled "Cedar Swamp" on Figure 3.3-1 and described in Section 3.4.

- Several drainages located within the Project Area boundaries, which are typed as seasonal, non-fish habitat streams or perennial, non-fish habitat streams (Figure 3.3-1). Some drainages extend upstream from these typed reaches, but lack defined channel features. Most of the drainages within the Project Area boundary would be classified as Class V streams under Skamania County's critical areas ordinance. Class V streams are small perennials streams or seasonal streams with short periods of spring or storm runoff (SCC 21A Appendix C). The tributary to Little Buck Creek may be classified as a Class IV stream as it nears the eastern Project Area boundary. The stream information has been updated from the information contained in the Application for Site Certification with additional data from field visits.

- One unnamed perennial stream crossed by West Pit Road, the proposed access road. This stream occurs in the Little White Salmon watershed. Flow was observed through the

existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to any other stream or waterbody.

3.3.1.2 Stormwater Runoff

Water runoff from the northeast portion of the Project Area drains southeast via Cedar Swamp and its tributaries to Little Buck Creek before flowing south to the White Salmon River, and ultimately to the Columbia River. Water runoff from the southwest area of the Project drains west and southwest to a flat area east of the Project, ultimately draining to the Little White Salmon River and then the Columbia River.

Project Area soils are classified as well-drained, with slow to moderate runoff, and slight to moderate hazard of water erosion. The presence of scour, sedimentation, steep slopes, ephemeral and perennial streams, and the soil classifications suggest that surface water runoff and infiltration within the Project are moderate (Haagen 1990).

3.3.1.3 Groundwater

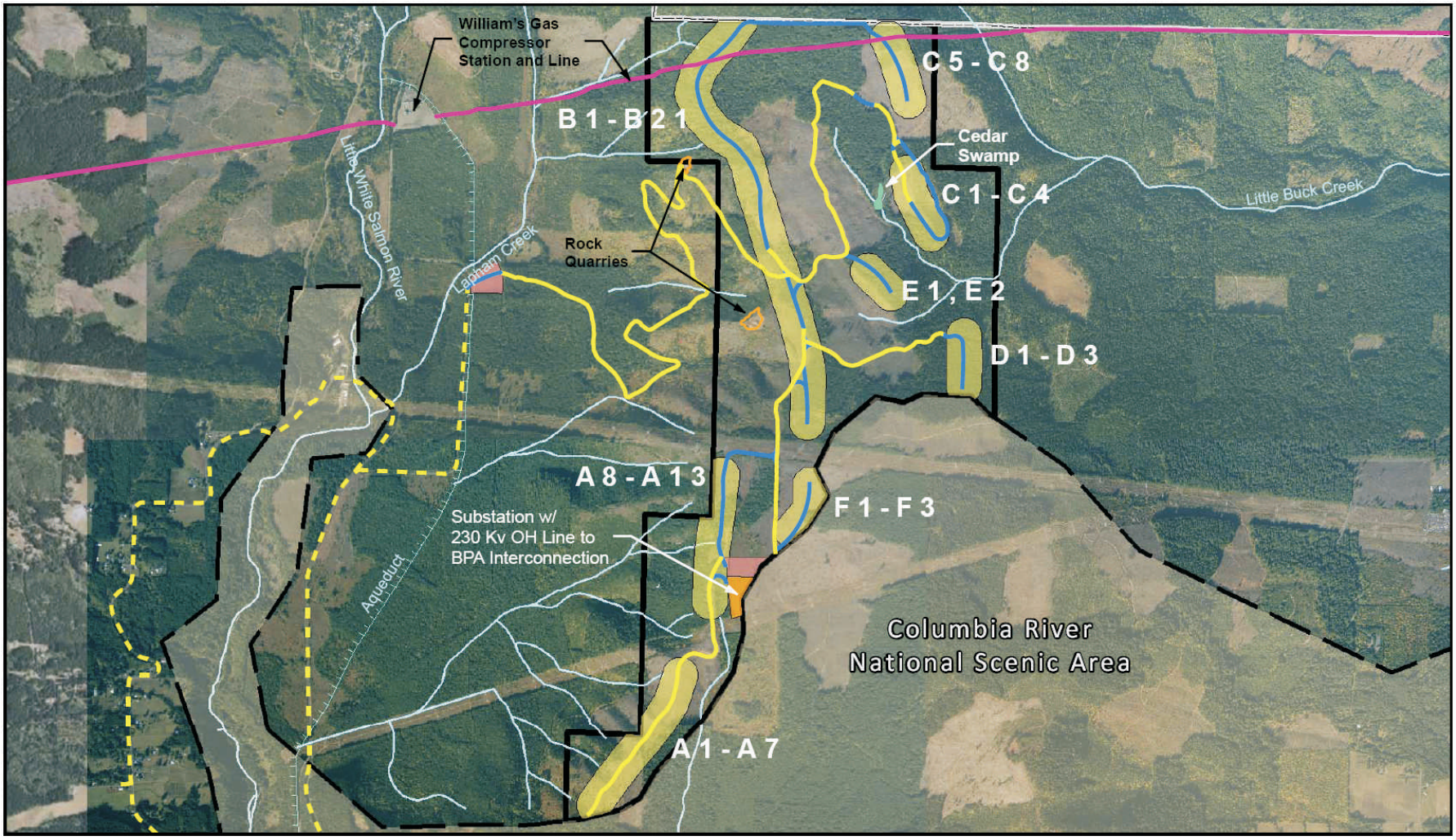
A subsurface investigation was conducted in September 2007 to assess near-surface soil and rock characteristics (Appendix B). The investigation included twelve test pits excavated from seven to 16 feet in depth. Groundwater was not encountered in any of the test pits. However, these observations reflect groundwater levels at the time of the field investigation and actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors not observed during this investigation. Regional or perched water tables may be present at a greater depth.

3.3.1.4 Floodplains

The Project Area is located on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet, outside the 100-year floodplain for the White Salmon, Little White Salmon, and Columbia Rivers (FEMA 1986).

3.3.1.5 Public and Private Water Supplies

There are no public water supplies within the Project Area. Private water supplies are limited to water supply wells serving adjacent residences and agricultural operations.



Job No. 33758687

Figure 3.3-1
Waterways in the Project Vicinity

3.3.2 IMPACTS

3.3.2.1 Proposed Action

Construction

Surface Water

On site, Project construction would involve roadway improvements on approximately 7.9 miles of existing private, gravel logging roads, construction of approximately 2.4 miles of new gravel access roads, the Project substation, an Operations and Maintenance building at one of two alternative sites, the collector system pad, a pad for each turbine tower, and underground electric cables buried in trenches along the access roads. Temporary roadways would be built to provide additional access for heavy machinery during construction. Of these improvements, only the planned improvement to West Pit Road may directly affect water resources.

The planned improvements to West Pit Road would cross one unnamed drainage that currently flows under West Pit Road through a culvert. This drainage would be classified by Skamania County as a Class V stream. The Skamania County Code establishes buffers for Class V streams; however, expansion of existing uses is allowed within these buffers. The culvert under West Pit Road was upsized during road improvements in summer 2009. Depending on the amount of additional roadway widening that may be required, this new culvert may need to be lengthened to extend beyond the width of the improved access road. This would be determined in during final design.

Small portions of stream and stream buffer are located with the 650-foot turbine corridors used for permitting this Project. However, all streams and stream buffers would be avoided during the micrositing process.

No wetlands or other surface water bodies would be filled or otherwise affected as a result of the Project. Wetlands are discussed in further detail in Section 3.4.

Stormwater Runoff

Construction would result in approximately 108 acres of disturbed surface, of which approximately 52 acres would be restored. Use of standard construction BMPs would mitigate surface runoff and erosion from these surfaces to a minor level.

Groundwater

No impacts to groundwater are anticipated from construction. Construction water would be obtained from a supplier with valid water rights and no construction water would be withdrawn on site. Potential spills to groundwater during construction would be controlled through standard construction BMPs. A Spill Prevention, Control and Countermeasure (SPCC) Plan would be prepared.

Floodplains

The Project Area is located outside of floodplain areas. No construction impacts to floodplains would occur.

Public and Private Water Supplies

During construction, approximately 1.7 million gallons of water would be used for road construction, wetting of concrete, dust control, and other activities. Water consumed during construction would be purchased by the contractor from an off-site vendor with a valid water right and transported to the Project Area in tanker trucks. No water would be withdrawn from the Project Area during construction. There would be no water treatment requirements or methods on site. Environmentally benign dust palliatives such as lignin may be added to water used for dust suppression to improve efficiency and reduce water use.

Operation

Surface Water

No impacts to surface water are anticipated from Project operation.

Stormwater Runoff

The total Project Area is approximately 1,152 acres; however, permanently improved areas would cover approximately 56 acres, less than 5 percent of the total Project Area. Stormwater impacts from disturbed areas would be generated from this permanently improved area.

The increase in surface water runoff from this additional impervious surface is expected to be minimal. Stormwater would continue to be routed off-site via culverts and some stormwater would continue to infiltrate in the way it does currently. Based on site conditions and assuming implementation of appropriate BMPs, the net impact to absorption in the Project Area is considered negligible and there would be negligible impacts to surface water.

Approximately 22 acres would be converted from forested to non-forested habitat in the areas surrounding the turbines where re-growth of trees would be prevented. This conversion would result in minimal impacts to precipitation interception and runoff.

Groundwater

Operation of the Project would have minimal or no impacts to groundwater. The well serving the Operations and Maintenance building would use less than 5,000 gallons of water per day, and would thus be exempt from permit requirements of RCW 90.44.050 ~~RCW 90.44.040~~. The size of the aquifer is not known; however, this would be the only well in the Project Area, which is approximately 1,152 acres in size. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for new wells.

Although the amount of impervious surface would increase by approximately 52 acres with the construction of the Project, impacts to groundwater recharge during operation would be negligible.

Floodplains

The Project Area is located outside of floodplain areas. No impacts to floodplains would occur from operation of the Project.

Public and Private Water Supplies

Project operation would require water use primarily for the bathrooms, showers, and kitchen in the Operations and Maintenance building. When the Project is operational, there would be eight to nine permanent full-time and/or part-time employees on the Operations and Maintenance staff. The average total water supply needs would be less than 5,000 gallons per day.

Water supply for the Operations and Maintenance staff would be provided through a well drilled within the Project Area. All water would be discharged to a septic tank installed on site, and thus most of the water used would be returned to the aquifer. There would be no process water generated on site, and no water associated with plant operations would be discharged to surface waters.

The Project would not require the use of any water for cooling or any other industrial use, and there would be no industrial wastewater stream from the Project. The Project would require and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and Ecology.

The Project would not require any new water rights or authorizations beyond the well for the Operations and Maintenance building.

Due to the low volume of water that would be required for operational use, no alternatives to reclaim water or other water reuse projects would be required.

Project water use is not expected to affect water levels in private wells in the vicinity of the Project. There are no public water supplies within the Project Area; therefore, no impacts are anticipated to public water supplies.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to surface water flow, water quality, stormwater runoff, groundwater quality, or water supply. If impacts to water resources are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.3.2.2 No Action Alternative

Under the No Action Alternative the Project would not be built, and there would be no well drilled to support the Operations and Maintenance building. No impacts to surface or ground water would occur.

3.3.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts of the proposed Project related to water resources during pre-construction, construction, and operation.

- Prepare and implement a Stormwater Pollution Prevention Plan (SWPP) prior to construction of the proposed Project to lessen soil erosion and improve water quality of stormwater run-off. The SWPP would be developed to prevent movement of sediment off-site to adjacent water bodies during short term or temporary soil disturbance at construction sites. The plan addresses stabilization practices, structural practices and stormwater management (as outlined by Section 402(p) of the Federal Clean Water Act and Chapter 90.48 RCW of the State of Washington's Water Pollution Control Act).

- Identify all areas of potential chemical storage during construction, including any herbicides, and provide appropriate control measures within the SWPP.

- Control the sequence and methods of construction activities to limit erosion. Clearing, excavation, and grading would be limited to the minimum areas necessary for construction of the Project, and would not be performed far in advance of facility construction.

- Design slopes to be graded no steeper than 3 feet horizontal (H) to 1 foot vertical (V).

- Protect slopes less than 3H:1V with silt fencing as appropriate. Silt fences would be installed in locations where they would trap silt eroded from slopes during construction and prior to reestablishing vegetation. The maximum flow path to each silt fence would be approximately 100 feet. No concentrated flows greater than 1 cubic foot per second would be directed toward any fence for the 25-year storm. Silt fences would be maintained throughout the construction period and beyond, until disturbed surfaces had been stabilized with vegetation. Silt fence construction would be determined by local construction conditions during final design of the facilities.

- Design sediment control measures used during construction based on 10-year design storm specifications. Water quality measures (other than sediment removal) would be based on the 6-month, 24-hour design storm.

- Utilize sediment traps to intercept stormwater runoff and allow sediment to settle, thereby minimizing the amount of sediment flowing off site. Sediment traps would be sized for the specific disturbed area, for bare soil conditions, and typically for 75 percent sediment removal efficiency.

- Implement and emphasize erosion controls over sediment controls through non-quantitative construction activities such as:
  - Straw mulching and vegetating disturbed surfaces;
  - Retaining original vegetation wherever possible;
  - Timing grading operations to dry seasons;
  - Directing surface runoff away from denuded areas;
  - Keeping runoff velocities low through minimization of slope steepness and length; and
  - Providing and maintaining stabilized construction entrances.
- Grade control structures such as rock check dams, hay bale check dams, dikes, and swales would be used where appropriate to reduce runoff velocity, as well as to direct surface runoff around and away from cut-and-fill slopes. Swales and dikes also would be used to direct surface water on top of the filled pad toward sediment traps and away from flowing over the bank.
- Utilize the appropriate erosion control blankets designed for various weather conditions during the construction period, such as straw or jute matting or other suitable erosion control blankets, on any disturbed slopes to prevent erosion and control sediment migration.
- Use quarry spall construction entrances to reduce migration of construction dirt to public roads. Placing the construction entrances is one of the first activities required at the site, but the rock bed also must be periodically replenished as it becomes dirty or migrates into the subgrade. All construction traffic would be directed to use the construction entrances.
- Restore ground surfaces within fourteen days of the area's final disturbance. Interim surface protection measures, such as erosion control blankets or straw matting, also may be required prior to final disturbance and restoration if warranted by the potential for erosion.
- Reduce potential for chemical pollution of surface waters during construction. Since source control is the most effective method of preventing chemical water pollution, careful control must be exercised over potentially polluting chemicals used on site during construction. Under the SPCC Plan, the general contractor would be responsible for planning, implementing, and maintaining BMPs for:
  - Neat and orderly storage of construction chemicals and spent containers in lined, bermed areas;
  - Prompt cleanup of construction phase spills; and
  - Regular disposal of construction garbage and debris.
- Train employees to utilize methods outlined by the SWPP.

- Dispose and contain garbage generated during construction properly.
- Design and incorporate BMPs into final construction plans and specifications so that operational impacts to water resources would be minor.
- Construct appropriate stormwater hydraulic and treatment facilities making sure that routine maintenance and chemical pollution prevention through source control are utilized for permanent stormwater management.
- Utilize the following constructed permanent stormwater BMPs:
    - Vegetated drainage ditches;
    - Culverts with stabilized inlets and outlets;
    - Permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover; and
    - Runoff treatment BMPs facilities would be designed to conform to the applicable Stormwater Management Manual.
- Adopt operational BMPs to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices as necessary to prevent stormwater pollution. Examples include:
    - Neat and orderly storage of chemicals under cover in the Operations and Maintenance facilities;
    - Prompt cleanup and removal of spillage;
    - Regular pickup and disposal of garbage and rubbish; and
    - Prevention of accumulations of liquid or solid chemicals on the ground or the floor.
- Train facility operators annually to in spill response and in the applicable pollution control laws and regulations.
- Train additional staff to recognize areas that may be affected by a spill and potential drainage routes.
- Train additional staff to report spills to appropriate individuals.
- Train additional staff on the appropriate material handling and storage procedures.
- Train additional staff to implement spill response procedures.

- Summarize in-house compliance inspections to be kept with the SWPP, along with any notifications of non-compliance and reports on incidents such as spills. If the SWPP has been followed but still proves inadequate to prevent stormwater pollution, Project staff would amend the SWPP and seek EFSEC concurrence with the improvements.

- Utilize BMPs to include vegetated ditches or swales which would increase infiltration to protect groundwater.

- Utilize a site development plan to protect groundwater from the on-site storage of chemicals (if any).

3.3.4 UNAVOIDABLE ADVERSE IMPACTS

Construction and operation of the Project would only result in negligible to minor impacts to water resources because the impacts are localized and the disturbance is short-term.

3.3.5 REFERENCES

Federal Emergency Management Agency (FEMA). 1986. Flood Insurance Rate Map, Skamania County, Washington; Community Panel Number 530160 075 B.

Haagen, Edward. 1990. *Soil Survey of Skamania County Area, Washington*. US Department of Agriculture, Natural Resources Conservation Service, Washington Soil Survey Program.

3.4 BIOLOGICAL RESOURCES

This section describes the existing biological resources in the Project Area, including vegetation, habitat, wetlands, special status species, fish and other wildlife. It also considers the potential for impacts to biological resources as a result of construction and operation of the Project, and mitigation measures designed to minimize those impacts. Information in this section is taken from the following background studies and reports:

- Vegetation Technical Report: Saddleback Wind Project (CH2MHill, no date) (Appendix C-1);

- Wetland Delineation Report, Saddleback Wind Energy Project (CH2MHill 2007) (Appendix C-2);

- Rare Plant Survey Report: Saddleback Wind Project (CH2MHill 2003) (Appendix C-3);

- Baseline Avian Use Surveys of the Project in Fall 2004, Summer 2006, and winter-spring 2008-2009 (West Inc. 2009a) (Appendix C-4);

- Final Report, Northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project (Turnstone 2004) (Appendix C-5);

- 2008 Final Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2008) (Appendix C-6);

- 2009 Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. (Turnstone 2009) (Appendix C-7);

- Bat Acoustic Studies for the Whistling Ridge Wind Resource Area in 2007 (West Inc. 2008; Appendix C-8), 2008 (West Inc. 2009b; Appendix C-9), and 2009 (West Inc. 2009c; Appendix C-10);

- Revised Report, Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon (WEST 2010; Appendix C11) prepared for Klickitat County;

- Washington Natural Heritage Program (WNHP 2003a, 2003b, 2009);

- Discussions with representatives of Washington Department of Fish and Wildlife and USFWS;

- Supplemental wetland reconnaissance and special status plant surveys in May and July 2009;

3.4.1 AFFECTED ENVIRONMENT

3.4.1.1 Regional Environment

The Project Area is located in the Southern Washington Cascades Province, within the grand fir (*Abies grandis*) and Douglas-fir (*Pseudotsuga menziesii*) major vegetation zones (Franklin and Dyrness 1988). Topography in the area is characterized by generally accordant ridge crests, separated by steep, deeply dissected valleys. The prevailing climate is cool and wet. The majority of precipitation falls as snow, which may accumulate one to three meters during the winter season. The site is located on Underwood Mountain. Major drainages in the vicinity of the Project Area include the White Salmon Basin to the east and the Little White Salmon River Basins to the west, both of which drain to the Columbia River, which is located south of the Project Area.

Historically, the Project Area was dominated by grand fir and Douglas-fir. The relative abundance of each of these coniferous species was driven by elevation, aspect, underlying soil, and previous disturbance history (Franklin and Dyrness 1988). Mixed conifer and deciduous forest stands were present, typically following natural disturbance events. Deciduous forests also were present, composed mainly of alder (*Alnus rubra, A. viridis* ssp. *sinuata*), Pacific dogwood (*Cornus nuttallii*), and big-leaf maple (*Acer macrophyllum*).

For the last century, the predominant land use in the area located between Underwood Mountain and the Little White Salmon River has been commercial forest production. Lands within the Project Area are privately owned, and have been actively-managed for timber for the last

century. As a result of ongoing timber harvest, forests within the Project Area are now characterized by a mosaic of stand ages; however, average stand age has declined as a result of relatively short stand rotations.

Changes in stand structure and complexity, patch size, and species distribution also have occurred. Forest management practices have resulted in a shift in species dominance to the commercially valuable Douglas-fir. ~~Changes in stand structure and complexity, patch size, and species distribution also have occurred.~~ Few large, old-growth conifers exist in the Project vicinity, and there are no late-successional stands or old forest habitats (using Washington Forest Practices habitat definition) within or adjacent to the site.[8] Canopy species within the corridor areas have been removed, and areas are managed to be devoid of shrub and tree species.

The proposed turbine corridors have been forested recently in general conformance with established timber harvest schedules, and are connected by a network of existing forest roads. Four major BPA high voltage transmission lines, located in two corridors, cross the site. Canopy species within these two corridors have been removed, and areas are managed to be devoid of shrub and tree species. The Project Area contains a network of roads ranging in width from approximately 8 to 20 feet. These roads are currently used to support logging activity and to access BPA transmission lines.

A Williams Northwest natural gas pipeline is located on the northern edge, their natural compressor station is located to the west, and cellular towers and communications facilities are located nearby. Resource mining in the area has left rock pits in places. As a result, the Project Area includes only heavily managed native habitat and is permanently committed to use by commercial forestry operations and utility infrastructure ~~no native habitat and is permanently committed to use by commercial forestry operations and utility infrastructure~~.

Initial habitat, vegetation, and special status plant surveys were conducted within the Project Area in 2003. Environmental assessments included a pre-field information review and field surveys designed to classify habitats and identify special status plants that may occur within the Project Area. Supplemental habitat, vegetation, and special status plant surveys were conducted in 2009.

3.4.1.2 Habitats

Habitat maps were created using DNR orthophotos from January 2002 and classified using the USFS Classification System (USFS 1985). Habitat maps were field-verified during the 2003 survey season. These data were entered into a GIS database and used to calculate the total acres of each habitat type that would be crossed by the proposed Project elements. The results of the habitat survey are provided in the Vegetation Technical Report (Appendix C-1).

[8] "Adjacent" refers to defined as non- Applicant lands that were within 1.8 mile of the proposed turbine strings and/or the two known northern spotted owl management areas (Mill and Moss Creek) north of the Project Area.

Five vegetation communities and wildlife habitats were identified within the Project Area:

- Grass-forb stand (recent clearcuts);
- Brushfield/shrub stand;
- Conifer-hardwood forest;
- Conifer forest; and
- Riparian-deciduous forest.

All five of the vegetation communities are part of a mosaic of habitat that comprises a commercial forest operation, as discussed in Section 3.4.1.1. Because of these man-made conditions, which result in frequent and repeated disturbance, the quality and value of the forest is generally considered low. Native tree species are used in timber production; however, they are not allowed to become mature forests prior to harvesting. Stand structure also is considered to be low quality with limited undergrowth of a few species. Weeds are present, especially in clear cuts, which are eventually cleared for regeneration. Patch size of forests are generally small, and bisected by numerous roads, transmission lines and other facilities for logging. Timber harvest rotations are ongoing; therefore, future quality of the habitat in the Project Area is also considered low.

Grass-Forb Stand

Grass-forb stands are defined as habitats where shrubs comprise less than 40 percent crown cover and are less than 5 feet tall (USFS 1985). This stand type typically occurs when a natural or anthropogenic disturbance such as a wildfire, wind, or timber harvest results in the removal or death of the majority of large trees, or when brushfields are cleared for planting. These habitats may be devoid of vegetation, or covered by herbaceous grasses and forbs. Tree regeneration in grass-forb stands is typically less than 5 feet tall and 40 percent crown cover. Grass-forb stands within the Project Area are located primarily in recently clearcut harvest areas. Vegetation in these areas is minimal and consists predominantly of weedy herbaceous species, including bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and dandelion (*Taraxacum officinale*). Coarse woody material, occasional slash piles, and large areas of bare ground are common in these areas.

Brushfield/Shrub Stand

Brushfields are defined as the shrub-dominated habitats (USFS 1985). These habitats typically develop following clearcut harvest, or natural disturbance that may result in removal of vegetation.

The majority of brushfields are young plantations that have been planted with Douglas-fir. The plantations typically have not reached the closed-canopy stage. Vegetation consists of remnant forest understory species, such as vine maple (*Acer circinatum*), Sitka alder, beaked hazelnut (*Corylus cornuta* var. *californica*), serviceberry (*Amelanchier alnifolia*), oceanspray (*Holodiscus discolor*), bracken fern (*Pteridium aquilinum*), sword fern (*Polystichum munitum*), and early

successional species such as Himalayan blackberry (*Rubus armeniacus*), fireweed (*Epilobium angustifolium*), common yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritacea*), and grasses. Large amounts of bare soil, slash and other logging debris are common.

Vegetation control has occurred in some areas as part of existing forest management practices. Control methods include herbicide application and/or mechanical control. Areas where vegetation management has occurred are visually and functionally different from areas where control has not been implemented. In areas where vegetation control has not occurred, dense vine maple thickets with occasional alder or Douglas-fir frequently occur. Patches of alder saplings, salmonberry (*Rubus spectabilis*), vine maple, red elderberry (*Sambucus racemosa*), oceanspray, lupine (*Lupinus* spp.), Oregon oxalis (*Oxalis oregana*), and grass also may be present in these areas. Small diameter coarse woody material is common.

Conifer-Hardwood Forest

Conifer-hardwood forests within the Project Area are predominantly characterized by the presence of bigleaf maple and Douglas-fir, with some red alder. The forest stand condition is characterized as a multi-layer, closed sapling-pole forest (USFS 1985). Canopy height ranges from 40 to 60 feet, and canopy closure is between 60 and 80 percent. The majority (~70 percent) of canopy cover results from the presence of Douglas-fir. The shrub layer is characterized by vine maple, salmonberry, thimbleberry (*Rubus parviflorus*), red elderberry, beaked hazelnut, and Pacific dogwood. Density of the shrub layer is variable. The herbaceous layer is characterized by sword fern, trailing blackberry (*Rubus ursinus*), oxalis, grasses, and moss. Coarse woody material is generally low to moderate. Deciduous snags are more common than conifer snags; however, short well-decayed conifer snags may be present.

Conifer Forest

Coniferous forests located within the Project Area are dominated by grand fir and Douglas-fir. Forest stand condition is primarily closed sapling-pole-sawtimber and large sawtimber. The diameter at breast height of pole-size conifers measures 8–12 inches. The diameter at breast height of sawtimber measures 12 to 23 inches. Closed sapling-pole-sawtimber stands are characterized by closed canopy, relative short live crowns, and exclusion of shrub species and many forb species. Coarse woody material in these stands is typically low, consisting mainly of remnants from historic forests. Snags are rare; however, small diameter snags become more common in the pole and sawtimber stages, as smaller individuals are out-competed.

Large sawtimber is considered to be at least 21 inches diameter at breast height. Large sawtimber stands are characterized by within-stand differentiation of canopy species, the emergence of dominant trees, and a more diverse and multilayer understory composed of shrubs and forbs. Snags and coarse woody material are generally rare; however, this may vary depending on past harvest practices, stand management, and actual stand age. The conifer forest within the Project Area is managed for commercial timber production and is replanted following harvest ~~The majority of coniferous forests within the project site is managed for commercial timber production, and is replanted following harvest.~~ Commercial timber lands are widespread throughout the vicinity of the Project Area.

Riparian Deciduous Forest

Riparian deciduous forests may develop in near-stream areas as a result of natural or anthropogenic disturbance. Riparian deciduous forest habitats are present within the Project Area in an area known as "Cedar Swamp." Historically this area was dominated by large, old-growth western redcedar (*Thuja plicata*); however, these trees have since been harvested. Cedar Swamp is now dominated by willow (*Salix* sp.) and cottonwood (*Populus balsamifera*), with scattered occurrences of young western redcedar. Cedar Swamp is discussed further in Section 3.4.1.3.

The vegetation communities described above are common throughout the Southern Washington Cascades Province. In the proposed Project Area, these communities are maintained primarily through forest management. Because the Project is located within private commercial timber lands, existing forest management practices are expected to continue for the foreseeable future. The total acreage of each habitat type was calculated during the 2003 surveys; however, because of active forest rotation schedules, some of these areas have been harvested. Aerials photos from 2009 were used to update the habitat maps from 2003 with recent timber harvests (Figure 3.4-1). The updated acreages of each habitat type can be found in Table 3.4-1.

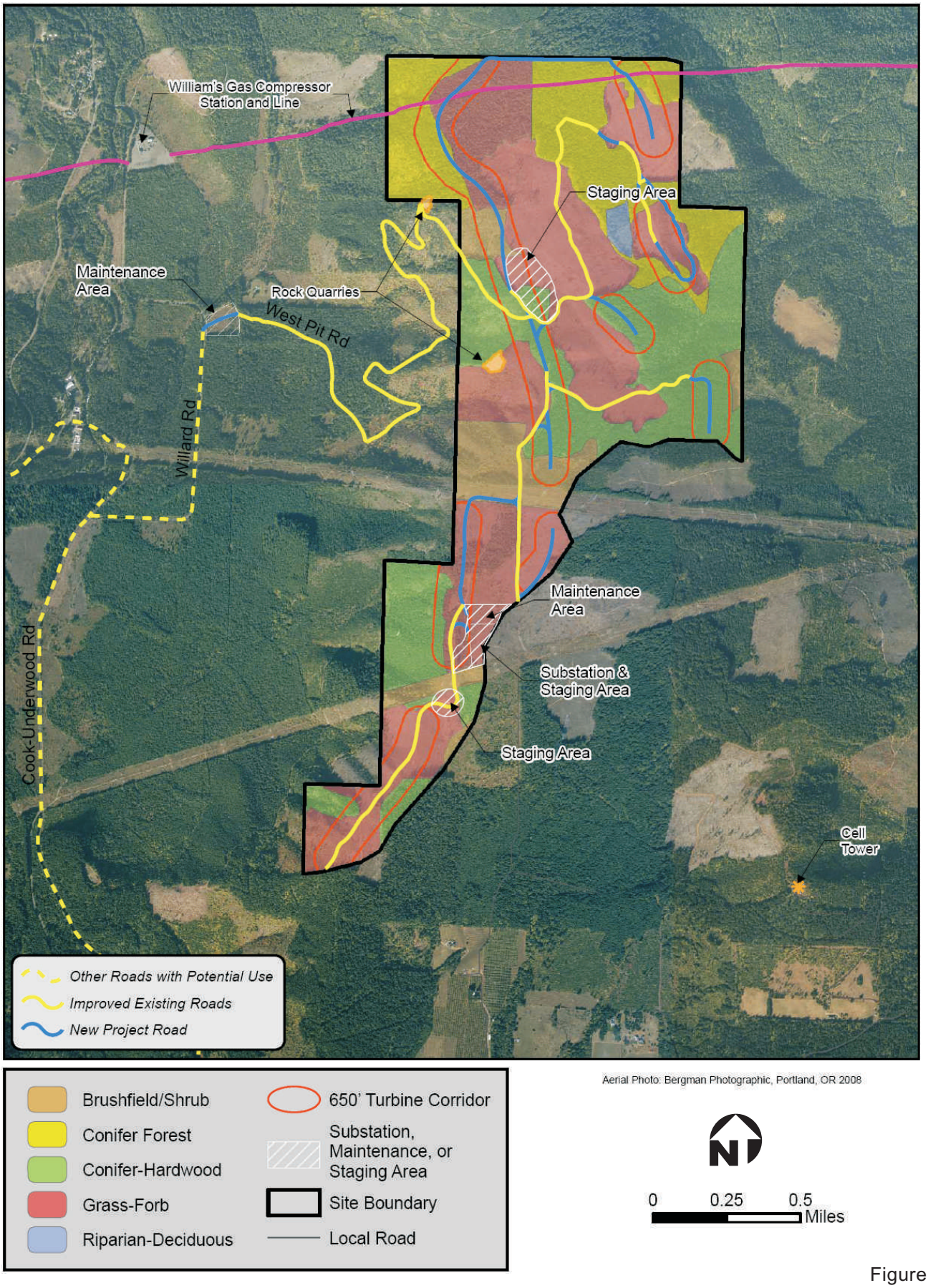
Grass-forb, brushfield/shrub, and conifer forest habitat types are present along West Pit Road. However, the band along the road that is within the Project bounds is too narrow to map on Figure 3.4-1.

Table 3.4-1
Habitat Types within the Project Site

Habitat Type	Area (acres)
Grass-Forb Stand	522
Brushfield/Shrub Stand	103
Conifer-Hardwood Forest	310
Conifer Forest	209
Riparian Deciduous Forest	8
Total	1,152

In addition, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species database was searched for the area in and around the Project Area. No sensitive habitat features such as snags, talus, or Oregon white oak were identified in or within one mile of the Project Area. The Project Area is not located within any known wildlife corridor, flyway, foraging area, or migratory route.

33758687_142.cdr



Source: GeoDataScape.

Figure 3.4-1

Habitat Types

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.4.1.3 Wetlands

No wetlands or wetland indicators were identified within the Project study area (the turbine corridors and proposed access roadways). One wetland was identified outside the study area perimeter west of turbines C1-C4 (Figure 3.4-2). This wetland is labeled as "Cedar Swamp" on the USGS map and is listed as palustrine unconsolidated bottom, semi-permanently flooded, impounded (PUBFh) on the National Wetland Inventory (NWI) (Appendix C-2).

Cedar Swamp is classified as a Category II wetland according to the Washington State Wetland Rating System for Eastern Washington (Ecology 2004). The standard wetland buffer for Category II wetlands enforced by Skamania County is 100 feet. The Cedar Swamp wetland is over 150 feet from the nearest proposed turbine string or proposed road, which meets Forest Practice requirements.

A preliminary review of the NWI was conducted for the area encompassing the construction access. Results indicate that wetlands occur along SR 14 near White Salmon, Washington (Figures 3.4-3a and 3.4-3b). The NWI does not show the presence of wetlands along any of the local secondary and forest roads proposed to be used by the Project. As the NWI is based on historic aerial photography interpretations, field investigations were conducted in May and July 2009. These investigations confirmed that wetlands do not occur along the local secondary and forest roads. See Section 3.3 for a discussion of surface water features such as streams.

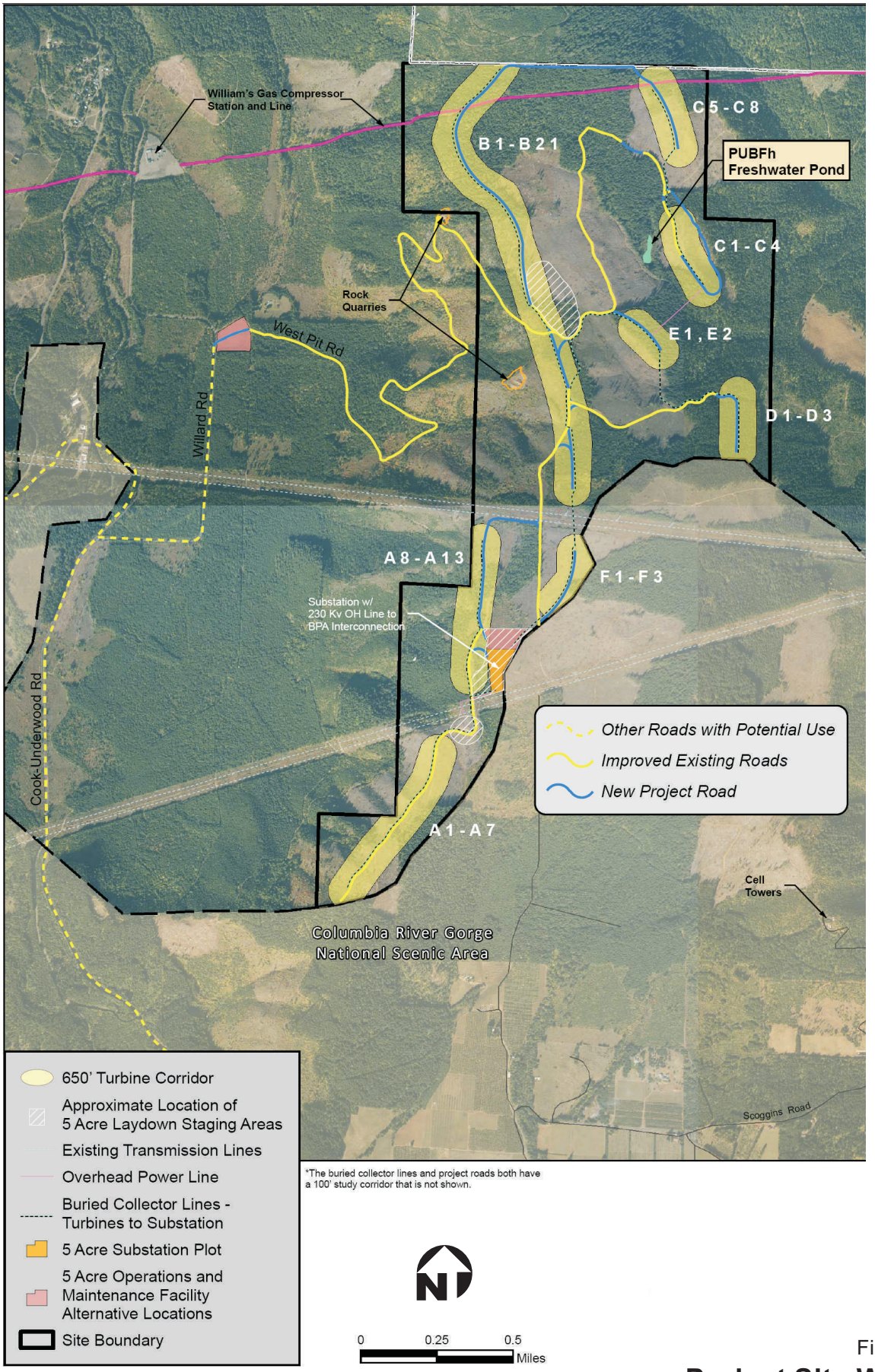
3.4.1.4 Special Status Plant Species

Several sources were used to identify special-status plants that have been documented or have the potential to occur within the vicinity of the proposed Project, including:

- Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Skamania County (USFWS 2009a);
- A Washington Natural Heritage Program (WNHP) record search of known special status plant locations in the vicinity of the Project Area (WNHP 2003a and 2009);
- *Rare Plant List for Skamania County* (WNHP 2003b and 2009).

These data indicated that no federal-listed plant species are known to occur in the vicinity of the Project Area. However, four WNHP sensitive plants occur within 2 miles of the Project Area, including branching montia (*Montia diffusa*), Suksdorf's desert parsley (*Lomatium suksdorfii*), Siskiyou false hellebore (*Veratrum insolitum*), and golden chinquapin (*Chrysolepis chrysophylla*). Two additional special status plant species are reported as historically occurring in the vicinity of the Project Area, including bolandra (*Bolandra oregana*) and white-top aster (*Sericocarpus rigidus*). Three occurrences of the Oregon white oak/Idaho fescue (*Quercus garryana/Festuca idahoensis*) vegetation community, a WNHP high-quality plant community, are documented within 2 miles of the Project Area (WNHP 2003a and 2009). These are located along the Columbia and White Salmon Rivers.

33758687_143.cdr



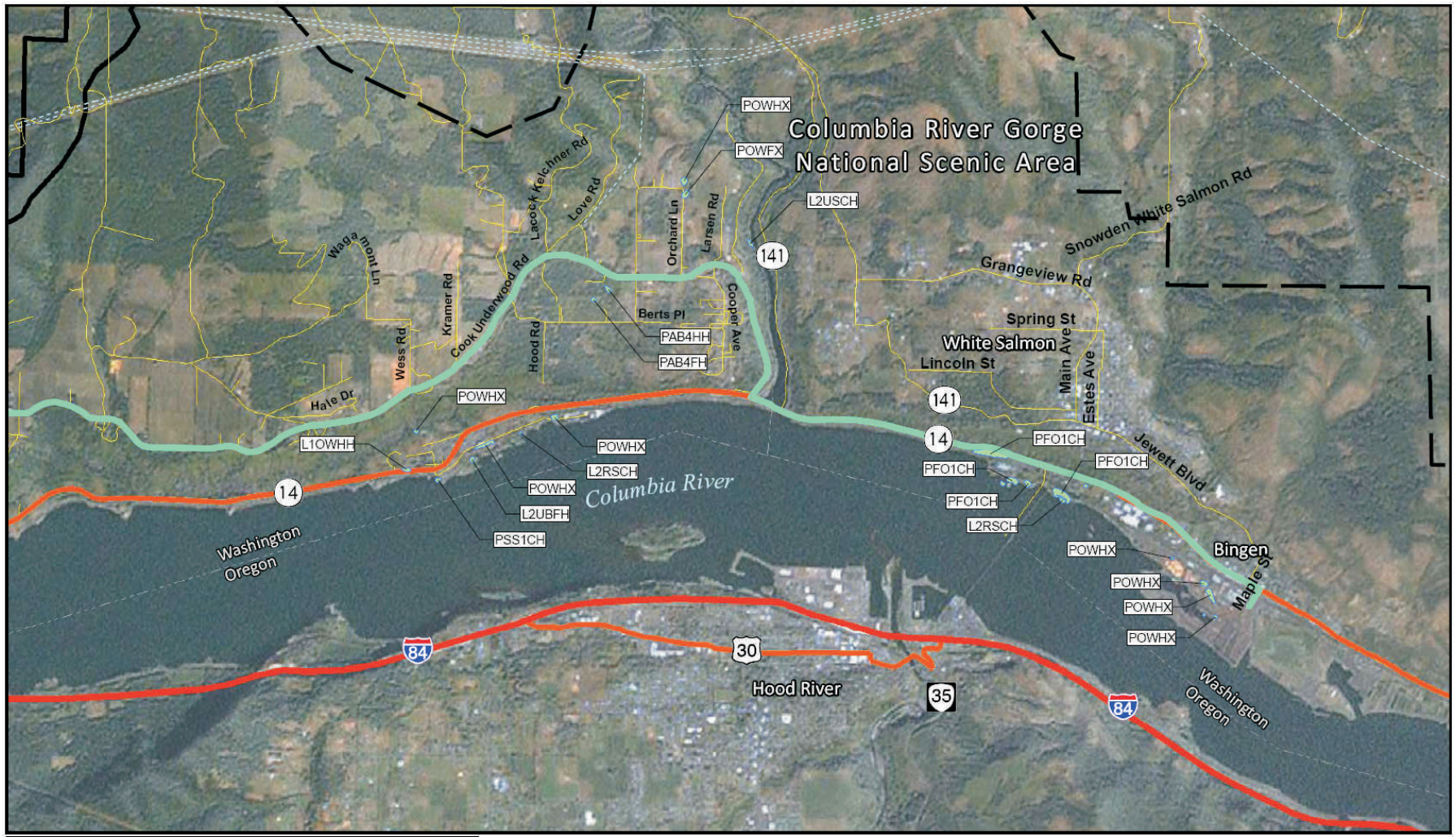
Source: GeoDataScape.

Figure 3.4-2

Project Site Wetland

URS

Whistling Ridge Energy Project
Skamania County, Washington

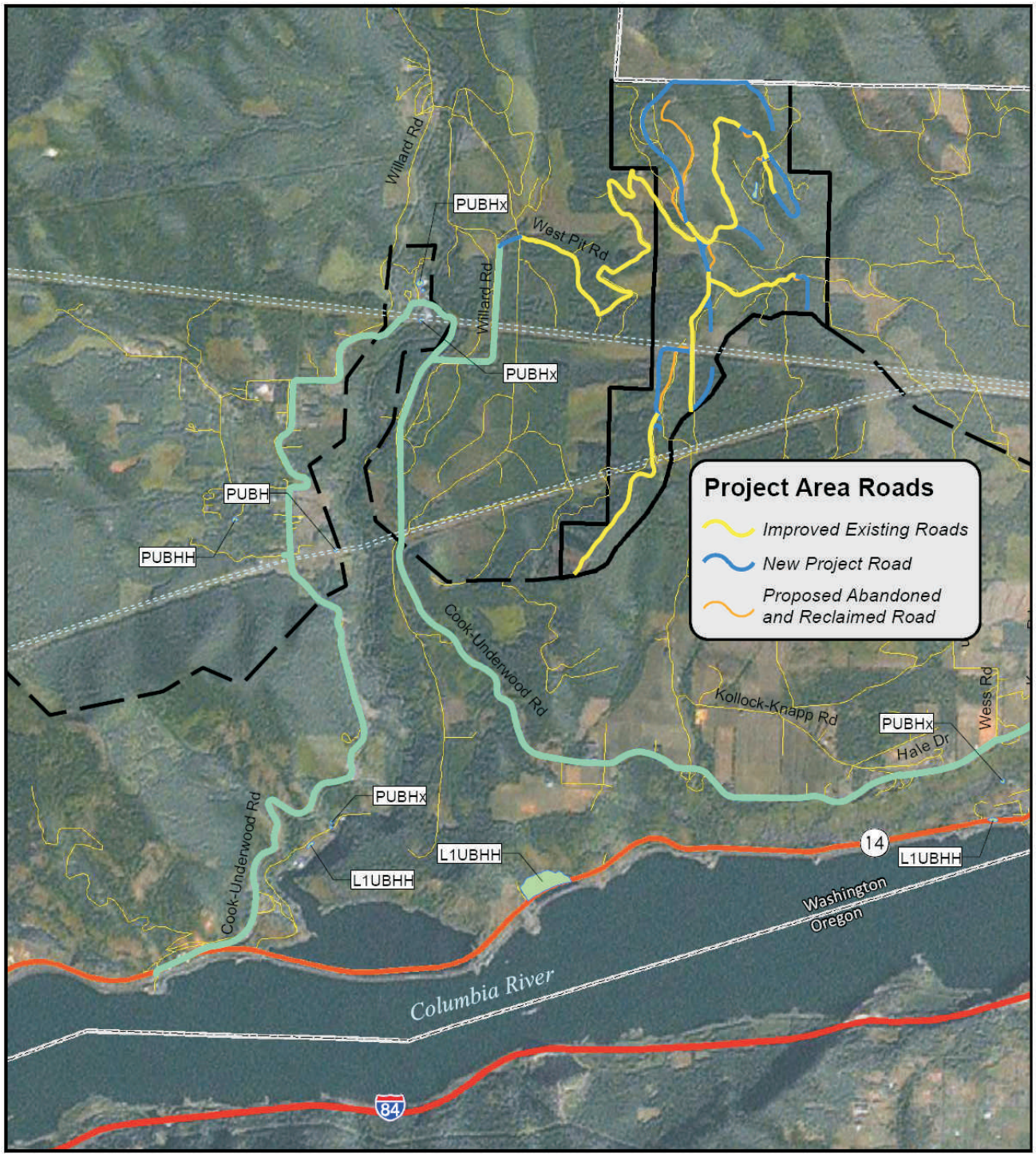


Job No. 33758687

Figure 3.4-3a

East Access Route NWI Wetlands

33758687_156.cdr



Site Boundary
Columbia River Gorge National Scenic Area
Other Roads with Potential Project Use
Project Area Roads
National Wetlands Inventory Wetland

N

0 0.5 1 Miles

Figure 3.4-3b
West Access Route NWI Wetlands

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Initial surveys were conducted in May and June 2003, and followed methods described in the US Bureau of Land Management Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Whiteaker et al. 1998). Survey dates were selected to encompass all or a portion of the blooming times of all special status plants potentially occurring in the Project Area. Surveys were conducted within a 300-foot corridor centered on proposed turbine strings and associated access roads, and a 100-foot corridor centered on existing roadways that were identified as needing improvement (Figure 3-4-4). Special status plant surveys also were conducted in proposed locations for the Operations and Maintenance facility, substation, and staging areas.

During the 2003 surveys, no special status plant species or plant communities were detected in the Project Area. A detailed account of survey methods and results, as well as a list of plant species observed during vegetation surveys, can be found in Appendix C-3.

Because turbine locations were changed from the initial alignment, field surveys conducted prior to the March 2009 Application submittal did not cover 100 percent of the proposed Project Area. Additional surveys were conducted in May and July 2009 to supplement the previous studies and included West Pit Road and underground cable routes where potential special status plant habitat could exist (Figure 3.4-4). During this survey, two WNHP Watch List species were observed within the Project Area: phantom orchid (*Cephalanthera austiniae*) and gnome plant (*Hemitomes congestum*). Watch List species are afforded no protection by any agency. Most species on the Watch List are no longer actively tracked because they were found to be more abundant than previously thought.

3.4.1.5 Special Status Wildlife Species

Seven special-status wildlife species are known to occur within the vicinity of the proposed Project: bald eagle (*Haliaeetus leucocephalus*) golden eagle (*Aquila chrysaetos*), northern goshawk (*Accipiter gentilis*), pileated woodpecker (*Dryocopus pileatus*), Vaux's swift (*Chaetura vauxi*), olive-sided flycatcher (*Contopus cooperi*) and western gray squirrel (*Sciurus griseus*). One species, the northern spotted owl (*Strix occidentalis caurina*), has been surveyed extensively within the Project Area and never detected and is therefore considered not to occur. Two additional special status species, Keen's myotis (*Myotis keenii*) and Townsend's big-eared bat (*Corynorhinus townsendii*), may occur but have not been identified in prior surveys. These species are summarized in Table 3.4-2. This section provides a detailed account of each species, their status within the Project Area, and a summary of surveys conducted within the Project Area.

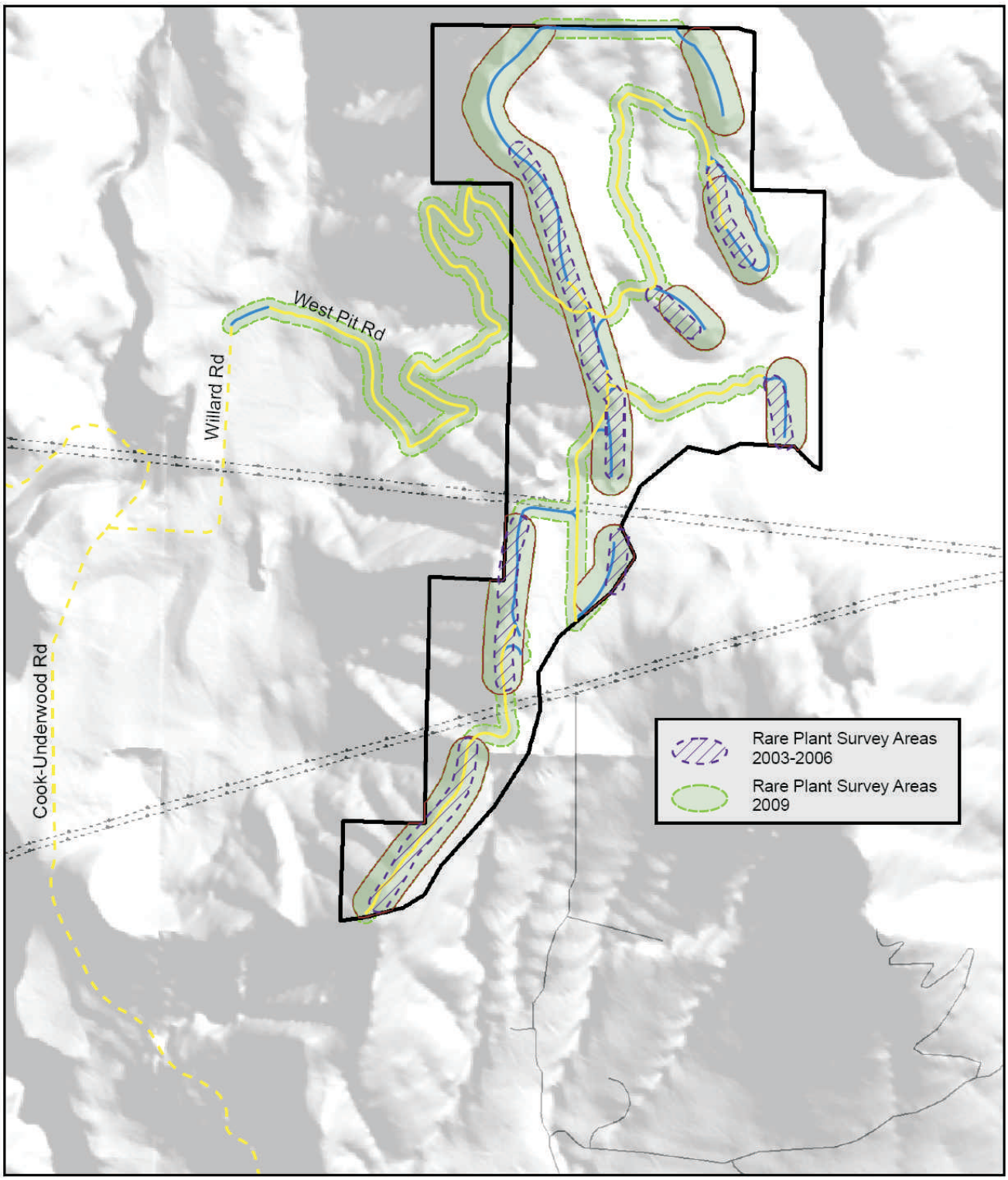


Figure 3.4-4

2003-2006, 2009 Rare Plant Survey Areas

Job No. 33758687

Table 3.4-2
Federal and State Special Status Species with the Potential to Occur in the Vicinity of the Whistling Ridge Energy Project Site

Common Name	Scientific Name	Washington State Status	Federal Status	Potential to Occur
BIRDS				
Bald eagle	*Haliaeetus leucocephalus*	Sensitive	Species of Concern, Bald Eagle Protection Act	Known to Occur
Golden eagle	*Aquila chrysaetos*	Candidate	Bald Eagle Protection Act	Known to Occur
Northern goshawk	*Accipiter gentilis*	Candidate	Species of Concern	Known to Occur
Northern spotted owl	*Strix occidentalis caurina*	Endangered	Threatened	Does not Occur
Olive-sided flycatcher	*Contopus cooperi*	-	Species of Concern	Known to Occur
Pileated woodpecker	*Dryocopus pileatus*	Candidate	-	Known to Occur
Vaux's swift	*Chaetura vauxi*	Candidate	-	Known to Occur
MAMMALS				
Western gray squirrel	*Sciurus griseus*	Threatened	Species of Concern	Known to Occur
Keen's myotis	*Myotis keenii*	Candidate	-	May Occur
Townsend's big-eared bat	*Corynorhinus townsendii*	Candidate	Species of Concern	May Occur

Bald Eagle

The bald eagle is a state and federal species of concern, and also protected under the Bald Eagle Protection Act of 1940 (16 United States Code [USC] 668-668d, 54 Stat. 250) which prohibits the taking, possession and commerce of such eagles. In Washington, bald eagles are year-round residents. In addition, many bald eagles from northern areas migrate south to Washington during the winter. In Washington they occur generally in coastal waters or near large inland lakes or rivers. They are considered "fairly common" during the winter near the Project Area, but likely occur nearby year round (BirdWeb 2009). The Columbia River is approximately two miles south of the Project Area, and the White Salmon River is approximately three miles east of the Project Area. These are the two nearest likely foraging locations for bald eagles. One bald eagle was recorded in the Project Area in 2009 during surveys for northern goshawk. In addition, three bald eagles were observed during the winter of 2008–2009 during baseline avian surveys. Two were observed flying within the rotor-swept area, and one below.

Golden Eagle

The golden eagle is a Candidate under the Endangered Species Act and also protected under the Bald Eagle Protection Act of 1940 (16 USC 668-668d, 54 Stat. 250) which prohibits the taking, possession and commerce of such eagles. In Washington, golden eagles are year-round residents, primarily in the eastern part of the state. The Project Area is at the westernmost edge of their year-round distribution, where they are considered "uncommon" (BirdWeb 2009).

Golden eagles require open areas with large, rocky cliffs or large trees. They are often found in alpine parkland and mid-elevation clear-cuts, as well as shrub-steppe area and open forests. Although they soar at high altitudes, they drop down to the ground to capture prey. They prey on mid-sized mammals such as marmots, rabbits, ground squirrels, and birds.

Two golden eagles were recorded during the fall of 2004. The timing of this observation was consistent with localized or longer distance migration of this species in the fall. One was observed flying at a height within the rotor-swept area, and one was observed flying above the rotor-swept area. None were recorded during the summer of 2006 during baseline avian studies in the Project Area, which is consistent with the Project Area being outside of the species breeding distribution.

Northern Goshawk

The northern goshawk is categorized as a "species of concern" by the USFWS, and as a "listing candidate" for sensitive, threatened or endangered species by the State of Washington. Goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest and Douglas-fir. Goshawk nest sites tend to be associated with patches of relatively large, dense forest; however, home ranges often consist of a wide range of forest age classes and conditions. Nest sites tend to be positively correlated with proximity to water or meadow habitat, forest openings, level terrain or "benches," northerly aspects and patches of larger, denser trees, although variation in habitat associations does occur (USFS 2002). Although they inhabit and hunt dense forest sites, they also hunt in open areas. They hunt on the wing, and by swooping down on ground-dwelling prey.

In Washington State, goshawks occur year-round and in some areas only during the non-breeding seasons. The Project Area is located in an area where either may occur, and the eastern slope of the Cascades is considered the most common place to find this "uncommon" species (BirdWeb 2009). This species is generally non-migratory. Some birds move to lower elevations in the winter.

Northern goshawks were recorded during avian surveys during the fall of 2004 and the summer of 2006. A total of five individuals were sighted; two during the fall and three during the summer (Figure 3.4-5). They were observed flying both within and above the rotor-swept height during surveys. Results of these surveys are detailed in Appendix C-4.

In response to the baseline data, and in order to better understand these sightings, the Applicant commenced multi-year, species- and season-specific biological surveys for Northern Goshawk. These surveys were developed based on best available survey protocols described below, and in consultation with WDFW. Northern goshawk surveys were conducted during the spring and summer seasons in 2004, 2008, and 2009, which are the time of year when goshawks would be most expected to occur. Surveys occurred on properties managed by the Applicant, Broughton Lumber and adjacent private land.

In 2004, protocol-level surveys were conducted in suitable habitat located in four core Project sections, including the provincial home range radius of 0.5 mile around the core area (see Map 7, Appendix C-5). Suitable habitat was identified using topographic maps and aerial photography.

Survey stations were establish at 0.2-mile intervals on roads and trails located in suitable habitat within 0.5 mile of a proposed wind turbine location. Potential goshawk habitat was surveyed in accordance with "Survey Methodology for Northern Goshawks in the Pacific Southwest Region" (USFS 2002). Two rounds of surveys were completed, including 185 calling stations each time. All raptor species responses detected during surveys also were recorded. No Northern Goshawks were recorded during the 2004 surveys. Detailed methodology and results for northern goshawk surveys can be found in Appendix C-5.

In 2008, the potential survey area for the northern goshawk was determined by protocol parameters outlined in the Northern Goshawk Inventory and Monitoring Technical Guide (USFS 2006), consultation with WDFW biologists, and GIS analysis. The survey area was established by placing a 150-foot buffer around the turbine string layout, and then adding an additional 2,624 foot buffer per protocol (see map in Appendix C-6). Forest stands with greatest potential to contain suitable habitat structure and composition to support northern goshawk were identified using GIS data and aerial photographs. Criteria for selecting stands included stand age greater than 25 years, and an average tree diameter at breast height of at least 12 inches. Based on these criteria, 1,100 acres was identified for surveys (Figure 3.4-5).

It was determined that the "Broadcast Acoustical Survey" methodology would be used for a two-year survey effort (2008 and 2009). Biologists completed two protocol surveys at 136 calling stations during the 2008 goshawk survey season. The first survey was conducted during the nesting period, and the second during the fledgling period. No northern goshawk responses were documented during either of the two site visits in 2008. In 2009, in addition to the two rounds of Broadcast Acoustical Surveys, two rounds of "Intensive Search" surveys were completed. These surveys were conducted where the turbine alignment extended north from prior project design. No goshawks were recorded during either type of surveys in 2009. Detailed methodology and results for 2008 can be found in Appendix C-6. The full methods and results for the 2009 surveys can be found in Appendix C-7.

Northern Spotted Owl

The Applicant conducted surveys and analysis to determine northern spotted owl occupancy. ~~The Applicant conducted surveys and analysis to confirm the absence of northern spotted owls or spotted owl activity centers in the vicinity of the proposed project.~~ Additionally, the Applicant coordinated and met with USFWS regarding its surveys and analysis for the northern spotted owl.

On April 9, 2009, the Applicant met with the USFWS to discuss the proposed Project. On May 14, 2009, the USFWS met the Applicant at the site for a site visit. On July 13, 2009 and September 14, 2009, the Applicant met with USFWS to further discuss the studies that have been performed for northern spotted owl. This section documents all the information that the Applicant obtained from its discussions with USFWS, and the surveys and analysis conducted by the Applicant.

33758687_158cdr

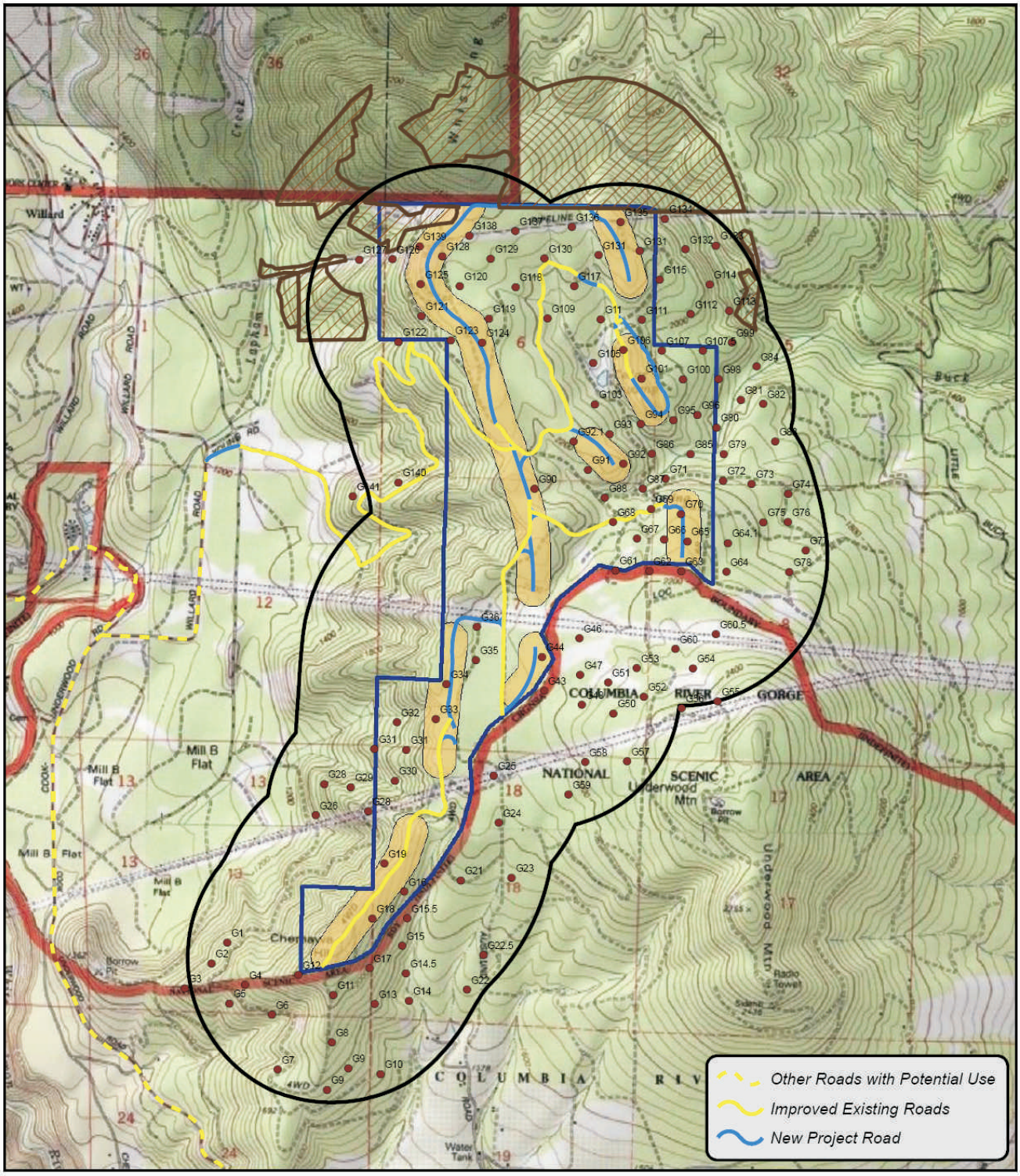


Figure 3.4-5

2008-2009 Northern Goshawk Survey Locations

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

A total of 9 turbines are proposed within the 1.8 mile provincial range of two northern spotted owl activity centers. There are no proposed turbines located within the 500 acre core areas of these activity centers. Two historical meeting sites on public lands near the property have not been used in over six and eight years, respectively, and are no longer considered to be occupied by USFW endorsed protocols. However, based on federal and state law, the areas are considered occupied until decertified by WDFW or USFW. ~~As detailed below, extensive surveys indicate that neither northern spotted owls nor northern spotted owl activity centers are present in or around the proposed project area. In addition, the project would not be located within a habitat area designated as critical or identified as essential to owl recovery~~. Given the extensive survey record confirming the absence of northern spotted owls, the proposed Project would not pose a risk of taking northern spotted owls under the Endangered Species Act Section 9 and its regulations (50 CFR § 17.3).

Northern Spotted Owl Distribution and Status

The northern spotted owl is one of three spotted owl subspecies, and the only one found in Washington State. They are distributed from extreme southwestern British Columbia to northern California. In Washington State, they inhabit the Eastern and Western Cascades, Western Lowlands and Olympic Peninsula Provinces. Within these regions, northern spotted owls are associated with a variety of areas containing suitable habitat for nesting, roosting, foraging and dispersal. They prefer forest habitats characterized by multi-layered canopy and a high incidence of large trees that provide suitable structure for nesting and roosting. They have large home ranges and use large tracts of land containing late successional forests. Fragmented forest habitats may be used for dispersal and foraging. They nest in stick nests of northern goshawks, on clumps of mistletoe, in large tree cavities, on broken tops of large trees, or on large branches or cavities in bands and rock faces.

Northern spotted owls are designated as threatened under the Endangered Species Act (16 USC §§ 1531-1544), as well as under Washington State law (WAC 232-12-297). Because they are listed under the Endangered Species Act, USFWS has designated northern spotted owl critical habitat and issued a northern spotted owl recovery plan (USFWS 2008). In addition, the Endangered Species Act prohibits the "take" of northern spotted owls, which includes modifying habitat in a manner that impairs significant behavioral patterns and results in actually killing or injuring an animal (50 CFR § 17.3).

As described in detail below, the Project is not located within habitat designated as critical or identified as essential to northern spotted owl recovery. In addition, the owls prefer forest habitats characterized by multi-layered canopy, and a high incidence of large trees that provide suitable structure for nesting and roosting. No such forests are present within the Project Area. Most importantly, however, extensive surveys following USFWS protocol indicate that the Project is not sited in or near northern spotted owls or spotted owl activity centers. Two historical nesting sites on public lands near the property have not been used in over six and eight years, respectively, and are therefore no longer considered occupied site centers pursuant to USFWS protocol and state law. Based on these facts, this analysis concludes that northern spotted owls would not be "taken" by the proposed Project.

Survey History and Description

The Applicant contracted with Turnstone Environmental Consultants (Turnstone) to conduct wildlife investigations in the proposed Project Area. Surveys were conducted in 2003, 2004, 2008 and 2009, and all surveys followed the Protocol for Surveying Proposed Management Activities that May Impact Northern Spotted Owls (USFWS 1992). In addition, the National Council for Air and Stream Improvement (NCASI) surveyed historical activity centers near the Project Area each year since 1994, the last six years of which were under contract with the DNR. These surveys were conducted in support of an ongoing owl demography monitoring study and, while focused on the same activity centers, placed more emphasis on the nest cores. Table 3.4-3 summarizes the survey results.

Table 3.4-3
Whistling Ridge Energy Project Site Survey Results for Northern Spotted Owl at the Mill Creek and Moss Creek Core Areas

Year	Mill Creek Core Survey Results		Moss Creek Core Survey Results	
	Spotted Owl	Barred Owl	Spotted Owl	Barred Owl
2009	no response	male observed	no response	pair observed
2008	no response	male & female observed	no response	pair observed
2004	no response	present*	no response	present*
2003	no response	present*	no response	no response

* = Surveyor unable to determine sex of barred owl detected.

Project Area Surveys. Surveys were conducted in suitable habitat located in and adjacent to the proposed Project Area, and included two historical spotted owl activity centers, discussed in further detail below. Suitable habitat was conservatively defined as stands with 12-inch diameter at breast height and greater with a canopy cover of 60 percent or greater[9]. Suitable habitat was identified using topographic maps, aerial photography, and stand classification data from the Applicant. Figure 3.4-6 indicates the location of survey calling stations.

During the 2003–2004 survey periods, the Project Area was surveyed from March–July 2003 using the one-year survey methodology, and from March–August 2004 using the two-year survey methodology. USFWS protocol allows a six-visit survey followed by three-visit survey over two years to rule out northern spotted owls for the following two years (USFWS 1992). No northern spotted owls were detected during the 2003–2004 surveys. See Maps 1 through 5 in Appendix C-5 for 2004 survey locations.

[9] Features that support nesting and roosting typically include a moderate to high canopy closure (60 to 90 percent); a multilayered, multi-species canopy with large overstory trees (with diameter at breast height greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly (Thomas et al. 1990.)

More recent northern spotted owl surveys were conducted from May–July 2008 and May–August 2009 (Appendices C-6 and C-7). Surveys were conducted using the USFWS protocol two-year survey methodology, which requires a minimum of three visits for two consecutive years in order to determine presence or absence (USFWS 1992). Surveys were implemented in all potentially suitable habitat located within a 1.8-mile radius of the corridor. This area totaled 14,901 acres. The survey area also included the historical activity centers discussed below, which expanded the survey area by 7,222 acres. No northern spotted owls were detected in either the survey area or historical activity centers in the 2008–2009 surveys.

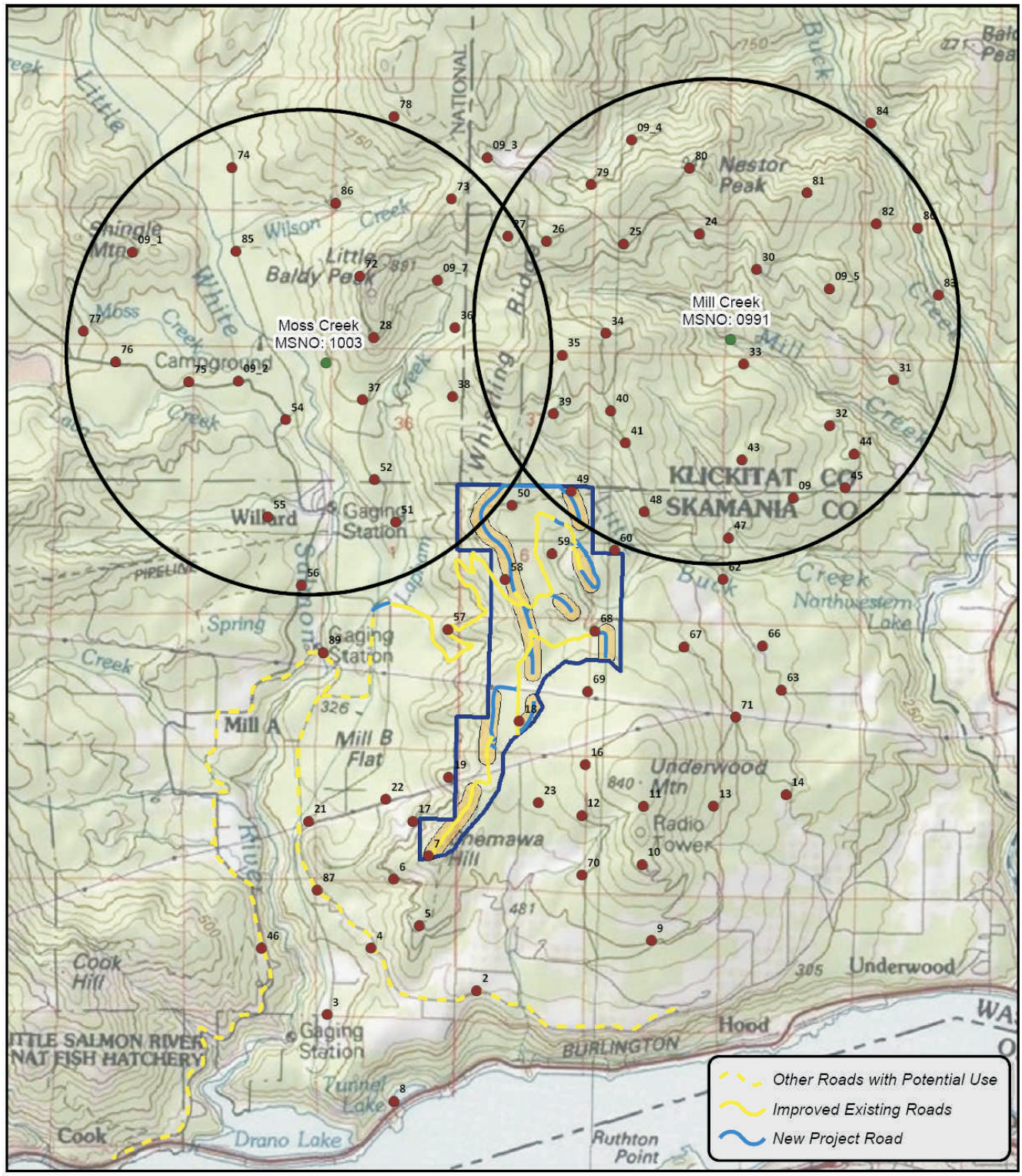
The Project's proposed layout was finalized in October 2008 and included additions to proposed turbine strings, removal of previously proposed turbines, and identification of areas requiring improved roadways. Changes to the Project layout resulted in lands added to the Project Area that, in some cases, were not included in wildlife surveys conducted prior to October 2008. The final turbine alignment did expand the area requiring owl surveys; however, because the survey area had included spotted owl activity centers located at the northern reach of the proposed Project Area, the area was accounted for in the 2008 and 2009 surveys.

Historical Activity Centers. Two historical northern spotted owl activity centers, Mill Creek (master site no. 0991) and Moss Creek (master site no. 1003), are located near the Project Area (Figure 3.4-6). The nest cores of both activity centers are located on public lands managed by DNR and USFS. The Mill Creek activity center is composed of contiguous but scattered northern spotted owl habitat located on private and DNR lands. This site was designated in 1992, and the last known spotted owls were a non-nesting pair seen in 2000 (Table 3.4-4 and T. Flemming, personal communication.). Since 2000, neither the surveys conducted by the Applicant nor DNR/NCASI have found northern spotted owls.

The Moss Creek activity center is composed of patchily distributed northern spotted owl habitat and a mix of rural residential lands, industrial timberland, and lands administered by DNR and USFS. This activity center was established in 1994 and the last known spotted owl was a male detected in 2002 (Table 3.4-4). Since that time, the Turnstone and DNR surveys have not resulted in any detections.

The longstanding absence of any northern spotted owls at these locations suggests that these historic site centers likely no longer qualify for special protection. As of January 1, 2009, a site center is defined under WAC as the location of status 1, 2 or 3 northern spotted owls, where status 1 means a male and female owl pair (i.e., observed in proximity to each other, a female detected on a nest, or one or both adults observed with young); status 2 means a male and female owl where pair status cannot be determined; and status 3 means either (a) "the presence or response of a single owl within the same general area on three or more occasions within a breeding season" where there is no response by an owl of the opposite sex after a complete survey, or (b) three or more responses over several years (WAC 222-16-010). Only sites documented in substantial compliance with WDFW protocols and quality control methods would be considered site centers (WAC 222-16-010).

33758687_159.cdr



NSO Calling Points
Historic NSO Nests
Historic NSO Nest Provincial Range
650' Turbine Corridor
Site Boundary

0 0.5 1 1.5 2 Miles

Figure 3.4-6

2008-2009 Spotted Owl Calling Points

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Table 3.4-4
DNR/NCASI Mill Creek and Moss Creek Owl Data

Year	Mill Creek (T4N R10E)		Moss Creek Campground (T4N R9E)	
	Spotted Owl	Barred Owl	Spotted Owl	Barred Owl
2008	no response	pair	no response	male
2007	no response	no response	no response	male
2006	no response	pair	no response	male
2005	no response	male	no response	pair
2004	no response	pair	no response	pair + 1 juvenile
2003	no response	no response	no response	no response
2002	no response	male	male	pair + 1 juvenile
2001	no response	-	no response	-
2000	pair	-	nest	-

Source: Washington Department of Natural Resources (T. Flemming, personal communication). 2003-2008 surveys conducted by NCASI pursuant to DNR contract; 2000-2002 survey data provided to DNR by NCASI.

No surveys—whether in substantial compliance with WDFW protocols or otherwise—have documented status 1, 2 or 3 owls on the Mill Creek or Moss Creek sites since January 1, 2009, when the new rule became effective. Furthermore, the Turnstone and DNR/NCASI surveys affirmatively documented the absence of northern spotted owl site centers at these locations. Therefore, the Mill Creek and Moss Creek locations do not meet the definition of a site center under Washington regulations. Even if they did, they should qualify for decertification under the interim decertification rules passed by the Washington Forest Practices Board[10].

Similarly, the USFWS protocol allows a historical activity center to be considered unoccupied if no owl responses are obtained after three years of surveys using protocol guidelines (USFWS 1992). These surveys do not need to be consecutive; the protocol anticipates that surveys would be conducted in one- or two-year increments (not three). In any case, however, the DNR/NCASI surveys of the Moss Creek and Mill Creek centers were conducted annually and obtained no responses over six and eight years, respectively. Based on the collective Turnstone and DNR/NCASI surveys, these centers should therefore be considered unoccupied pursuant to the USFWS protocol.

Barred Owl Concerns. During the 2003–2004 and 2008–2009 Project Area surveys described above, only barred owls were detected. In addition, the Applicant learned that the USFWS is in the process of revising its protocol for 2010 to include special guidance for conducting surveys where barred owls are detected. After the 2008 surveys, the Applicant consulted with USFWS,

[10] See Washington State Register 09-02-202 (amending WAC 222-16-080(6)(b) (re-promulgated in Washington State Register (WSRs) 09-10-012 [filed April 24, 2009], 09-18-047 [filed August 27, 2009], 10-10-133 [filed December 21, 2009], and 10-06-026 [filed February 22, 2010]) (emergency rules effective for 2009 calendar year and until June 17, 2010 when a permanent rule became effective [WSR 10-11-081, filed May 17, 2010] establishing "spotted owl conservation advisory group" to determine whether northern spotted owl site center need be maintained based on surveys demonstrating absence of the owls).

and was instructed to follow existing survey protocol (K. Berg, personal communication). The Applicant did so, but also incorporated USFWS's suggestion that biologists visit core areas during the day to look for northern spotted owls, which might not respond in the presence of barred owls. Biologists conducted three day-time site visits over the seasonal breeding window in 2009 but did not detect any northern spotted owls.

NSO Habitat Designations

Federal and state habitat designations can be useful in characterizing the importance of certain areas to spotted owl life cycles and recovery. In this case, as described in the subsections below, the Project would not be located in the areas designated as most critical to northern spotted owls or identified as essential to their recovery. The Project would be located within a state-delineated management area, but the absence of a site center means that management restrictions would not be applicable to the Project Area.

Managed Owl Conservation Area and Designated Critical Habitat Area. The USFWS released its Final Recovery Plan for the Northern Spotted Owl in 2008 (USFWS 2008), which recommends a network of habitat blocks, or managed owl conservation areas (MOCAs), on federal lands in the west-side provinces in the northern spotted owl range. MOCAs were designated to correspond to the owl's full geographic distribution. The recovery plan's strategy focuses on managing MOCAs to support self-sustaining populations of 15 to 20 spotted owl pairs, as well as spacing and managing areas between MOCAs to permit owl movement between and among MOCAs (USFWS 2008). The revised critical habitat designation, also issued in 2008, concluded that the MOCA network is "sufficient to achieve the recovery" of northern spotted owls and designated only those lands as critical (73 Federal Register page 47,328). The Project Area is not located within, adjacent to, or between federally designated MOCAs or, therefore, corresponding designated northern spotted owl critical habitat (Figure 3.4-7).

Conservation Support Area. In the final recovery plan, USFWS delineated Conservation Support Areas (CSAs) to support designated MOCAs. CSAs are areas between or adjacent to MOCAs where habitat contributions made by private, state or federal land managers "are expected to increase the likelihood that [spotted owl] recovery is achieved, shorten the time needed to achieve recovery, and/or reduce management risks…" (USFWS 2008). In Washington State alone, the USFWS delineated 2,163,453 acres as CSA habitat.

The proposed Project Area is located within the Klickitat CSA, a 425,114-acre mix of private, state and federal lands (Figure 3.4-7). The Project Area's location within a CSA does not mean that spotted owls are present in the Project Area, or that modification of the area would compromise owl recovery. As the USFWS explained in excluding CSAs from designated critical habitat, "although recognized as potentially helpful in achieving recovery plan goals, these areas were not considered essential to the conservation of the species" (73 Federal Register page 47,331). Although CSAs are not unimportant, the recovery criteria for northern spotted owl populations *"do not require the contributions of [CSAs] as an essential component of recovery"* (USFWS 2008). Moreover, to the extent CSA lands provide an important function in supporting the MOCA network, it is worth noting that the Project Area constitutes just 0.27 percent of Klickitat CSA lands and 0.053 percent of Washington CSA lands.

Spotted Owl Special Emphasis Area. In 1996, Washington State finalized a rule identifying ten spotted owl special emphasis areas (SOSEAs) to complement protections provided by the Northwest Forest Plan. The proposed Project is located in the southernmost portion of the White Salmon SOSEA which, like the Klickitat CSA, was delineated with the goal of providing demographic support (WAC 222-16-086[10]). In such areas, any suitable spotted owl habitat should be maintained (WAC 222-10-041[1]). More specifically, all suitable habitat within 0.7 mile of a site center plus 2,605 acres (approximately 40 percent) of suitable habitat within the median home range circle (a 1.8 mile radius) is assumed necessary to maintain the site center's viability (WAC 222.10.041[4]). This 40 percent suitable habitat level corresponds with USFWS research on the level of habitat necessary to avoid take and support recovery[11]. According to DNR, both the Mill Creek and Moss Creek site centers exceed 40 percent of the suitable habitat[12]. The proposed Project would not alter that fact. Therefore, the SOSEA limitations on habitat use or modifications do not restrict use of the Project Area as a wind turbine energy facility (WAC 222.10.041[4]). Forest practices within a SOSEA are therefore allowed to proceed so long as they do not affect the 40 percent suitable habitat threshold.

Habitat Conservation Plans. A review of USFWS habitat conservation plans issued in the Pacific region indicates that there is one spotted owl-related habitat conservation plan (HCP) applicable in or near the Project Area (USFWS 2009b). The HCP covers DNR managed land directly to the north of the Project site, but not the Project site itself. ~~A review of USFWS habitat conservation plans issued in the Pacific region indicates that there are no spotted owl-related habitat conservation plans applicable in or near the project area (USFWS 2009b).~~

The Applicant has sited the proposed Project to avoid habitat areas deemed critical to northern spotted owls or essential to their recovery. Surveys conducted pursuant to USFWS protocol indicate that spotted owls are not present in or near the Project, and that nearby historical sites are no longer occupied pursuant to USFWS protocol or state law. Because there are no spotted owls or activity centers present in the Project Area, no Project impacts to northern spotted owls are expected. Finally, the Project would not affect the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this Project does not pose a risk of taking northern spotted owls under The Endangered Species Act Section 9.

Olive-Sided Flycatcher

The Olive-Sided Flycatcher is not listed as federally or state threatened or endangered, however, it is considered a federal species of concern. The Project habitat is not very conducive for this species, and that is why only a few individuals were observed. The species does migrate and it would not be expected in the Project Area in winter or early spring. This species occurs in forest habitat and adjacent cleared areas such as burned areas or clear cuts. They perch high in treetops and catches insect prey on the wing in cleared areas. They breed in Washington State and also

[11] See 61 Federal Register 21,426, 21,428 (May 10, 1996) (proposed 4(d) rule for northern spotted owls setting 40 percent target); USFWS (2008) Appendix C at 77 (targeting 35–40 percent).

[12] Data provided by DNR which shows Mill Creek at 48 percent and Moss Creek at 55 percent (J. Herman, personal communication)

migrate through during August to areas in South America. The olive-sided flycatcher is considered a fairly common breeder in the area encompassed by the Project Area (BirdWeb 2009). There were 21 birds observed during summer 2006 avian surveys, and six recorded during the spring of 2009. All 21 observed in 2006 were within the rotor-swept area; it is not reported in 2009 how many were in the rotor-swept area. None were recorded during the fall of 2004 or the winter of 2008–2009 (Appendix C-4).

Pileated Woodpecker

The pileated woodpecker is considered a Washington State Candidate for listing. This species occurs in all forest types as long as large trees exist for nesting and foraging. Old-growth and mature forest therefore are a common association. In Washington, pileated woodpeckers occur year round but are uncommon in the vicinity of the Project Area. They are more common west of the Cascades. During avian surveys in the Project Area, six pileated woodpeckers were recorded in the fall, two during the winter, seven during the spring, and none in the summer. None occurred within the rotor-swept area (Appendix C-4).

Vaux's Swift

Vaux's swift is considered a Washington State Candidate for listing. It typically occurs in coniferous or mixed forest of mature age where snags are available for roosting and nesting. They forage for insects in flight in open sky, typically above woodlands or bodies of water. In Washington, Vaux's swift breeds widely, and the Project Area is considered within the range of common occurrence for the species. They migrate south during the fall. During fall 2004 avian surveys, 15 Vaux's swifts were recorded in three groups, 87 percent of which occurred within the rotor-swept area. Four were recorded in two groups during the summer of 2006, all of which occurred within the rotor-swept area. Eleven were recorded during the summer of 2009; the number within the rotor-swept area was not reported in this study (Appendix C-4).

Western Gray Squirrel

The western gray squirrel is listed as a "threatened" species by WDFW. In Washington, western gray squirrel distribution has been reduced to three geographically isolated populations: the "Puget Trough" population, centered in Thurston and Pierce counties, the "South Cascades" population, located in eastern Skamania County, Klickitat and Yakima Counties, and the "North Cascades" population, located in Chelan and Okanogan Counties. Western gray squirrels are arboreal species. Although they forage on the ground, this species rarely strays far from trees. They use tree canopies for cover and nesting. Western gray squirrels prefer areas where contiguous tree canopy allows arboreal travel in a minimum of a 198 feet (60 meters) radius around the nest (Ryan and Carey 1995). Western gray squirrels are diurnal species, with most activity occurring during morning hours. This species is most active during August and September, when this species is collecting and storing food for winter (Ryan and Carey 1995). The principal food source for the gray squirrel is acorns; however, conifer seeds are also eaten (Dalquest 1948). While pine nuts and acorns are considered essential foods for accumulating body fat in preparation for winter, green vegetation, seeds, nuts, fleshy fruits, and mushrooms also are consumed (WDW 1993, Carraway and Verts 1994, Ryan and Carey 1995).

33758687_140.cdr

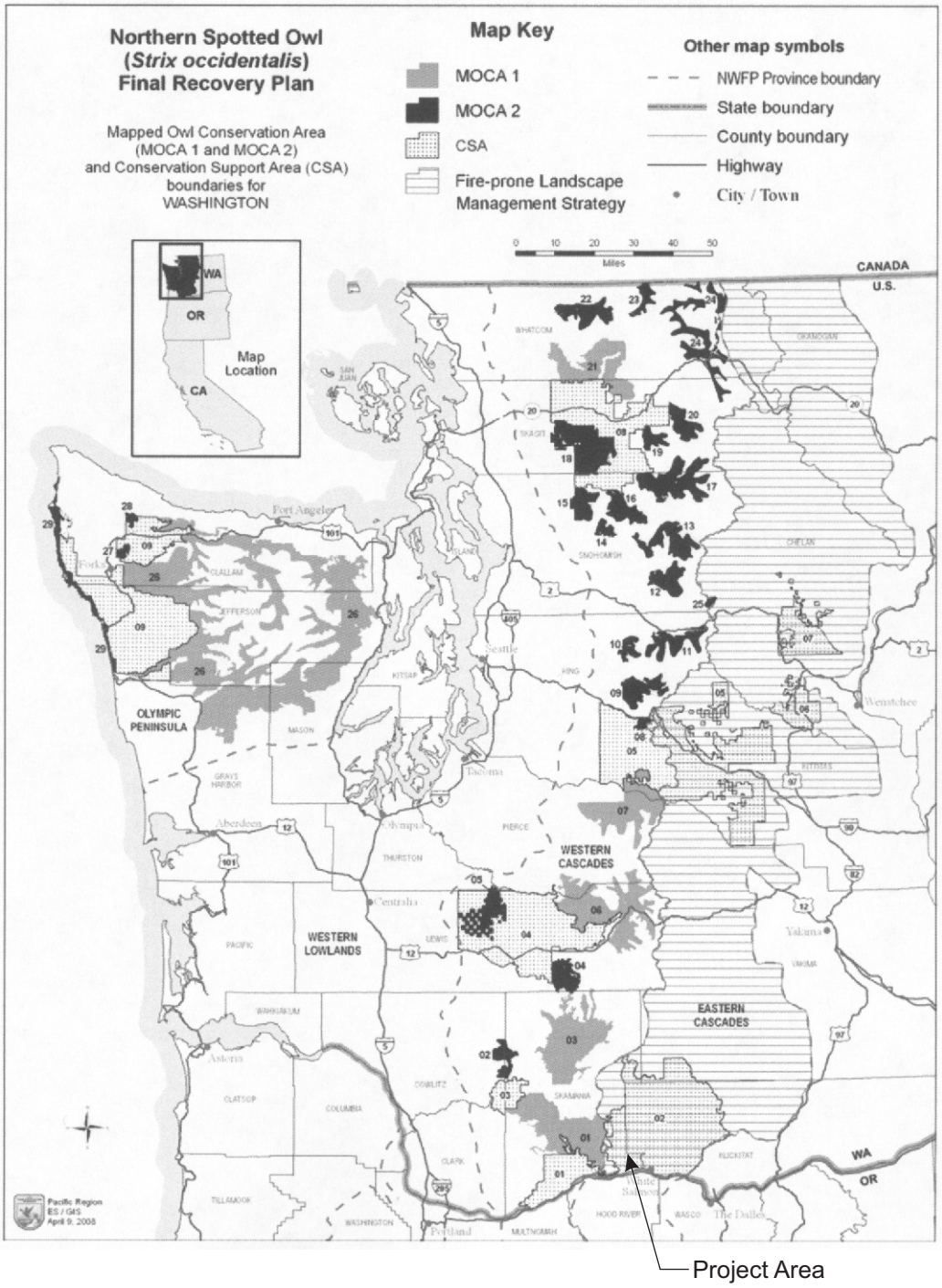


Figure 3.4-7

Map of Spotted Owl MOCAs and CSAs

Source: 2008 Final Spotted Owl Recovery Plan (USFWS 2008).

Western gray squirrel surveys were implemented by the Applicant on lands located in and adjacent to the Project Area in 2004, 2008, and 2009 (Figure 3.4-8). Surveys conducted in 2004 included a general search for western gray squirrels and nests while conducting northern goshawk station placement and surveys. Two adult western gray squirrels were identified during that effort.

An additional protocol survey was completed following methods described in Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance (Van der Haegen et al. 2004). No western gray squirrels were detected during protocol surveys. Detailed methodology and results for western gray squirrel surveys in 2004 can be found in Appendix C-5.

Additional western gray squirrel surveys were completed by the Applicant in 2008 and 2009. Prior to implementing field surveys, the Applicant consulted with a WDFW biologist to identify survey criteria and methodology. It was determined that gray squirrels surveys should be performed in areas where Project activities would result in the removal of potential western gray squirrel habitat or structural modification (i.e., stand thinning), and these surveys should include unaltered habitat within 400 feet of potential disturbance.

An area consisting of a 1,050-foot buffer around the proposed turbine layout to account for lands that may be affected by the Project, and also the 400-foot buffer of undisturbed lands, was identified for potential survey. This area included 1,420 acres; however, only 738 acres were identified as potentially suitable to support western gray squirrel (Figure 3.4-8). Surveys were conducted following methods described by Van der Haegen, Van Leuven, and Anderson (2004). Surveyors searched for individuals and nests, focusing mainly on gray squirrels, but also noting other species. When possible, historical use by western gray squirrels was determined. No gray squirrels or nests were detected during these surveys in 2008 or 2009. Detailed methodology and results can be found in Appendices C-6 and C-7.

Keen's Myotis

Keen's bat is considered a Washington State Candidate for listing. In Washington, this species is recorded as occurring on the Olympic Peninsula and Cascade Mountains (BCI 2009). The Project Area is likely on the very edge of the distribution range for Keen's myotis. Although little is known about this species, it is believed to rely on old-growth forests. Keen's myotis likely roosts in tree cavities and forages in dense coniferous forests. Bat surveys conducted during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Instead, bats are grouped into species with either "high-frequency" calls or "low-frequency" calls. Keen's myotis is considered part of the "high-frequency" group. Based on the lack of detailed information of this species life history and habitat requirements and nature of the bat surveys conducted it is difficult to conclude with certainty what the likelihood of Keen's bats occurring in the in the Project Area. However, due to the lack of old-growth or mature forest types within the Project area and the predominant commercial forestry use of the property, the likelihood of occurrence on the site is considered to be low.

Townsend's Big-Eared Bat

Townsend's big-eared bat is a federal species of concern and a Washington state candidate for listing. Its distribution spans the western US, and occurs primarily in desert scrub and pine forest regions (BCI 2009). In the spring and summer, females form maternity colonies in mines, caves or buildings. In winter they hibernate in caves and abandoned mines. These maternity and roosting locations are sensitive to disturbance. It forages after dark in upland areas. Bat surveys conducted in the Project Area during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Instead, bats are grouped into species with either "high-frequency" calls or "low-frequency" calls. Townsend's big-eared bat is considered part of the "low-frequency" group. Based on lack of detailed information on this species distribution and the nature of the bat surveys conducted on the site, it is difficult to conclude with certainty the likelihood of Townsend's big-eared bats occurring in the Project Area. There are no known roosting structures or maternity colonies occurring in the vicinity of the Project Area. Consequently, the likelihood of occurrence on the site is considered to be low.

3.4.1.6 Other Wildlife Species

In addition to studies of special status species, other studies of birds and bats at the Project site have been ongoing since 2004. Birds were surveyed during all seasons of the year in the fall of 2004, summer of 2006, winter 2008–2009 and spring of 2009. Results are summarized in Appendix C-4.

Bats were surveyed during the fall of 2007, summer–fall of 2008 and summer–fall of 2009. Results of those studies are presented in Appendices C-8, C-9 and C-10. The timing of these surveys is expected to capture the peak of bat use during the breeding season (summer) and migration (fall). Information on the potential for other taxonomic groups to occur in the Project Area is based on general distribution and habitat requirements for individual species.

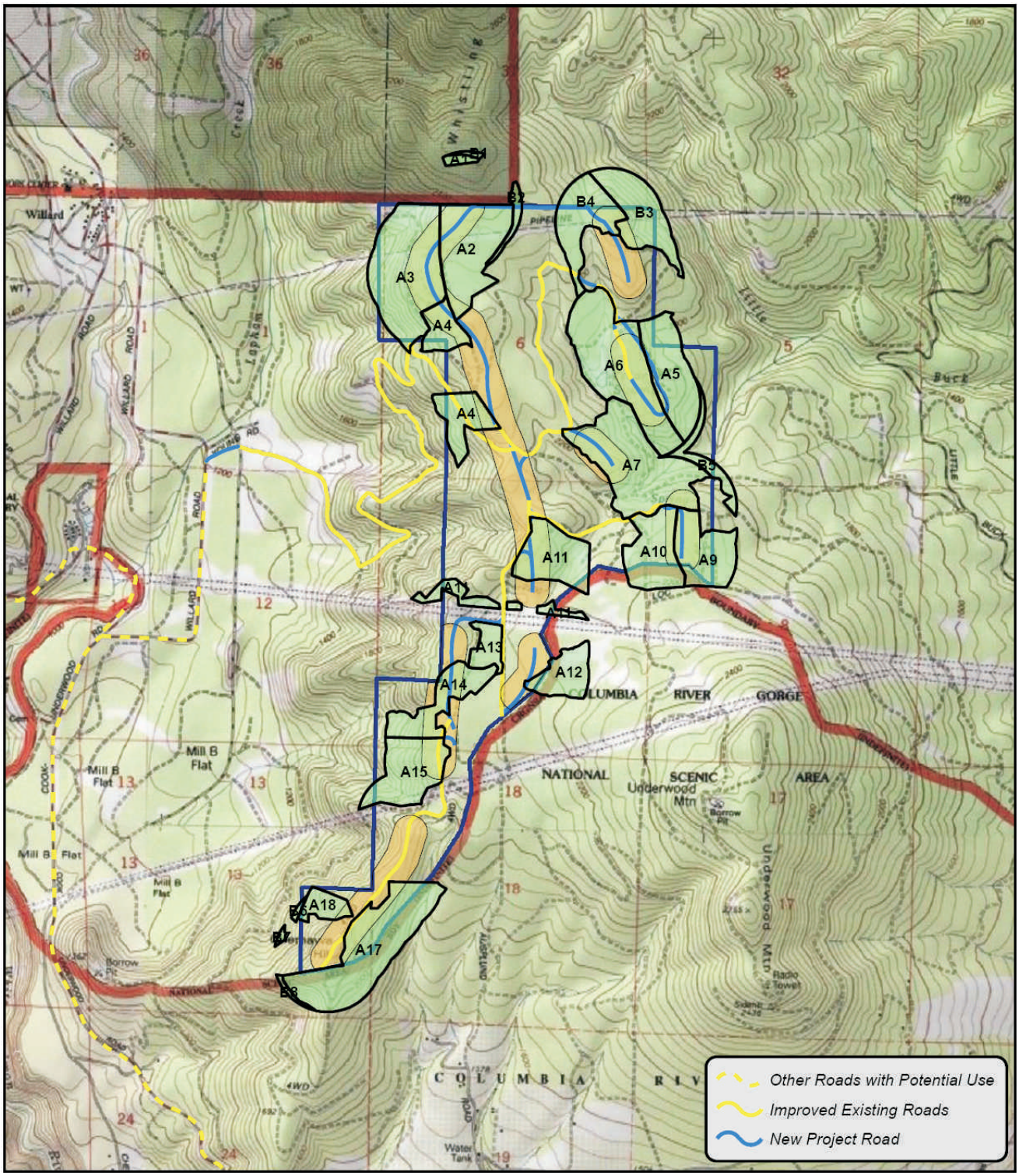
Birds

Avian surveys were conducted in the Project Area across all seasons in multiple years. There were: 53 surveys during the fall migration period (September 11 to November 4, 2004), 45 surveys during the breeding/nesting season (May 15 to July 14, 2006), 47 surveys during winter and 116 surveys during spring (December 4, 2008 to May 29, 2009).[13]

Study protocol followed methods described by Reynolds et al. (1980). An 800-meter circular plot was centered on each observation point (Figure 3.4-9). All observations, behavior, and flight patterns of birds in and near plots were recorded. Flight patterns, such as direction of travel and flight altitude also were recorded.

[13] In its 2003 Energy Overlay Environmental Impact Statement, Klickitat County also included two survey locations at or in proximity to the Project site. These included surveys during the spring and summer 2003 seasons. See Appendix B to the Klickitat County Energy Overlay Draft Environmental Impact Statement (Kennedy/Jenks Consultants 2003).

33758687_160.cdr



Western Gray Squirrel Survey Areas

650' Turbine Corridor

Site Boundary

N

0 0.25 0.5 Miles

Figure 3.4-8

Western Gray Squirrel Survey Areas

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Observations of birds beyond the 800-meter radius were recorded; however, these data were analyzed separately from data collected from survey plots. The location of raptors, other large birds, or species of concern observed during counts was recorded on field map. A list of all birds recorded in the Project Area (including those during special status species surveys) is provided in Table 3.4-5. Appendix C-4 contains full results of fall 2004, summer 2006, winter 2008-09 and summer 2009 surveys.

A total of 87 species were recorded during avian surveys. Passerines (songbirds) were the most abundant avian group overall. American robin, dark-eyed junco and white-crowned sparrow were the three most frequently observed birds across all seasons. Mean overall bird use in the study area was low compared to these other wind resource areas studied; ranking 19th compared to 24 other wind resource areas (Figure 9 in Appendix C-4). Eleven species of raptors were observed: American kestrel, bald eagle, Cooper's hawk, golden eagle, northern harrier, northern goshawk, osprey, prairie falcon, red-tailed hawk, sharp-shinned hawk, and turkey vulture. Red-tailed hawk was by far the most observed raptor, followed by Cooper's hawk and sharp-shinned hawk. Mean annual raptor use was 0.28 raptors per plot per 20-minute survey, which is a standardized way to measure use in order to compare results to avian use at other sites. This annual rate is low relative to raptor use at 36 other wind-energy facilities that implemented similar protocols and had three or four season surveys. Mean raptor use in the study area was low compared to these other wind resource areas; ranking 29th compared to 36 other wind energy facilities (Figure 7 in Appendix C-4).

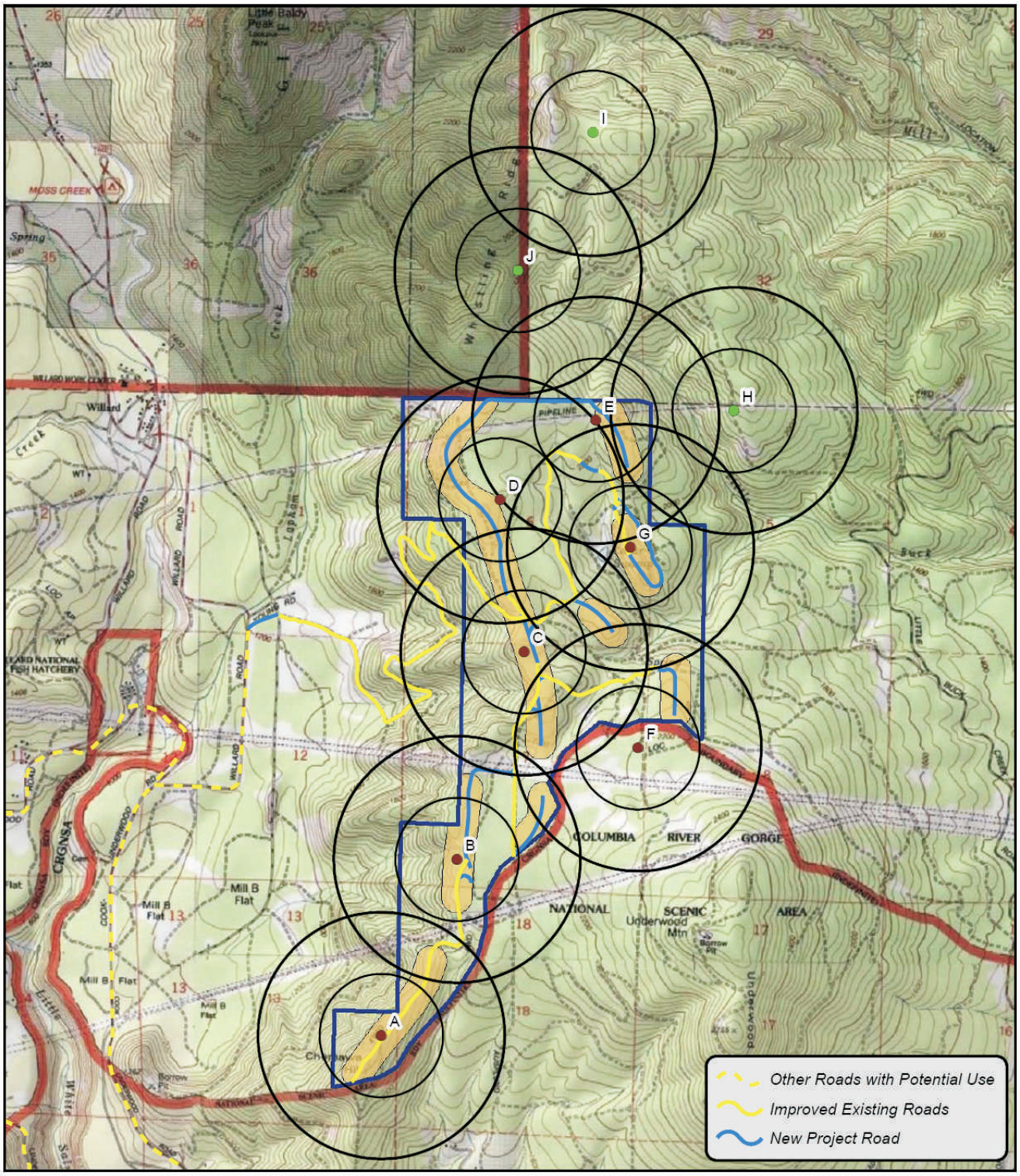
Fall Migration Surveys (2004)

General avian surveys identified 39 species of bird in the survey area (Figure 3.4-9). Passerines (songbirds) were the most abundant avian group, constituting 87.4 percent of observations. This group was observed with the greatest frequency (94.4 percent of surveys). Raptors were the second most abundant group observed; however, this group represented only 4.9 percent of observations. Raptors were observed during 38.5 percent of the surveys, followed by woodpeckers (22.6 percent of surveys) and doves/pigeons (9.3 percent of surveys).

The most common species at the Project Area included dark-eyed junco, American goldfinch, Steller's jay, common raven, and white-crowned sparrow. The species of birds most frequently observed during fall surveys were common raven, Steller's jay, dark-eyed junco, red-breasted nuthatch, and golden-crowned kinglet. Eight species of raptor were observed during the survey. Those with the highest use of the site were sharp-shinned hawk, Cooper's hawk, and red-tailed hawk. The highest raptor use observed at the site during 2004 surveys occurred between September 11 and October 12, 2004. These data do not indicate that any areas within the proposed site have substantially higher raptor use than others.

No federal or state listed endangered or threatened avian species were observed during the survey period. Four state candidate species were observed: golden eagle, northern goshawk, pileated woodpecker, and Vaux's swift. Two State Monitor species were observed, including four single turkey vultures and four groups totaling 27 western bluebirds. Detailed results and summary tables can be found in Appendix C-4.

33758687_161.cdr



Avian Observation Dates

- 2004, 2006, 2008-2009
- 2008-2009

- 400/800 m Buffers
- 650' Turbine Corridor
- Site Boundary

N

0 0.5 1 Miles

Figure 3.4-9

2004, 2006, 2008 and 2009 Bird Survey Locations

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Table 3.4-5
Birds Observed in the Project Area Across All Seasons

Species (Common Name)	Winter	Fall	Summer	Spring
American crow				X
American goldfinch	X	X	X	X
American kestrel				X
American robin	X	X	X	X
Bald eagle	X		X	
Band-tailed pigeon		X	X	X
Barred owl			X	
Barn swallow				X
Bewick's wren			X	
Black-capped chickadee	X	X	X	X
Black-headed grosbeak			X	X
Black-throated gray warbler			X	
Brown-headed cowbird			X	X
Bullock's oriole				X
Canada goose				X
Cassin's finch				X
Cassin's vireo			X	
Cedar waxwing			X	
Chestnut-backed chickadee	X	X	X	X
Chipping sparrow			X	X
Clark's nutcracker		X		
Common raven	X	X	X	X
Cooper's hawk	X	X	X	X
Dark-eyed junco		X	X	X
Downy woodpecker	X		X	X
Evening grosbeak			X	X
Golden-crowned kinglet	X	X	X	X
Golden-crowed sparrow		X		
Golden eagle		X		
Gray jay				X
Hairy woodpecker		X	X	X
Hammond's flycatcher			X	X
Hermit thrush			X	X
Hermit warbler				X
House wren			X	X
Lazuli bunting			X	X
Lincoln's sparrow		X		
Macgillivray's warbler			X	X
Mountain chickadee		X		X
Mourning dove		X		
Nashville warbler			X	X
Northern flicker	X	X	X	X
Northern harrier		X		X

Species (Common Name)	Winter	Fall	Summer	Spring
Northern goshawk		X	X	
Northern rough-winged swallow			X	
Northern saw-whet owl				
Olive-sided flycatcher			X	X
Orange-crowned warbler			X	X
Osprey			X	
Pileated woodpecker	X	X		X
Pine siskin			X	X
Prairie falcon		X		
Purple finch		X	X	X
Red crossbill		X	X	X
Red-breasted nuthatch	X	X	X	X
Red-breasted sapsucker				X
Red-tailed hawk	X	X	X	
Red-winged blackbird				X
Ruby-crowned kinglet		X	X	X
Rufous hummingbird			X	X
Ruffed grouse		X	X	
Say's phoebe				X
Sharp-shinned hawk		X	X	X
Snowy owl				X
Song sparrow	X	X		X
Sooty grouse				X
Spotted towhee		X	X	X
Steller's jay	X	X	X	X
Swainson's thrush			X	
Townsend's solitaire			X	X
Townsend's warbler			X	
Tree swallow		X		X
Turkey vulture		X	X	X
Varied thrush		X		X
Vaux's swift		X	X	X
Violet-green swallow			X	X
Warbling vireo			X	X
Western bluebird		X	X	X
Western tanager		X	X	X
Western wood-peewee			X	X
White-breasted nuthatch				X
White-crowned sparrow		X	X	X
Wild turkey				X
Willow flycatcher			X	
Wilson's warbler			X	X
Yellow-rumped warbler		X	X	X
Yellow warbler			X	

Summer Surveys (2006)

Fifty-five species of birds were observed during summer breeding and nesting surveys in 2006 (Figure 3.4-9). Passerines were the most abundant group (88.5 percent), followed by raptors and woodpeckers (3.3 percent each), and doves/pigeons (3.2 percent). The most frequently observed groups were passerines (100 percent of surveys), woodpeckers (35.6 percent of surveys), and raptors (31.1 percent of surveys). Species with the highest use of the Project Area included white-crowned sparrow, red crossbill, western tanager, spotted towhee, and MacGillivray's warbler. The most frequently observed species included white-crowned sparrow (77.8 percent of the surveys), western tanager (75.6 percent of surveys), spotted towhee (64.4 percent of surveys), MacGillivray's warbler (48.9 percent), and dark-eyed junco (48.9 percent). Three species of raptors were observed, including red-tailed hawk, northern goshawk, and sharp-shinned hawk. Raptor use in the fall was only slightly higher than during the summer breeding season. The data do not indicate that any portions of the Project Area have substantially higher raptor use than other areas. For all bird species combined, use of the Project Area by avian species was slightly higher during the summer breeding season than during the fall migration period. Detailed results and summary tables can be found in Appendix C-4.

Winter/Spring Surveys (2008-2009)

Fifteen species of birds were observed during winter surveys in 2008–2009, and 65 species during the spring of 2009. In winter, observations were dominated by common raven, American robin, and unidentified finches. The number of species and number of individuals observed in the spring were the highest across all seasons. Similar to other seasons, passerines were the most abundant group, followed by woodpeckers and then raptors. Individual species with the highest use included American robin, dark-eyed junco and yellow-rumped warbler. The data do not indicate that any portions of the Project Area have substantially higher raptor use than other areas. Detailed results and summary tables can be found in Appendix C-4.

The WDFW Priority Habitats and Species database was searched for known occurrences of raptor nests. The only recorded nest was for an osprey, more than one mile east of the Project Area.

Bats

Bat acoustic studies were conducted for the Project in 2007, 2008 and 2009. Detailed information on these investigations can be found in Appendices C-8 (2007), C-9 (2008) and C-10 (2009).

Bat acoustic studies conducted from 2007 through 2009 were implemented at various locations in the Project Area. The goal of the studies were to: (1) characterize the local bat population in a variety of habitats, (2) identify areas of high usage by bats, and (3) characterize the frequency of bat usage of areas representative of where turbine strings would be located. Studies were done across several seasons to estimate annual variation during breeding and periods of migration.

For all studies, passive Anabat® II echolocation detectors coupled with Zero Crossing Analysis Interface Modules (ZCAIM; Titly Electronics Pty Ltd., NSW, Australia) were used in all survey years. Anabat detectors record bat echolocation calls using a broadband microphone. Bat species are generally grouped into those that emit low frequency (<35 kHz) or high frequency (≥

35 kHz) calls. The units of activity equaled the number of bat passes, and were used to calculate the number of bat passes per detector night (Hayes 1997). The data thus indicate the level of bat activity rather than absolute abundance.

In 2007, detectors were placed at two locations from August 20 through October 21 (Figure 1 in Appendix C-8). The 2007 studies were intended to provide a general census of bat activity in recently reforested or young forest areas. This type of habitat is similar to what would be found in the areas within 150 feet of the proposed turbines, on the two sides of the turbines. The northernmost detector was located just outside the proposed turbine corridor. This detector was initially placed at ground level; however, it was raised to a height of 130 feet (40 meters) on September 7. The southernmost detector was located outside the Project Area; however, it was placed in habitat believed to be representative of that found in the Project Area. The southernmost detector was placed at ground level, and remained at that location for the duration of the study.

Due to equipment failures in 2007, both Anabat detectors were only operable for 24 percent of the sampling period, amounting to 45 detector-nights. Bat activity was similar between north and south ground level Anabat units (mean = 11.67 ± 2.0 and 9.6 ± 4.1, respectively). Bat activity recorded after the northern Anabat detector was elevated was much lower (mean = 2.47 ± 1.1) than that recorded at ground level. A list of bat species with potential to occur in the Project Area based on range maps, divided between high-frequency and low-frequency species, can be found in Table 3.4-6.

Table 3.4-6 (Revised to Add Call Frequency)
Bat Species Likely to Occur in the Project Area, Based on Range-Maps

Species	Status	High Frequency (>35 kHz)	Low Frequency (<35 kHz)
California bat		X	
Big Brown bat			X
Fringed myotis	FCo, SM	X	
Hoary bat			X
Keen's bat	SC	X	
Little brown bat		X	
Long-legged bat	FCo, SM	X	
Pallid bat	SM		X
Silver-haired bat			X
Townsend's big-eared bat	FCo, SM		X
Western long-eared bat		X	
Western pipistrelle	SM		
Western red bat		X	
Western small-footed bat		X	
Yuma myotis		X	

Status Codes:
FCo – Federal Species of Concern
SC – State Candidate
SM – State Monitor
Source: Western Ecosystems Technology, Inc., Final Report, Bat Acoustic Studies for the Saddleback Wind Energy Project, Skamania County, Washington, February 14, 2008)
(no information on call frequency was provided for Western pipistrelle)

The bat acoustic survey effort was increased to four locations during the 2008 survey period, and the survey period covered July 3 to October 7, 2008. This period corresponded with summer

breeding and fall bat migration. Four survey locations were used, all on the ground (Figure 1 in Appendix C-9). Two were located in clear cuts (SB1 and SB4), one immediately adjacent to a wetland (SB2) and one in a road corridor (SB3). Sampling at the wetland was intended to characterize bat occurrence a location known to have a high level of usage, because wetlands are frequently used as foraging and drinking habitat for bats. Similarly, sampling in the road corridor was intended to capture the highest levels of use within the Project Area, because road corridors are frequently used by bats to travel between roosting and foraging locations. The two clear cut sites were most representative of the types of habitat where turbines would be located for the proposed Project. However, because all detectors were located on the ground, sampling did not entirely capture the potential bat use of the rotor-swept area.

Table 3.4-7 summarizes bat activity at all survey locations. During the 2007 and 2008 surveys, the two clear cut sites (SB1 and SB4) had an average of 14.30 and 73.76 bat passes per night, respectively. The wetland (SB2) and road corridor (SB3), recorded much higher levels of use, at 178.03 and 327.25 bat passes per night, respectively. Seasonal activity patterns were similar for the two clear cut survey locations, with the highest bat activity occurring during the months of July and August. Bat activity in the wetland area was highest during the month of July. In comparison to 2007, bat numbers were on average higher because in 2007 this peak use period was not captured during the sampling period (in 2007 sampling did not begin until August 20).

Table 3.4-7
Average Bat Detections Per Night During Three Survey Years

Year	Location	Habitat	Ground or Elevated	Average per Detector Night
2007	North	Young forest	G	11.67
	North	Young forest	E	2.47
	South	Young forest	G	9.60
2008	SB1	Clear cut	G	14.30
	SB2	Wetland	G	178.03
	SB3	Road corridor	G	327.25
	SB4	Clear cut	G	73.76
2009	WR1	Clear cut	G	17.28
	WR2	Clear cut	E	10.59
	WR3	Young forest	G	11.04
	WR4	Young forest	E	1.53
	WR5	Clear cut	G	6.43
	WR6	Clear cut	E	1.64

In 2009, the bat survey efforts were further refined to focus specifically on the types of locations where turbines would be sited. Three locations were selected (Figure 3.4-10), two in clear cuts and one in a recently reforested area (young forest). In addition, each sampling location had a pair of Anabat detectors; one on the ground and one elevated on a meteorological tower. The elevated detectors were intended capture bat use in what would likely be the rotor-swept area, which is where potential bat-turbine collisions would occur. The ground level detectors were intended to provide some comparison to prior year studies, most of which were done at ground level. The numbers of bat detections in 2009 are summarized in Table 3.4-7.

In general, elevated detectors recorded fewer bats than their ground level counterparts, indicating that bat occurrence within the rotor-swept area is lower than those at lower flight elevations. For all years (2007–2009), elevated bat detections were the lowest numbers recorded, between 1.53 and 10.50 bat passes per night. All bat detections in 2009 were collected by Anabat equipment installed in locations most representative of potential turbine locations. The detections were notably lower than some of the other records in 2008 taken from equipment placed in areas of known high bat use.

Amphibians and Reptiles

Amphibians and reptiles likely to occur within the Project Area are those species that can tolerate disturbance associated with managed timber activities and drier-than-average conditions for at least part of their life cycle. This includes such common species as Long-toed salamander (*Ambystoma macrodactylum*), Rough-skinned newt (*Taricha granulose*), Ensatina (*Ensatina eschscholtzii*), Pacific treefrog (*Pseudacris (=Hyla) regilla*), and northwestern garter snake (*Thamnophis ordinoides*). Breeding may occur within the intermittent drainages located in the northeast corner of the site, within cedar swamp, or substantial roadside drainage ditches. These species may stray further from water sources during heavy rains or during winter conditions.

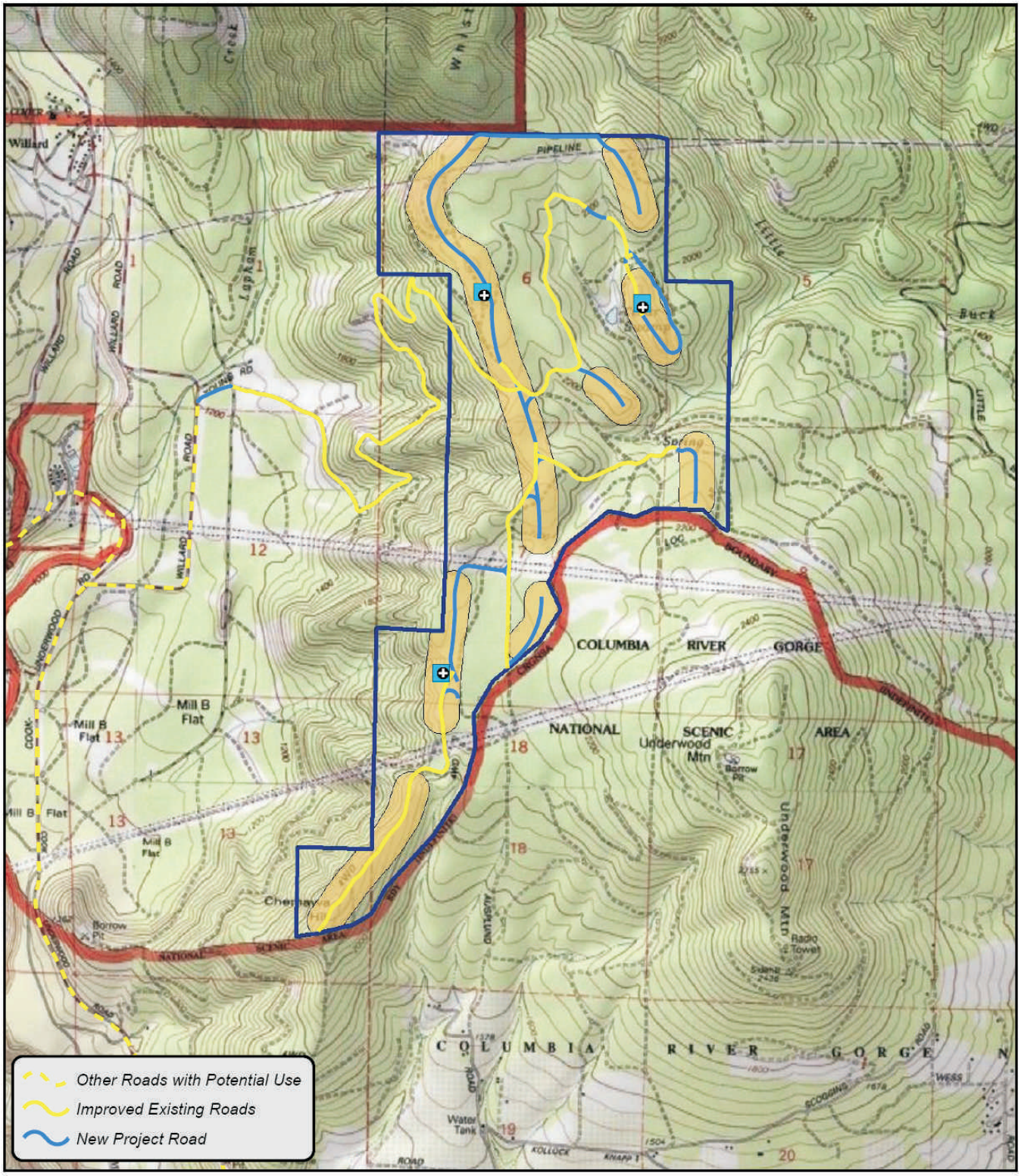
Mammals

Several large mammals have the potential to occur within the Project Area. Known priority wildlife habitats, including mule deer and black-tailed deer (*Odocoileus hemionus)* winter range, are present east of Underwood Mountain, extending to lands to the north/northeast. Winter range for Columbia black-tailed deer is present in lands west of Underwood Mountain, and extends north and south from the Project Area. Elk (*Cervus elaphus*) winter range is present throughout the Project Area. Other species likely to occur throughout the region include cougar (*Puma concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), and black bear (*Ursus americanus*). Douglas squirrels (*Tamiasciurus douglasii*) were recorded during surveys for the western gray squirrel.

Fish

No fish have been documented within the Project Area. The Project is on a ridgeline between Underwood Mountain and the White Salmon River, approximately 3 miles north of the Columbia River. The ridgeline is oriented in a north-south direction. The Columbia River receives runoff via the White Salmon drainage area east of the site and via the Little White Salmon River west of the site. The White Salmon River contains evolutionarily significant units and designated critical habitat for three species listed as threatened under the Endangered Species Act: (1) Lower Columbia River Chinook, (2) Middle Columbia River Steelhead, and (3) Columbia River Chum (Figure 3.4-11).

33758687_162.cdr



2009 Anabat Stations
- Bathat
- Ground

650' Turbine Corridor

Site Boundary

N

0 0.25 0.5 Miles

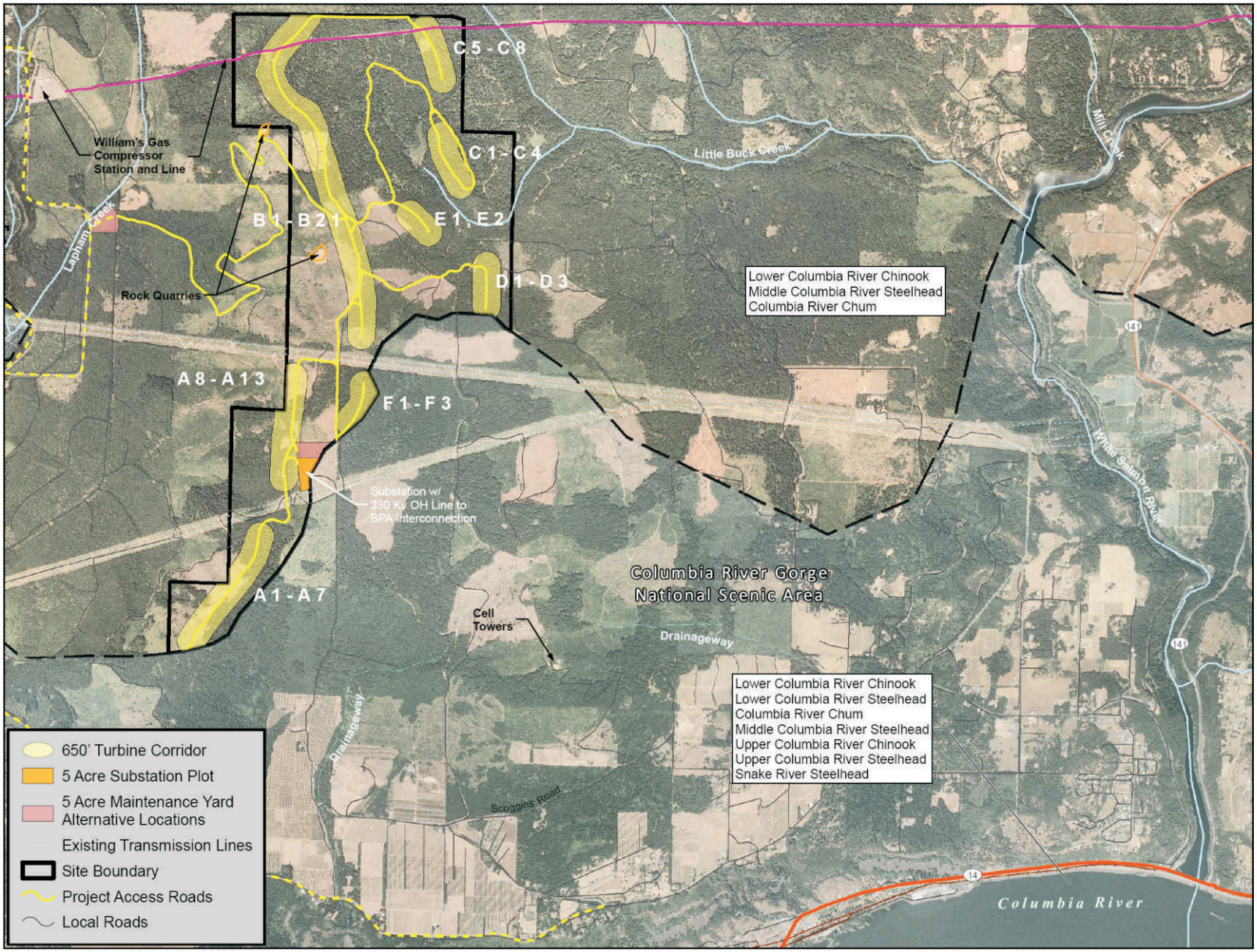
Figure 3.4-10

2009 Bat Survey Locations

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application



1:26,000

0 1,000 2,000 4,000 Feet

Figure 3.4-11
Designated Critical Fish Habitat

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

A tributary to Little Buck Creek is located in the northeast portion of the Project Area. This tributary is typed as a non-fish-bearing stream. No special status fish species are present in Little Buck Creek. However, Buck Creeks drains into Northwestern Lake, which in turn drains into the White Salmon River.

West Pit Road crosses an unnamed drainage. This stream had observed flow through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to Lapham Creek or the Little White Salmon River. Fish are not present in this stream.

3.4.1.7 Noxious Weeds

The Project Area contains several noxious weed species, which are nonnative, invasive plants. The weed species observed during field visits to date are listed in Table 3.4-8.

The Washington Noxious Weed Control Board identifies lists of noxious weed species that require control, eradication, or monitoring. Class A noxious weeds are nonnative species with a limited distribution within a state and require eradication to reduce the potential of becoming more widespread.

Table 3.4-8
Noxious Weed Observations

Scientific Name	Common Name	Status
Centaurea stoebe	Spotted knapweed	Class B - Designate
Cirsium arvense	Canada thistle	Class C - Designate
Cirsium vulgare	Bull thistle	Class C
Cytisus scoparius	Scot's broom	Class B - Designate
Daucus carota	Queen Anne's lace	Class B
Hypericum perforatum	Common St. John's-wort	Class C
Leucanthemum vulgare	Ox-eye daisy	Class B
Linaria dalmatica	Dalmatian toadflax	Class B - Designate
Rubus armeniacus	Himalayan blackberry	Class C
Senecio vulgaris	Common groundsel	Class C

Class B noxious weeds are regionally abundant, but may have limited distribution in some counties. In Washington, in regions where a Class B noxious weed is unrecorded or of limited distribution, prevention of seed production is required. In these areas the weed is a "Class B designate." However, in regions where a Class B species is already abundant or widespread, control is a local option. In these areas the weed is a "Class B non-designate."

Class C noxious weeds are already widely established, but placement on the state list allows counties to enforce local control if desired. Skamania County has designated a few Class C weeds. Within the Project boundary, only Canada thistle (*Cirsium arvense*) is a designated Class C weed.

3.4.2 IMPACTS

This section identifies the potential impacts to biological resources as the result of both construction and operation of the proposed Project.

3.4.2.1 Proposed Action

Skamania County Critical Areas Ordinance Regulation

The Skamania County Critical Areas Ordinance recognizes the following as critical areas: watershed protection areas (including wetlands, streams, creeks, rivers, ponds and lakes); critical aquifer recharge areas; fish and wildlife habitat; frequently flooded areas; and geologically hazardous areas (including landslide hazards, erosion hazards and volcanic hazards). All critical areas have a required no-touch buffer setback based on the classification of the critical area, as set forth in Skamania County Critical Areas Ordinance Title 21A. All buffers are undisturbed buffers and must be free of any logging, road building, or other development activities including, but not limited to, vegetation removal, grading, filling, mowing, or placement of structures. The Project would not affect any critical areas or buffers.

Construction

Habitat Types

Construction and operation of the Project would require the removal of vegetation in some areas to accommodate roadway construction and improvement, turbine siting, staging, and construction. The impacts of Project construction would not differ substantially from customary forestry activities on the site. Each turbine footing and foundation would measure approximately 3,100 square feet. Vegetation surrounding each turbine would be managed according to the following specifications:

- A circular area extending 50 feet from each turbine tower base would be harvested and graveled;
- From 50 feet to 150 feet from the base of the turbine towers, tree heights would be limited to 15 feet above the elevation of the base of the turbine; and
- From 150 feet to 500 feet from the base of the turbine towers, tree height would be limited to 50 feet above the turbine base within an area formed by a 90 degree arc centered on the ordinary downwind direction (Figure 2-4 in Chapter 2).

The A and F turbine strings and parts of the B and C turbine strings would be accessed by existing roads. Modifications to these roads are anticipated in order to support the long and heavy loads required for delivery of the wind turbine systems. An estimated 5.1 miles of roads within the Project Area would require improvements as a result of the proposed Project. The majority of new roads would be constructed to access parts of the B and C turbine strings, and all of the D and E turbine strings. Access to these turbines would require 2.4 miles of new roadway. All roads used to access turbines would be maintained throughout the life of the Project.

All vegetation clearing would be completed using crawler tractors, rubber-tired skidders, mobile feller-bunchers, or cable yarding equipment. This equipment is typically used in timber harvest, and is currently used to harvest other stands located on the Applicant's property. Logs would be transported by truck to Applicant facilities in Bingen, Washington. Except for permanently cleared areas, cleared areas would be replanted with trees within one year following completion of construction (typically the following spring). Areas where trees are permanently removed would be replanted with appropriate native grasses and low-growing shrubs. Because trees would be cleared for the purpose of the Project, cleared areas would be considered "forest conversion" under the Washington Forest Practices Act. However, cleared areas would still be reforested in accordance with typical commercial forestry management practices when feasible. ~~Permanent and temporary~~ Temporary and Permanent impacts to habitat types within the Project Area can be found in Tables 3.4-9 and 3.4-10.

West Pit Road was widened in the summer of 2009. Additional road improvements would be required during the construction phase of the Project. However, the loss and modifications of habitat types from these modifications are anticipated to be minor. ~~Tables 3.4-9 and 3.4-10 show the temporary and permanent impacts of the Project to the habitat types found on the site and along the portion of West Pit Road that would be improved.~~

Table 3.4-9
Temporary Impacts from Project Elements to Habitat Types (acres)

Habitat Type	Turbine Corridor[a]	Road Corridor[b]	Transmission Line Corridor[c]	Operations and Maintenance Area	Substation Area	Roadway Corridor Outside Project Area[d]	Total
Grass-Forb Stand	15.12	6.57	0.68	0	0	0.23	22.60
Brushfield/Shrub Stand	2.31	1.61	0.61	0	0	0.66	5.19
Conifer-Hardwood Forest	11.56	2.05	1.08	0	0	0.40	15.09
Conifer Forest	7.40	3.07	0.02	0	0	0.23	10.72
Riparian Deciduous Forest	0	0	0	0	0	0	0
Total	36.39	13.30	2.39	0	0	1.52	53.60

[a] Total temporary impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line connecting each turbine string.
[b] The temporary impact area of proposed roadway modifications within the Project Area encompassed by a 100-foot corridor along all roads. Does not include overlap of transmission corridor or turbine corridor.
[c] The temporary impact area of proposed development within the area encompassed by a 100-foot corridor along all Project transmission lines. Does not include overlap of road corridor or turbine corridor.
[d] The area of temporary impact is based on the assumption that 5 feet on both sides of the roadway would be restored after construction of permanent roadway modifications.

Table 3.4-10
Permanent Impacts from Project Elements to Habitat Types (acres)

Habitat Type	Turbine Corridor[a]	Road Corridor[b]	Transmission Line Corridor[c]	Operations and Maintenance Area	Substation Area	Roadway Corridor Outside Project Area[d]	Total
Grass-Forb Stand	10.47	7.17	0.36	5.0	7.10	0.68	30.78
Brushfield/Shrub Stand	1.31	1.98	1.14	0	0	1.97	6.40
Conifer-Hardwood Forest	8.67	1.82	1.95	0	0	1.20	13.64
Conifer Forest	4.94	4.23	0	0	0	0.70	9.87
Riparian Deciduous Forest	0	0	0	0	0	0	0
TOTAL	25.39	15.20	3.45	5.00	7.10	4.55	60.69

[a] Total permanent impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line connecting each turbine string.
[b] The permanent impact area of proposed roadway modifications within the Project Area encompassed by a 100-foot corridor along all roads. Does not include overlap of transmission corridor or turbine corridor. Also excludes existing roadway.
[c] The permanent impact area of proposed development within the area encompassed by a 100-foot corridor along all Project transmission lines. Does not include overlap of road corridor or turbine corridor.
[d] The permanent impact area is based on the assumption that the existing roadway is 20 feet wide, the new roadway would be 25 feet wide, and that an additional 5 feet on each side of the roadway would be permanently cleared.

Wetlands

No wetlands or wetland buffers are located within the Project footprint. Therefore, no wetlands or buffers are expected to be affected by construction of the Project.

A review of the National Wetland Inventory indicates that wetlands may occur along SR 14 but not along County or private roads proposed for the Project's construction access and turbine delivery routes. No improvements to SR 14 are anticipated to be required, and therefore no wetland-related impacts would occur. Roadway improvements to the County or private logging roads are not expected to affect wetlands. This information was confirmed through field investigations performed in May and July 2009.

See Section 3.3 for a discussion of impacts to other surface water features such as streams.

Special Status Plant Species

No federal- or Washington State-listed plant species have been documented at the site during multiple field surveys. Therefore, no project-related impacts are anticipated from construction of the proposed Project. Two plant species on the WNHP Watch List, gnome plant and phantom orchid, were observed within areas that may be cleared for construction of the Project. Both species are growing in areas that have been previously clearcut and were able to re-establish. In addition, there are no regulatory requirements to protect these species.

Special Status Wildlife Species

Potential construction related impacts to bald eagle, golden eagle, northern goshawk, northern spotted owl, olive-sided flycatcher, pileated woodpecker, Vaux's swift, western gray squirrel, Keen's myotis, and Townsend's big-eared bat are discussed in this section.

Bald Eagle. Four bald eagles were recorded in the Project Area. The Project Area is over two miles away from the nearest known bald eagle foraging habitat, which is the Columbia or White Salmon Rivers. Therefore bald eagle use of the Project Area is considered infrequent and sporadic. The removal of coniferous forest as a result of Project construction that far away from suitable foraging habitat would not impact bald eagles. No breeding habitat would be affected.

Golden Eagle. Golden eagles have been recorded in the Project Area; however they are considered an uncommon visitor to this region of Washington State. They are known to forage in mid-elevation clear cut habitat. The permanent removal of 21.31 acres of grass-forb stand or shrub habitat for construction of turbine strings and transmission line corridors would decrease the amount of foraging habitat available to golden eagles within the Project Area. Any golden eagles potentially using the Project Area for foraging would likely be temporarily deterred from using the site by construction vehicle and personnel activity.

Northern Goshawk. Northern goshawks were recorded in the Project Area. Although they were recorded during the summer, no evidence of nest or breeding individuals was observed during multiple years of surveys. A breeding goshawk may have a wide area of home range spanning multiple age classes of forest. They also may forage in open areas. Construction of the proposed Project would result in the permanent loss of 21.86 acres of managed coniferous or mixed deciduous-coniferous forest. This would represent a loss of habitat generally suitable for goshawks, though unlikely to support breeding pairs. Goshawks also forage in open area, where they swoop to the ground to capture prey. Approximately 17.13 acres of grass-forb habitat would be permanently lost during construction of the Project.

Northern Spotted Owl. The Applicant has sited its proposed Project to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the Project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no northern spotted owls or activity centers present in the Project area, no Project construction impacts are expected. Finally, the Project would not impact the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this Project does not pose a risk of taking northern spotted owls under Endangered Species Act Section 9.

Olive-sided Flycatcher, Pileated Woodpecker, and Vaux's Swift. These three avian species are all passerines with known occurrence within the Project Area. All three use coniferous forest for nesting. Construction of the proposed Project would result in loss of 21.86 acres of forest habitat. Construction during the breeding season would likely result in disturbance of any individuals occurring in the vicinity, thereby temporarily reducing the use of further areas of habitat. Vaux's swift and olive-sided flycatchers forage on the wing over cleared areas, so it is likely that no additional habitat loss would occur for these species as the result of conversion of forested area to clearing (grass-forb stand).

Western Gray Squirrel. The construction of the proposed Project would result in the permanent removal of 21.86 acres of managed coniferous or mixed deciduous-coniferous forest. The gray squirrel prefers habitat where contiguous tree canopy allows arboreal travel in a minimum of a 198-foot (60-meter) radius around the nest (Ryan and Carey 1995). Current forest management practices on forest within the proposed Project Area has created habitat not generally suitable for this species, due to fragmentation of mature forest stands. Contiguous forest habitat located in the Project Area would not develop in the future. The Project Area also contains very few oak trees, and those that were observed were of small stature (less than 20 feet tall), stunted, and growing in openings on exposed rocky slopes in shallow soils. Acorn crops from oak trees are an important food source for western gray squirrels, and the lack of this primary food source may deter use of the Project Area by gray squirrels. Because habitat for this species is considered rare or of moderate/poor quality in the Project Area, impacts to western gray squirrel due to loss of coniferous forest habitat are expected to be negligible.

Keen's Myotis and Townsend's Big-Eared Bat. The special status bat species may occur in the Project Area, based on their documented distribution. Surveys for bats were not able to identify all bats to species level. Both species may utilize mature or old-growth forested habitats within the Project Area, if suitable nest sites were available. Permanent loss of 21.86 acres of forest habitat and 21.31 acres of shrub/grass/forb habitat may result in a small reduction of suitable habitat for these species. No known roosting or breeding locations would be impacted.

Other Wildlife Species

In general, wildlife in the Project Area could be affected by the construction of the Project through the loss of suitable habitat, potential fatalities during clearing or grading of the construction area, and disturbance/displacement from construction activity and personnel occupying the site. Fragmentation of the remaining habitat also could occur, although current land management practices result in an existing source of ongoing fragmentation on the site. Therefore, permanent vegetation removal and temporary construction disturbance are the primary impacts as a result of the proposed Project.

Birds. Direct mortality to birds and/or bird nests could occur during the initial clearing or grading of the construction areas. Additional disturbance could occur indirectly to birds or bird nests occurring adjacent to construction areas. This may occur if a nest or a primary foraging area is nearby. In areas where temporary disturbance would occur, it is anticipated that birds would generally reoccupy restored habitats with time. Some habitat would be permanently converted from one type (forest) to another (clear cut or grass-forb). This would result in a temporary disturbance, likely followed by recolonization of the area by a different suite of birds.

Bats. Impact to bats as a result of construction would be minimal unless known nesting or roosting sites were removed. Disturbance or displacements to bats as a result of construction activities would be minimal because bats are primarily active during the night, when construction would not occur.

Amphibians/Reptiles. No wetlands or other surface water bodies are proposed to be filled as a result of the Project. Therefore, no amphibian breeding habitat would be directly impacted. Amphibians and reptiles would potentially experience direct loss of non-breeding habitat and further fragmentation of the remaining habitats.

Mammals. No direct mortality of large mammals is anticipated as a result of construction because these species are able to relocate away from heavy equipment used in clearing and grading. Some avoidance of the area due to disturbance would likely occur on a temporary basis. Permanent removal of vegetation would result in the loss of some habitat for these species. The conversion of one habitat type to another would likely not reduce the amount of area available to the more commonly-occurring species, which utilize multiple habitat types during their life cycle.

Fish. No impacts are anticipated from construction of the Project. No perennial streams or fish are located within the construction areas within the Project boundaries. In addition, the construction would occur when the ephemeral drainages that cross the access roads are dry. This would eliminate any potential impacts from sediment. The unnamed drainage on West Pit Road may be temporary impacted if this segment of the road needs to be widened. However, no fish are present in this stream.

Noxious Weeds

While no Class A weeds have been observed in the Project Area, several Class B and C weeds are present. Noxious weeds can threaten the general ecological health and diversity of native ecosystems. Noxious weed infestations are the second leading cause of wildlife habitat degradation.

Because many weeds are adapted to disturbed conditions and can establish immediately after construction, constructing the Project could foster the spread of noxious weeds throughout the Project Area. Noxious weeds would be managed within the Project Area. By implementing BMPs, weeds are not anticipated to spread further as a result of the development of the Project.

Operation

Habitats

Table 3.4-10 shows the permanent impacts of the Project to the habitat types found on the site. Operation of the Project would result in the permanent removal of 60.69 acres of habitat. ~~Operation of the project would result in no further impacts to habitats on the project site.~~

Wetlands

No wetlands or wetland buffers are located within the Project operation area. Therefore, no wetlands or buffers are expected to be impacted by operation of the Project.

Special Status Plant Species

No impacts to special status plant species are anticipated from the operation of the Project.

Special Status Wildlife Species

In order to determine which species (including special status species) are most at risk for turbine fatalities, a relative index to collision risk (***R***) was calculated for bird species observed in the survey area using the following formula:

$$R = A*Pf*Pt$$

Where *A* = mean use for species ***i*** averaged across all surveys, ***Pf*** = proportion of all observations of species ***i*** where activity was recorded as flying (an index to the approximate percentage of time species ***i*** spends flying during the daylight period), and ***Pt*** = proportion of all flight height observations of species ***i*** within the rotor-swept height. This is a relative index, which only illustrates which species may be the most susceptible to turbine fatalities. For the Project, the exposure index ranges from 0.29 on the high end (red crossbill) to 0 for many species (indicating that they were recorded on the site but not flying within the rotor swept area. If a species was recorded on the site, but never flying at all, then the exposure index would not be applicable. Exposure indices for all species across all years of survey can be found in Appendix C-4.

This index does not account for differences in behavior other than flight characteristics (i.e., flight height and proportion of time spent flying). In this impacts section, point count data were used to establish diurnal indices of avian use, and how these indices compare to other wind resource areas in the United States.

Bald Eagle. Bald eagles, although now fairly common in Washington State, are likely uncommon visitors to the Project Area. They are unlikely to nest or forage within the Project Area because there is no suitable habitat. An exposure index of 0.02 was calculated for the bald eagle (Appendix C-4). The potential for ongoing occurrence of bald eagle in the Project Area is very low. The potential for bald eagle fatalities as a result of turbine strike is also considered to be extremely low.

Golden Eagle. Two golden eagles were recorded in the Project Area during the fall of 2004. One occurred within the rotor-swept area and one was above. The golden eagle's exposure index at Whistling Ridge is reported to be less than 0.01 (Appendix C-4). Therefore, golden eagles are considered to be at relatively low risk for collision with turbines at this site.

Golden eagles typically soar at a height within the rotor-swept area of most modern turbines, and swoop to the ground to capture prey. Golden eagles have recently experienced their first mortality at a wind turbine site in Washington State (Durbin 2009). Numerous golden eagles have been killed at the Altamont wind turbine project in California, indicating that this species is susceptible to turbine collision. Golden eagles have experienced mortality greater than would be anticipated based on their level of occurrence at Altamont Pass (Appendix C-4).

The creation of cleared areas re-vegetated with low growing herbaceous species around turbines may increase the risk of golden eagles entering the rotor-swept area if they forage for prey located beneath turbines. However, given their rare occurrence in the Project Area, the potential for golden eagles to experience a turbine collision is extremely low.

Northern Goshawk. Extensive surveys over four years recorded no goshawks in the Project Area, indicating that if they do occur, it would be extremely rare. Based on these years of species specific surveys using multiple methodologies, they were recorded more than would be expected during baseline surveys in 2004 and 2006. Based on those records, the exposure index for northern goshawk at the Project Area is reported to be 0.02. This includes the occurrence of five individuals, four of which were flying within the rotor swept area. Similar to the golden eagle, this species may be at risk of increased foraging activity in open areas around turbines because they hunt for prey that occurs on the ground in cleared areas. However, given their rare

occurrence in the Project Area, the potential for turbine related fatalities for this species is extremely low.

Northern Spotted Owl. The Applicant has sited its proposed Project to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the Project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no northern spotted owls or activity centers present in the Project Area, no Project construction impacts are expected. Finally, the Project would not impact the White Salmon SOSEA's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this Project does not pose a risk of taking northern spotted owls under Endangered Species Act Section 9.

Western Gray Squirrel. No impacts to western gray squirrels are anticipated from operation of the proposed Project.

Olive-sided Flycatcher, Pileated Woodpecker, and Vaux's Swift. These three species are encompassed in the bird discussion under "Other Wildlife."

Keen's Myotis and Townsend's Big-Eared Myotis. These two bat species are encompassed in the bat discussion under "Other Wildlife."

Other Wildlife Species

Birds. Potential operation-related impacts to avian species include turbine collision and displacement. Based on the exposure index derived from abundance and flight behavior, the species most likely to collide with wind turbines located at the Project are red crossbills (R = 0.29), American robin (R = 0.14), common raven (R = 0.23), and western bluebird (R = 0.11). The full list of species and their exposure index can be found in Appendix C-4. In addition, the revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (West 2010) prepared for Klickitat County can be found in Appendix C11 of this FEIS. For an updated cumulative impacts analysis that takes into consideration wind energy development within forested habitats of western WA, please refer to Section 3.14.3.5.

The highest index for any raptor was 0.05 for red-tailed hawk, indicating a risk approximately six times lower than for the red crossbill. A regression analysis using data collected from the Whistling Ridge site and 13 other new-generation wind turbine projects found a significant correlation between raptor use and raptor mortality. Based on this analysis and surveys in the Project Area, the estimated a raptor/vulture fatality rate is zero per MW/year, which is an extremely low estimate compared to many wind projects (Appendix C-4). The Applicant's consultants have generally reported a range of mortality for predictions, as was done in the baseline report for the proposed Project, where the 90 percent prediction interval around the estimate was 0 to 0.25 raptor fatalities/MW/year. Further, data collected from the Project Area indicate that the area is not within a major migratory pathway, at least during fall migration.

Vaux's swifts, western bluebirds (a State Monitor species), and olive-sided flycatchers were commonly observed flying at rotor-swept heights, and some turbine-related mortality may occur for these species over the life of the Project. One prairie falcon and multiple turkey vultures

(both State Monitor species) were observed at rotor-swept heights. Turkey vultures are known to have very low susceptibility to turbine collisions (Orloff and Flannery 1992). Pileated woodpeckers were recorded on the site, but not flying. Osprey (a State Monitor species) was recorded during northern goshawk surveys, which was separate from the baseline avian studies and therefore not included in the exposure index calculations.

~~These collisions would likely be rare, and~~ It is unlikely that the Project would have any negative impacts on population levels on and near the Project Area. According to the National Academy of Sciences (2008), there is no evidence that "measurable demographic changes to bird populations in the United States" is occurring from fatalities at wind developments. Higher numbers of Vaux's swifts and western bluebirds were recorded during fall migration, whereas olive-sided flycatcher appears to primarily use the Project Area for breeding.

Waterfowl, waterbirds, and shorebirds were not observed using lands within the Project Area during this study, and mortality involving this group is expected to be rare. Based on abundance, passerines are expected to make up the largest proportion of fatalities at the Project. Post-construction mortality data collected at other wind projects in Washington and Oregon indicate that less correlation between pre-construction surveys and turbine-related mortality is observed in non-raptor species. The lack of correlation may be because most fatalities are among nocturnal migrants that are not accounted for during surveys.

The avian use information for the Project Area is based on detections of birds seen and/or heard calling. Because songbirds are less vocal during fall, this information may be skewed toward summer use. Similarly, the level of night migration for species associated with the Project Area is also not known. Risk analyses presented above provide some insight into which species are most vulnerable to turbine collision; however, estimates are based on abundance, proportion of daily activity budget spent flying, and flight height of each species. Observations were made during daylight hours, and do not take into consideration flight behavior or abundance of nocturnal migrants. Further, the analysis does not account for varying ability among species to detect and avoid turbines, habitat selection, or other factors that may influence exposure to turbine collision. As a result, actual risk may be lower or higher than indicated by these estimates (Orloff and Flannery 1992).

Bats. It is likely that some bat mortality would occur during operation; however, mortality estimates are difficult due to our lack of understanding of why bats collide with wind turbines (Kunz et al. 2007, Baerwald et al. 2008). Several factors may aid in the assessment of potential impacts to bats, including site-specific habitat and topography, species composition, and activity patterns. The following impact assessment was completed by examining site-specific habitat features and bat acoustic data collected to date. Additional insight from investigations conducted at other wind projects is presented where relevant. The revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (West 2010) prepared for Klickitat County, is included as Appendix C-11 of this EIS. For an updated cumulative impacts analysis that takes into consideration wind energy development within forested habitats of western Washington, please refer to Section 3.14.3.5.

The number of bat detections varied greatly between the three survey years. This is based on variation in habitat surveyed and the height of detector placement. Overall, the majority of detected species were low-frequency species, such as big brown and silver-haired bats. Hoary bats made up 8.2 percent of all passes by low-frequency species. Based on studies from other wind energy projects in the Pacific Northwest, turbine fatalities would be most expected from hoary bats and silver haired bats. Big brown bats are relatively uncommon at wind turbine fatalities. At elevated stations meant to reflect the rotor-swept area, low-frequency bats were again recorded in much higher numbers than high-frequency species. This likely reflects migration flight heights and foraging preferences.

The timing of peak bat activity on the proposed Project Area (portions of July and August) does not coincide with when the highest levels of bat mortality have been documented at other wind projects in the US. Fatality studies have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (Johnson 2005, Arnett et al. 2008). While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007). The highest use of the Project Area occurred in July and August, prior to the time that most bat mortality occurs at wind resource areas in the Pacific Northwest as well as throughout the US.

High bat activity in July and August is likely due to use of the Project Area by local bats during the reproductive season, when pups are being weaned and foraging rates are high. Activity beyond mid-August likely represents movement of migrating bats through the area. Activity by hoary bats also was substantially higher in July, and dropped off significantly beginning in early August. After August 31, activity for all bats was very low relative to earlier dates, indicating that most bats had left the area for winter hibernacula or warmer climates. These data indicate higher use of the Project Area by resident populations of bats, rather than by migrants passing through the area. Further, high bat activity levels during the breeding season, as seen in the Project Area, do not equate to high bat fatality rates. Low mortality has been documented during the breeding season at several wind projects, even when relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003).

Finally, no known large bat colonies are present near the proposed Project. The nearest know hibernaculum is located near the town of Trout Lake, nearly 20 miles north of the proposed Project (B. Weiler, personal communication). No significant peaks in bat activity, suggesting high migration activity, were noted during the August-September time frame that bats migrate. ~~The project site does not contain topographic features, such as canyons, that may funnel migrating bats toward corridors where turbines would be placed.~~ No turbines would be constructed near wetlands or ponds, and cleared areas surrounding turbine strings would closely mimic clearcuts or young reforested areas, where to date, recorded bat activity levels in the Project Area were the lowest.

Some bat fatalities are anticipated as a result of the operation of the proposed Project. Variable levels of recorded use by bats across years, habitats and recording height above ground indicate that the extent of impacts is difficult to predict at this time.

Amphibians/Reptiles. No impacts are anticipated to amphibians or reptiles as a result of Project operation.

Mammals. Because data on impacts to big game as a result of wind project operation is limited, it is difficult to predict the impact of the proposed Project on wildlife using priority habitats on the proposed Project Area. Additional coordination with WDFW is ongoing, and would continue to address this resource.

Fish. No impacts are anticipated to fish as a result of Project operation.

Noxious Weeds

The spread of noxious weeds is not anticipated to occur as a result of Project operation with BMPs in place.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. A detailed site restoration plan is required within 90 days of Project termination. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to wetlands, vegetation, wildlife habitat, and noxious weeds. If impacts to biological resources are anticipated as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.4.2.2 No Action Alternative

Under the No Action Alternative the Project would not be built. Timber harvest would still occur within the proposed Project boundary, which would continue to affect habitats and potentially increase the spread of weeds. However, there would be no increased avian or bat fatalities from turbine operations.

Other power generation facilities could be constructed and operated in the region to meet long-term needs for power, including other wind projects or generation using fossil fuels. Fossil fuel combustion would affect vegetation, wetlands, wildlife, and threatened and endangered species, including impacts related to carbon dioxide emissions. The significance of such impacts would depend on the site-specific locations and design of such facilities.

3.4.3 MITIGATION MEASURES

- The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts to biological resources during construction and operation to the extent feasible.

- Avoid and minimize the use of overhead collector lines, which create areas where birds may congregate and perch, thus decreasing the potential for turbine collisions.

- Use of tubular turbine towers, avoiding the lattice type towers which creates areas where birds may congregate and perch, thus decreasing the potential for turbine collisions.

- Use of un-guyed meteorological towers, reducing the potential for bird collision with wires.

- Minimize the use of turbine lighting in the Project Area, thereby reducing the potential for birds and bats to be disoriented by lights or attracted to turbines.

- Install newer generation up-wind turbines.

- Utilize certified "weed free" straw bales during construction to avoid introduction of noxious weeds.

- Re-seed all temporarily disturbed areas with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the re-vegetation of these areas and to avoid the establishment and spread of noxious weed species.

- Implement a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species.

- Conduct raptor nest surveys prior to construction during the breeding season (approximately April to July) in order to avoid or minimize impacts to any raptors potentially nesting in or near the Project Area. Construction activities requiring the surveys would include those that would remove forested areas and/or require the use of heavy equipment substantial enough to potentially disturb nesting activities.

- Implement a two year minimum post-construction avian mortality study.

- Convene a Technical Advisory Committee to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The Technical Advisory Committee would be composed of representatives from WDFW, USFWS, Skamania County, and the Applicant. The role of the Technical Advisory Committee would be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the Project, including potential adaptive management

opportunities. The post-construction monitoring plan would be developed in coordination with the Technical Advisory Committee.

- Coordinate with WDFW for potential impacts to big game species (deer and elk), if appropriate.

- Prepare a SWPP for both the construction and operation phases of the project and submit to EFSEC for approval.

3.4.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed Project would result in permanent loss, temporary disturbance and fragmentation of existing habitat for a number of wildlife species. These impacts, while unavoidable, would take place in landscape of managed timber lands which has for many years and would continue to be a fragmented environment with ongoing disturbance. There are no impacts to wetlands, and any particularly sensitive areas would be avoided during micrositing of the turbines.

No population impacts are expected to birds through turbine collisions. Adequate information is not known on bat population sizes to determine whether population response would be anticipated.

~~The proposed project would cause mortality to birds and bats through turbine collisions. However, the level of mortality is not anticipated to be sufficient to negatively affect the population viability of any single species.~~

It appears unlikely that the Project would cause any mortality to a threatened or endangered species. Extensive surveys for northern spotted owl and northern goshawk have been conducted throughout the Project Area and both species are considered either completely absent or extremely rare. Golden eagles were recorded during surveys in 2004, but not in more recent surveys. Bald eagles were recorded in the winter of 2008 and summer of 2009. The potential for ongoing occurrence of either golden or bald eagles is considered extremely rare.

3.4.5 REFERENCES

Arnett, E.B., K. Brown, W.P. Erickson, J. Fielder, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, T. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersly. 2008. Patterns of fatality of bats at wind energy facilities in North America. *Journal of Wildlife Management* 72: 61–78.

Baerwald et al. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. *Current Biology* 18:695–696.

Berg, K. 2009. Personal communication with Jeff Reams of Turnstone Environmental via email on May 29, 2009.

BirdWeb. 2009. Internet site of the Seattle Audubon Society. Accessed on November 13, 2009 at http://birdweb.org.

Bat Conservation International (BCI). 2009. Internet site of Bat Conservation International. Access on November 13, 2009 at http://www.batcon.org.

CH2M Hill. No date. Vegetation Technical Report, Saddleback Wind Energy Project.

CH2M Hill. 2003. Rare Plant Survey Report, Saddleback Wind Energy Project.

CH2M Hill. 2007. Wetland Delineation Report, Saddleback Wind Energy Project, Skamania County, Washington. Prepared for Horizon Wind Energy LLC. Portland, Oregon.

Durbin, Kathie. 2009. Washington wind turbines claim first known eagle victim. *The Columbian*. May 18, 2009. Accessed at: http://columbian.com/article/20090519/NEWS02/705199958.

Carraway, L. N. and B. J. Verts. 1994. Sciurus griseus. *Mammalian Species*, No. 474:1–7.

Dalquest, W. W. 1948. Mammals of Washington. *University of Kansas Publications, Museum of Natural History*, 2:1–444.

Flemming, T. 2009. Personal communication with Devin Sahl, Turnstone Environmental. September.

Fiedler, J. K. 2004. Assessment of bat mortality and activity at Buffalo Mountain Windfarm, eastern Tennessee. Thesis, University of Tennessee, Knoxville, USA.

Franklin, Jerry F. and C.T. Dyrness. 1988. *Natural Vegetation of Oregon and Washington.* Oregon State University Press.

Gruver, J. C. 2002. Assessment of bat community structure and roosting habitat preferences for the hoary bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming. Thesis, University of Wyoming, Laramie, USA.

Hayes, JP. 1997. Temporal variation in activity of bats and the design of echolocation-monitoring studies. *J Mammal* 78: 514–524.

Herman, Jed. 2009. Personal communication with Curt Smitch. WDNR northern spotted owl habitat data. Excel spreadsheet based on GIS database.

Howe, R. W., W. Evans, and A. T. Wolf. 2002. Effects of wind turbines on birds and bats in northeastern Wisconsin. Wisconsin Public Service Corporation, Green Bay, USA.

Johnson, G. D. 2005. A review of bat mortality at wind-energy developments in the United States. *Bat Research News* 46:45–49.

Johnson, G. D., M. K. Perlik, W. P. Erickson, and M. D. Strickland. 2004. Bat activity, composition and collision mortality at a large wind plant in Minnesota. *Wildlife Society Bulletin* 32:1278–1288.

Kennedy/Jenks Consultants. 2003. Klickitat County Energy Overlay Draft Environmental Impact Statement. August.

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M.D. Strickland, and J.M. Szewczak. 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. *Journal of Wildlife Management* 71: 2449–4486.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas. Work performed by BioSystems Analysis, Inc., Tiburon, CA. Sacramento, CA: California Energy Commission.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. *Condor* 82:309–313.

Ryan, L. A. and A.B. Carey. 1995. Distribution and Habitat of the Western Gray Squirrel (*Sciurus griseus*) on Fort Lewis, Washington. *Northwest Science* 69(3):204-216.

Schmidt, E., A.J. Piaggio, C.E. Bock, and D.M. Armstrong. 2003. National Wind Technology Center Site Environmental Assessment: Bird and Bat Use and Fatalities – Final Report. NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, Colorado.

Thomas et al. 1990. A conservation strategy for the northern spotted owl. Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl. USDA Forest Service, USDI Bureau of Land Management, USDI Fish and Wildlife Service, and USDI National Park Service. Portland, OR. 458 pp.

Turnstone Environmental Consultants, Inc (Turnstone). 2004. Final Report, Northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. Prepared for SDS Lumber Company.

———. 2009a. 2008 Final Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. Prepared for SDS Lumber Company.

———. 2009b. 2009 Report, Results of northern spotted owl, western gray squirrel and northern goshawk surveys conducted for the Whistling Ridge Wind Energy Project. Prepared for SDS Lumber Company.

US Fish and Wildlife Service (USFWS). 1992. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls, 1992 Revised Version.

———. 2008. Final Recovery Plan for the Northern Spotted Owl. U.S. Fish and Wildlife Service, Portland, OR. 142 pp.

———. 2009a. Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Skamania County (Revised November 1, 2007). Available at: http://www.fws.gov/westwafwo/speciesmap/SKAMAN.html.

———. 2009b. Conservation Plan and Agreement Database. Accessed via the Internet at: http://ecos.fws.gov/conserv_plans/public.jsp on December 9, 2009.

US Forest Service (USFS). 1985. *Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington.* Pacific Northwest Region. E.R. Brown, technical editor.

———. 2002. Survey methodology for Northern goshawks in the Pacific Southwest Region.

———. 2006. Northern Goshawk Inventory and Monitoring Technical Guide. Gen. Tech. Report WO-71. July.

Van der Haegen, M., S. Van Leuven, and D. Anderson. 2004. Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance. *Wildlife Research Report*. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Washington Department of Fish and Wildlife (WDFW). 2009. Wind Power Guidelines. Olympia, WA.

Washington Department of Wildlife (WDW). 1993. Status of the Western Gray Squirrel (*Sciurus griseus*) in Washington. Olympia, WA. Final status report.

Washington Natural Heritage Program (WNHP). 2003a. Special Status Plants Species and Habitats Data Search. Washington Natural Heritage Information System.

———. 2003b. *Rare Plant List for Skamania County.* Washington Natural Heritage Program. http://www.dnr.wa.gov/nhp/refdesk/lists/plantsxco/skamania.html.

———. 2009. Special Status Plants Species and Habitats Data Search. Washington Natural Heritage Information System.

Washington State Department of Ecology (Ecology). 2004. Washington State Wetland Rating System for Eastern Washington. Revised. Publication # 04-06-15.

Weiler, Bill. Washington Department of Fish and Wildlife. Telephone conversation with Greg Johnson, Western Ecosystems Technology, Inc. 2003.

West, Inc. 2008. Bat acoustic studies for the Saddleback Wind Energy Project, Skamania County, Washington, August 20th – October 21st, 2007. Prepared for SDS Lumber Company.

———. 2009a. Wildlife baseline studies for the Whistling Ridge wind resource area, Skamania County, Washington, Final Report. Prepared for SDS Lumber Company.

West, Inc. 2009b. Bat acoustic studies for the Saddleback Wind Energy Project, Skamania County, Washington, July – October 7th , 2007. Prepared for SDS Lumber Company.

West, Inc. 2009c. Bat acoustic studies for the Saddleback Wind Energy Project, Skamania County, Washington, June 4th – October 25th, 2009. Prepared for SDS Lumber Company.

West, Inc. 2010. Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion or Eastern Washington and Oregon.

Whiteacre, L., J. Henderson, R. Holmes, L. Hoover, R. Lesher, J. Lippert, E. Olson, L. Potash, J. Seevers, M. Stein, and N. Wogen. 1998. *Survey Protocols for Survey & Manage Strategy 2 Vascular Plants, Version 2.0.* Bureau of Land Management. December. Available at: http://www.blm.gov/or/plans/surveyandmanage/SP/VascularPlants/cover.htm.

3.5 ENERGY AND NATURAL RESOURCES

This section describes potential impacts to energy resources.

3.5.1 AFFECTED ENVIRONMENT

3.5.1.1 Region

Regional Demand

In September 2009, the Northwest Power and Conservation Council released the Draft Sixth Northwest Power Plan (NWPCC 2009), which contains projections for regional power demand[14]. The plan notes that regional population is likely to increase from 12.7 million in 2007 to 16.3 million by 2030. Demand for electricity is expected to grow, in part as a result of this population growth. The Draft Sixth Northwest Power Plan states:

> *The Pacific Northwest consumed 19,000 average megawatts or 166 million megawatt-hours of electricity in 2007. That demand is expected to grow to 25,000 average megawatts by 2030 in the Council's medium forecast. Between 2007 and 2030, demand is expected to increase by a total of 6,500 average megawatts, growing on average by 270 average megawatts, or 1.2 percent, per year.*

The cost of energy of all types is expected to be significantly higher over the next twenty years than during the 1980s and 1990s. Cost increases would be driven by increasing demand and the fact that the cost of finding and producing new energy sources is higher than for existing supplies. Carbon emission taxes or cap-and-trade policies are likely to further raise energy costs. The Northwest Power and Conservation Council predicts that wholesale electricity prices are expected to increase from about $45 per megawatt-hour in 2010 to $85 by 2030 (2006$).

[14] The Northwest Power and Conservation Council released their Sixth Northwest Power Plan in February 2010. The FEIS continues to reflect the information in the Draft Sixth Northwest Power Plan. For the final version of the Power Plan, see the Northwest Power and Conservation Council's website at http://www.nwcouncil.org/energy/powerplant/6/default.htm.

Pacific Northwest Markets for Renewable Energy Resources

According to the Northwest Power and Conservation Council, much of the future demand for electricity in the region could be met through conservation. However, markets for renewable or "green" energy are still growing in the Pacific Northwest, and the Project can help to meet this growing demand. One driver for this shift is the establishment of RPS at the state level, which requires that utilities obtain a percentage of their power from renewable sources. For example, in 2006, voters in the Washington passed Initiative 937, which requires that by 2020 large public and private utilities must obtain 15 percent of their electricity from renewable resources, and undertake cost-effective energy conservation. In 2008, California increased its RPS goal from 20 percent to 33 percent renewable energy by 2020.

In addition to the RPS requirements, Washington law requires larger utilities in Washington to offer a voluntary "qualified alternative energy product," essentially an electricity product powered by green resources, beginning in January 2012 (RCW 19.29A.090). State law defines a qualified alternative energy resource as electricity fueled by wind, solar energy, geothermal energy, landfill gas, wave or tidal action, gas produced during the treatment of wastewater, qualified hydropower, or biomass. As of 2008, 15 of the 16 utilities covered by the report had an active green power program with customers participating, and five additional utilities not covered by the law reported to the state that they were operating green power programs. Estimated sales of green power for 2008 were up 17 percent over 2007. Wind powered electricity represented 83.3 percent of green power sales (WUTC 2008).

Bonneville Power Administration Transmission System

BPA owns and operates 15,000 miles of power lines that carry power from the dams and other power plants to utility customers throughout the Pacific Northwest. The BPA service area includes Oregon, Washington, Idaho, Western Montana, and small portions of Wyoming, Nevada, Utah, California, and Eastern Montana.

Electric power plants require an interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. BPA owns and operates the FCRTS, which comprises more than three-fourths of the high-voltage transmission grid in the Pacific Northwest, and extra regional transmission facilities. BPA considers and grants interconnection requests to the FCRTS in accordance with its Open Access Transmission Tariff. Current and proposed wind project interconnections to BPA transmission facilities in the vicinity of the Project Area are shown in Figure 3.14-1. Under BPA's tariff, BPA offers transmission interconnections to the FCRTS to all eligible customers on a first-come, first-served basis, with a decision on whether or not to make this offer subject to environmental review under NEPA.

3.5.1.2 Project Area

The Project would be located north of the Columbia River. The Columbia River corridor is an area of good wind energy potential that currently supports several successful wind power projects. The Columbia River Gorge provides a low-elevation connection between continental air masses in the interior of the Columbia Basin east of the Cascade Range and the maritime air of the Pacific Coast. Especially strong pressure gradients develop along the Cascades and force the air to flow rapidly eastward or westward through the Gorge.

Electric service for the Project Area is provided by Skamania County Public Utility District #1, which obtains electricity from the Federal Columbia River Power System (FCRPS), the series of hydroelectric projects along the Columbia River, through BPA. Backup power is obtained from Condit Dam, which is scheduled to be decommissioned in 2010. In July 2009 the Public Utility District sought intervener status with EFSEC to argue in favor of the Project, based on the ability of the Project to provide backup power to the Public Utility District once Condit Dam is removed (EFSEC 2009). There is currently no utility service of any kind at the proposed Project Area.

The proposed Project Area is already heavily used by energy and other utilities. Two BPA high-voltage transmission lines cross the Project Area, a natural gas pipeline runs near the north border of the Project Area, and there are two communications towers within one mile of the Project Area.

3.5.2 IMPACTS

3.5.2.1 Proposed Action

Construction

The Project would consume limited amounts of energy and natural resources, primarily during construction. The electrical substation would be built immediately adjacent to the BPA lines, reducing the need to build new long-distance high-voltage transmission lines.

Estimated types and quantities of energy and natural resources consumed during construction are as follows:

- 19,250 gallons of fuel (diesel and gasoline) for construction equipment
- 3,700 tons of steel for turbine towers
- 1,000 tons of steel for tower foundation reinforcement
- 100,000 yards of gravel (aggregate) for roads and crane pads
- 10,000 cubic yards of concrete for turbine foundations
- 1.7 million gallons of water for road compaction, dust control, wetting concrete, etc., assuming plain water is used for dust control (this amount could be reduced through the use of lignin or other dust palliative if permitted by EFSEC)

The source of fuel for construction equipment and vehicles would be licensed fuel distributors or gas stations. Petroleum products, including vehicle and equipment gasoline and diesel fuels, and machinery lubricants are available and would be purchased from numerous commercial outlets in the Project vicinity. Water for construction would be obtained from a local source with valid water rights, as described in Section 3.3 Water Resources. Concrete would be purchased from existing suppliers located near the Project Area. Electricity for construction equipment would be provided from portable generators.

Bulk materials such as aggregate gravel and sand, in addition to soils, would be supplied locally from existing quarries. Other building materials, equipment, and other operational commodities would be purchased from equipment and material suppliers. The largest resource use would be steel and concrete. Diesel fuel and electricity also would be consumed during construction. The amounts of all of these resources would be small compared to existing supplies, and none are expected to affect availability or market supply.

Nonrenewable resources in the Project vicinity are primarily gravel extracted from local sources and used locally. Primary consumption of these resources is related to construction projects (sand, gravel, and other mineral resources as used in steel, aluminum, concrete, and other building products). Several gravel pits and quarries are located near the Project Area. These would be adequate to supply the needs of the Project.

Renewable resources are materials that can be regenerated, such as wood, other fibers, wind, and sunlight. The primary renewable resources in the Project Area are timber and wind. The Project Area, including the Project Area, has been used for the renewable production of forest products for many years. The addition of the Project would diversify this renewable resource-based business by using a second, compatible renewable resource, the wind energy of the site. The Project would shift approximately 56 acres of commercial forest land to non-forest uses for the Project Area roads and the turbine corridors. In the context of the 1,152-acre site and the large areas of surrounding area in private and Washington State timber management, this reduction would not affect the availability of timber as a renewable resource.

Operation

Operation of the Project would consume limited amounts of energy and nonrenewable natural resources. During operations, electrical energy from Skamania County Public Utility District #1 would be consumed on a limited basis during times when the wind generated on site is insufficient to power warning lights required by the Federal Aviation Administration and security lights. Some electricity would be used at the Operations and Maintenance and substation facilities. In addition, turbines require electrical energy to run lubrication pumps and cooling systems, electrical monitoring systems, and position motors when wind speeds are below generation levels.

- Types and quantities of energy and natural resources consumed during operations are as follows:
- Fuel for operations and maintenance vehicles (approximately 8,500 gallons annually)
- Minor quantities of lubricating oils, greases and hydraulic fluids for the wind turbine generators
- Electricity for Project operations (less than approximately 600 kilowatt hours per wind turbine generator per month)
- Water for use at the Operations and Maintenance facility and periodic maintenance of turbine blades (less than 5,000 gallons per day)

Electricity for Project operations would mostly be generated by the approximately 75 MW of electricity created by the Project itself. Wind facilities have a very high "energy payback" (ratio of energy produced compared to energy expended in construction and operation), and wind's energy payback time is one of the shortest of any electrical generation technology. It takes approximately three to eight months, depending on the wind speed at the site, for a wind facility to produce the total amount of energy used to construct the equipment and build the Project (AWEA 2007). The Applicant expects this to be true for the Project as well.

During periods when the wind turbines are not generating power, electricity would be purchased from the Skamania County Public Utility District #1.

The impact of this proposed Project to the regional electric demands can best be seen by a recent Northwest Power and Conservation Council evaluation of projected electrical demand in the region. The NPCC found that a medium forecast predicts a demand of about 5,300 MW by 2025 with a range of about minus 2,500 MW to a high of about plus 7,000 MW. The medium forecast represents a growth of about 1 percent per year. Given the regional energy needs and the unique convergence of gas pipelines, wind energy, and transmission lines in Klickitat County, it is reasonable to estimate that the County could produce a portion of the projected increased energy demand. Currently, the regional power resources come from the following energy technologies:

- Hydroelectric, 55 %
- Coal fired thermal, 19 %
- Nuclear power, 5 %
- Imports, 8 %
- Gas fired combustion turbines, 3 %
- Non-Utility generation, 6 %
- Miscellaneous, including wind power, 4 %

The Klickitat County Energy Overlay Zone Final EIS[15], released by the Klickitat County Planning Department, also recently evaluated the projected energy demand in Klickitat County, Washington, the county immediately adjacent to Skamania County. The Klickitat County Planning Department found that the technologies that are currently being used within Klickitat County include hydroelectric, gas fired combustion turbines, biomass fired turbines, and wind energy. These energy technologies are expected to continue to be developed in the County (through the year 2024) and include:

- Seven 250 MW or five 350 MW natural gas thermal projects;

[15] See: http://www.klickitatcounty.org/default.asp

- Two 50 MW biomass projects;
- Four wind power projects with total generating capacity of 1,000 MW; and
- Solar projects are anticipated to be small in size and number.

The proposed Project, although in a small way, would help meet the Project demand outlined by the NPCC as mentioned above through its wind power generation. Additionally, the proposed Project would be consistent with the types of projects that have been outlined within the Klickitat County Energy Overlay Zone Final EIS.

Studies of the projected impact of this proposed Project to the FCRTS have found that the North Bonneville-Midway 230-kV line interconnection provides sufficient capacity for the proposed 70 MW request. From the proposed BPA substation interconnection, the power flow would be directed 80% towards North Bonneville and 20% towards Midway. The contingency analysis for this interconnection request indicates that no overloads are anticipated to occur, and this proposed Project would not be expected to affect the operation of BPA's transmission system.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least 90 days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential uses of energy and natural resources. If impacts to energy or natural resources are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.5.2.2 No Action Alternative

Under the No Action Alternative, the proposed Project would not be built. The energy and water use for the Operations and Maintenance building would not take place. It is likely that the region's power needs would be met through energy efficiency and conservation measures, existing power generation, or the development of new power generation. However, projections of the region's power needs are discussed further in the Northwest Power and Conservation Council's Sixth Northwest Power Plan.[16] Base load demand would likely be filled through expansion of existing, or development of new thermal generation such as gas-fired combustion turbine technology. Other wind sources also could be developed. Such development could

[16] See: http://www.nwcouncil.org/energy/powerplan/6/default.htm.

occur at appropriate locations throughout Washington State. The impacts on energy and natural resources would depend on the type, location, and size of the facility proposed.

3.5.3 MITIGATION MEASURES

Adverse impacts to energy and natural resources are identified to be minimal and therefore no mitigation measures would be required.

3.5.4 UNAVOIDABLE ADVERSE IMPACTS

The Project would have minor unavoidable adverse impacts to energy and natural resources. The overall impact of the Project to energy and natural resources would be positive, since it would provide the region with low-cost, clean, renewable energy, in accordance with state and national policies and priorities.

3.5.5 REFERENCES

American Wind Energy Association (AWEA). 2007. Wind Power Today. Accessed at: http://www.awea.org/pubs/factsheets/windpowertoday_2007.pdf.

Energy Facility Site Evaluation Council (EFSEC). 2009. Application No. 2009-01: Skamania County Public Utility District No. 1 Petition for Intervention. Accessed at: http://www.efsec.wa.gov/Whistling%20Ridge/Adjudication/Petitions%20for%20intervention/SCPUD%20Petition%20for%20Intervention.pdf.

Northwest Power and Conservation Council (NWPCC). 2009. Draft Sixth Northwest Power Plan. September. Accessed at: http://www.nwcouncil.org/energy/powerplan/6/default.htm.

Washington Utilities and Trade Commission and Department of Community, Trade and Economic Development WUTC and CTED). 2008. Green Power Programs in Washington: 2008 Report to the Legislature. December. Accessed at: http://www.wutc.wa.gov/webdocs.nsf/0/547510a1319daa74882575d80057a2bf/$FILE/Green%20Power%20Report.pdf.

3.6 PUBLIC HEALTH AND SAFETY

This section describes existing health and safety hazards at the Project Area and identifies potential health and safety risks from Project construction and operation. Risks discussed include fire or explosion, release of hazardous materials, vandalism, traffic accidents, turbine structural failure, ice throw, electric and magnetic fields, and shadow-flicker. Mitigation measures are identified for potential impacts.

3.6.1 AFFECTED ENVIRONMENT

3.6.1.1 Existing Health and Safety Risks

Existing health and safety hazards at the Project Area include those associated with the current commercial forestry operations on the site. Commercial forestry operations include some risks of fire and explosion from equipment operation, especially during dry summer months. Commercial forestry entails a small risk of leaks or spills of fuel, oil, or hydraulic fluid. There is also a small health and safety hazard related to logging trucks currently traveling to and from the site. During the dry summer months, there is some risk of fire from lightning.

Resources for responding to risks to ~~environmental~~ public health and safety include fire prevention, law enforcement, and emergency medical response.

3.6.1.2 Fire Prevention

The Project Area is currently used for commercial forestry and there are no structures on the site.

Two city fire departments (North Bonneville and Stevenson) and seven Skamania County fire districts provide fire protection to Skamania County residents. DNR also provides fire suppression services to forested areas in Skamania County, and would be the first responder to a fire emergency at the Project Area (J. Weeks, personal communication). Skamania County Fire District No. 3 (SCFD3) (also known as Underwood Fire District) provides fire protection and emergency response to a 20-square mile service area immediately south of the Project Area (D, Cox, personal communication). Although the Project Area is not formally within SCFD3's service area (T. Skinner, personal communication), SCFD3 would likely respond to a fire at the Project Area, along with and in coordination with DNR (R. Hovey, personal communication). The Mill A Fire Department is also near the Project Area, and has a staff that includes less than six volunteer firefighters and no paid personnel (J. Carlson, personal communication).

The Project Area is located in DNR's West Klickitat Area. The DNR work center closest to the Project Area is the Husum work center, which is staffed by one fire manager officer and one assistant fire manager (J. Weeks, personal communication). Other staff and equipment at the Husum work center includes six firefighters and two Type 6 wildfire engines (Fullerton and Helgerson 2008). The DNR response time to the Project Area would vary depending on the location of the engines and the type of fire emergency at the Project Area, but would range from 45 minutes to one hour (R. Hovey and J. Weeks, personal communications). The engines are usually assigned to work projects in the field.

SCFD3 is located in the unincorporated community of Underwood and is staffed by 17 volunteer firefighters. The SCFD3 service area is 20 square miles. Equipment at SCFD3 includes one each of the following: Type 1 engine, Type 2 engine, Type 3 engine, Type 7 engine, Type 2 tender, and Type 3 tender (Fullerton and Helgerson 2008). The Washington State Ratings Bureau rating for SCFD3 at the Project Area is "Unprotected – 10," because the site is not located within the SCFD3 boundaries (T. Skinner, personal communication).

The Project Area is located outside of the Columbia River Gorge National Scenic Area. If an incident at or near the site, i.e., a wildland fire, threatens the area, the Columbia River Gorge

National Scenic Area fire agency could respond. The fire agency is equipped with three Type 6 wildfire engines, one fire prevention module, two command vehicles, two cooperative engines (with the DNR), and one cooperative engine (with the Oregon Department of Forestry). The Columbia River Gorge National Scenic Area fire agency has nine employees and is staffed seven days per week, July through September (Fullerton and Helgerson 2008).

Skamania and Klickitat Counties have jointly prepared a Community Wildfire Protection Plan through a Title III grant from the Secure Rural Schools and Self Determination Act (Klickitat and Skamania Counties 2006). This is a plan developed by a community in an area at risk from wildfire, with the goal of reducing the risk of catastrophic wildfire within the region. .

Table 3.6-1 lists the fire departments that serve the site and surrounding area, along with the departments' staff and equipment. These fire districts have mutual aid agreements with each other (J. Carlson, personal communication).

3.6.1.3 Law Enforcement

The Skamania County Sheriff's Office provides law enforcement services in the Project vicinity. Sheriff's Office headquarters are located in Stevenson, approximately 15 miles southwest of the Project Area. The response time from Sheriff's Office headquarters to the Project Area is approximately 20 minutes.

The Washington State Patrol patrols SR 14 south of the site. Roads extending north of SR 14 are county roads, and are patrolled by the Sheriff's Office. Table 3.6-2 provides information on the police departments serving the site area, including service area and number of officers.

3.6.1.4 Emergency Medical Services

Two ambulance companies provide emergency response services for the Project Area: Skamania County Emergency Medical Service and Skyline Ambulance. Skamania County Emergency Medical Services is the functioning entity of Skamania County Hospital District No. 1, which provides ambulance service to the residents of Skamania County. Skyline Ambulance is based at Skyline Hospital in White Salmon, and is equipped with three ambulance vehicles. Table 3.6-3 lists characteristics of the first response ambulance service providers for the Project Area.

Table 3.6-1
Fire Departments in the Whistling Ridge Energy Project Vicinity

Fire Department	Paid Full-Time Personnel	Volunteer Personnel	Equipment	Protection Class[a]
Skamania County Fire District No. 3	0	17	1 – Type 1 engine 1 – Type 2 engine 1 – Type 3 engine 1 – Type 7 engine 1 – Type 2 tender 1 – Type 3 tender	10
Mill A Fire Department	0	<6	(c)	
Washington Department of Natural Resources	6	NA[b]	2 – Type 6 wildfire engines	-
Columbia River Gorge National Scenic Area Fire Agency	9	NA[b]	3 – Type 6 wildfire engines 1 – fire prevention module 2 – command vehicles 2 – cooperative engines (with DNR) 1 – cooperative engine (with Oregon Department of Forestry).	-

Sources: Fullerton and Helgerson (2008), Washington State Patrol (personal communication), MSRC (2008), J. Carlson (personal communication).
[a] T. Skinner (personal communication): As rated by the Washington Surveying and Rating Bureau. The Bureau rates the level of fire protection provided by fire departments against four main elements: available water supply; logistical characteristics and makeup of the district fire department; available communications systems; and fire control and safety measures taken and ordinances in effect in the particular fire district. Ratings are used to evaluate fire protection availability for insurance purposes. Ratings range from 1 to 10, with class 1 representing the highest level of fire protection and class 10 the lowest level. Ratings were not available for the DNR or the Columbia River Gorge National Scenic Area Fire Agency.
[b] Not available.

Table 3.6-2
Police Department Staffing Levels in the Whistling Ridge Energy Project Vicinity

Department	2008 Population of Service Area	Number of Commissioned Officers	Ratio of Officers to 1,000 Population
Skamania County Sheriff's Office	10,700	23	2.1[a]
Washington State Patrol District 5 Goldendale Detachment	30,800[b]	9	0.3
Washington State Patrol Vancouver District 5	608,600[c]	60	0.01
Average for Washington State	6,489,490	10,541	1.6[d]

[a] D. Cox (personal communication), WASPC (2008), Washington State Patrol (personal communication).
[b] Includes population of Klickitat and Skamania Counties.
[c] Includes population of Clark, Cowlitz, Lewis, and Skamania Counties.
[d] WASPC (2008), statistics are for 2007.

Table 3.6-3
Ambulance Service Providers in the Whistling Ridge Energy Project Vicinity

Name	Ownership	Level of Care
Skyline Ambulance	Public	Advanced Life Support
Skamania County Emergency Medical Services	Public	Advanced Life Support

Sources: Skyline Hospital (2008), Skamania County EMS (2008).

The two hospitals closest to the Project Area are Skyline Hospital in White Salmon (7 miles southeast of the Project) and Providence Hood River Memorial Hospital, directly across the Columbia River from White Salmon in the City of Hood River (8 miles southeast of the Project). Skyline Hospital is a 32-bed acute care hospital with a Trauma Level IV designation, serving western Klickitat County and eastern Skamania County. Services at Skyline Hospital include acute care, obstetrics, surgery, cardiopulmonary care, radiology and laboratory services, physical therapy, a pharmacy, and emergency services. Skyline Hospital owns and operates a three-vehicle ambulance service (Skyline Hospital 2008).

Providence Hood River Memorial Hospital is a 25-bed facility that provides cardio conditioning, counseling, diabetes treatment, a dialysis center, emergency services, obstetrics, radiology, laboratory services, nutrition, occupational medicine, a sleep center, and surgery[17].

3.6.2 IMPACTS

3.6.2.1 Proposed Action

Potential impacts to ~~environmental~~ public health may occur during construction or operation.

Construction

Construction impacts include the typical risks to health associated with the construction of an industrial facility, including fire or explosion, release of hazardous materials, vandalism, and accidents.

Fire or Explosion

The only structures proposed on the site are the turbine towers, associated transformers and substation, and the Operations and Maintenance facility. Project construction could temporarily increase the risk of fire at the Project Area and in the broader Project Area, as a result of the operation of vehicles and power equipment, which may cause fires through contact with dried plants during dry summer weather. Blasting may be used where solid rock is encountered during construction of turbine foundations or trenches for the underground electrical collection system. Blasting could create a fire hazard during dry weather.

As the landowner and a long-term commercial forestry business, the Applicant has maintained the ability to respond to fires on their forest land with dozers and water trucks, and would

[17] See: http://www.providence.org/hoodriver/

continue to do so. Fire response by the Applicant would be supplemented by DNR, which provides fire protection on forest lands. DNR has resources in the area and responds to all wildland fires. DNR would likely respond to a structure fire in the woods, as would Underwood Fire District #3 and Mill A Volunteers. SCFD3 is the nearest local fire district. Eric Ziegler, District Chief, submitted a letter to EFSEC during the EIS scoping period stating that SCFD3 can provide service coverage to the Project Area to respond to fires without any reduction in service to their constituency. Mill A Volunteers is not a recognized fire district with a tax base but a volunteer fire company. Mill A Volunteers has joint responder agreements with Underwood Fire District and the DNR.

There are two locations being considered for the Operations and Maintenance facility site, one site next to the substation and the other at the bottom of West Pit Road. The West Pit Road site would have a lower fire risk and shorter response times for emergency services, since the facility would be along a county road.

Releases of Hazardous Materials

The risk of releases to the environment that would affect health would be similar to any large construction project. The primary potentially hazardous materials used during construction would be diesel fuel for construction equipment, lubricating oils and hydraulic fluids for the turbines, and mineral oil for the transformer at each turbine and the substation. Approximately 19,250 gallons of diesel fuel would be used during construction. Most trucks would fuel up off-site; some fuel would be transported to the site.

Each turbine would contain a small amount of hydraulic fluid, and would have a pad-mounted transformer containing approximately 500 gallons of mineral oil for cooling. The BPA substation would have either one or two transformers, each containing up to 12,000 gallons of mineral oil. These transformers would be filled during construction.

Should contaminated media be unexpectedly encountered during construction of the Project, work would be stopped, and an environmental specialist would be called in to characterize the nature and extent of the contamination and to determine how the work may safely be completed. Work would proceed only after measures approved by the WDOE and identified in the Hazardous Waste Management Plan are put in place to prevent the spread of contaminated materials and protect the health and safety of workers.

Vandalism

During construction, the presence of out-of-area workers could create a negligible increase the risk of vandalism in the community. Vandalism of Project facilities and theft of equipment during construction also is a potential area of concern. Security provisions could include temporary fencing with a locked gate around the construction site; the use of site trailers for the temporary storage of special equipment or materials; and the use of outdoor lighting and motion-sensor lighting. Access to the Project Area would be controlled, and site visitors including vendors, equipment personnel, maintenance contractors, material suppliers, and all other third parties would require permission for access from authorized Project staff prior to entrance. These measures would help to reduce the potential for vandalism and other incidents at the Project Area that would require a response by local law enforcement agencies. The Applicant may contract for on-site security to supplement coverage by the Skamania County Sheriff.

Traffic Accidents

Project construction could lead to a slight increase in the chance of traffic accidents, due to the presence of a peak of 265 construction workers traveling to the site, along with the transport of construction materials and the turbine components. This impact would last a maximum of one year, with peak impacts limited to a several-month period in the summer. This risk would be minimal and similar to any construction project involving the use of heavy equipment and large structural components on the roadways. The Skamania County Sheriff or the Washington State Patrol would respond to traffic accidents. Medical response would be provided by the local ambulance services (Skamania County Emergency Medical Service and Skyline Ambulance) and the two local hospitals (Skyline Hospital in White Salmon and Providence Hood River Memorial Hospital in Hood River), which have capacity for additional patients.

Turbine Structural Failure

The risk of turbine structural failure during construction would be very small, and would be due primarily to problems in the assembly process, should a failure occur. The turbine supplier would be required to document and provide the quality assurance/quality control procedures used during manufacturing and assembly to minimize or eliminate the risk of failure.

Ice Throw

Ice storms, both mild and occasionally severe, may occur in the Project Area. During periods of ice build-up, the exposed parts of the turbine may be coated with ice. When a stationary blade accumulates ice followed by an increase in temperature, the ice on the blade can thaw. If the blades are stationary, the ice would fall near the turbine base, but once the blades begin to rotate, ice fragments may be thrown. Ice throw would not be a risk during construction because the turbines would not be operating.

Shadow Flicker

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity as the moving blade casts shadows on the ground and objects, including windows at residences. Some health concerns have been raised about the effects of shadow flicker. Shadow flicker can only occur if the location of the turbine is close to a receptor that is in a position where the blades interfere with very low-angle sunlight. Shadow flicker would not be a risk during construction because the turbines would not be operational.

Electromagnetic Fields

Electrical transmission lines, distribution lines, and substations create electromagnetic fields. Electromagnetic fields also exist in nature and around all types of electrical devices and appliances. They are produced by the presence of differences in electrical potential (voltage) and the movement of charges because of the potential (current). This movement produces magnetic fields. The electrical and magnetic fields around electrical appliances and utility facilities are extremely low frequency. They have a significantly lower frequency (60 cycles per second, or Hz), than radio broadcast waves (0.5 to 100 million cycles per second) or electromagnetic energy from sunshine (1,000 trillion cycles per second). Electrical and magnetic fields would not be generated prior to completion of the Project other than by electrical generators used for temporary site power.

Operation

Potential health and safety concerns from operation of a wind energy facility include ongoing risks of fire or explosion, releases to the environment, vandalism or traffic accidents, along with concerns regarding turbine structural failure, tower failure, blade throw ice throw from the turbine blades, shadow flicker from the moving blades, and electrical and magnetic fields.

Fire or Explosion

Wild fires in the Project Area are relatively rare, and fire conditions are monitored continually by the DNR. During Project operation, fire protection would continue to be provided by the Applicant, DNR, Underwood Fire District, and Mill A Volunteers. Potential for fire would be lower once construction is completed, and would relate primarily to lightning and vehicle use during the dry summer months. These risks would be mitigated through appropriate operational practices. DNR has stated that resources for fire protection and suppression services are adequate to serve the Project during construction and operation (J. Weeks, personal communication).

Turbine fires are possible; however, with the types of modern wind turbines proposed for the Project, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central supervisory control and data acquisition system, which would notify operators of the alarm by cell phone or pager.

Releases to the Environment

Operation of the Project would not result in the generation of regulated quantities of hazardous wastes. Since no fuel would be burned to power the wind turbine generators, there would be no spent fuel, ash, sludge or other process wastes generated. The only materials used during Project operations that present any potential for accidental spills are lubricating oils and hydraulic fluids used in the wind turbine generators and transformers.

- ***Turbine Fluids.*** The fluids within the turbines are checked by staff periodically and must be replenished or replaced on an infrequent basis (generally less than once per year and sometimes only once every five years). When replacing these fluids, the industry standard practice is for staff to climb up to the nacelle and remove the fluids in small (typically five-gallon) containers and lower them to the ground using a small maintenance crane built into the nacelle itself. The containers would then be transferred to a pickup truck for transport to the Operations and Maintenance facility for temporary storage (typically less than one month) before being picked up by a licensed transporter for recycling. Replacement fluids are added in the same method, only in reverse.

- ***Replacement Fluids.*** Small quantities of replacement fluids, typically no more than a few 50-gallon drums of lubricating oil and hydraulic oil, may be stored at the Operations and Maintenance facility for replenishing and replacing spent fluids. These fluids would be stored in appropriate containers. All operations staff would be trained in appropriate handling and spill prevention techniques to avoid any accidental spills. Because only small quantities of fluids are transported, added, or removed at any one time and are

stored for short periods of time, the potential for an accidental spill during routine maintenance is extremely limited.

- ***Pad Mounted Transformers.*** Each wind turbine generator has a pad mounted transformer located at its base. These transformers contain mineral oil, which acts as a coolant. Each pad mounted transformer contains up to 500 gallons of mineral oil. The transformer is designed to meet stringent electrical industry standards, including containment tank welds and corrosion protection specifications. Regular maintenance is performed on the transformers, including checking the condition of the coolant.

- ***Substation Transformer(s).*** The BPA substation would be equipped with either one or two transformers. Each substation transformer would contain up to 12,000 gallons of mineral oil for cooling. These transformers are designed to meet stringent electrical industry standards, including containment tank welds and corrosion protection specifications. The substation transformers are equipped with an oil level sensor that detects any sudden drop in the oil levels and send an alarm message to the central supervisory control and data acquisition system. Finally, the substation transformers are supported by a concrete vault to ensure that any accidental fluid leak does not result in any discharge to the environment.

It is anticipated that an Operation SPCC Plan would be submitted and approved by EFSEC prior to operation.

Vandalism

Vandalism of Project facilities and theft of equipment during operation is similar to that expected during construction. As with the construction period, the Project design would include site security measures including fencing and outdoor lighting, and the Applicant may contract for on-site security to supplement coverage by the Skamania County Sheriff.

Traffic Accidents

The risk of traffic accidents during operation would be low. The Project would employ between eight and nine operations staff; this number would not generate sufficient additional traffic to increase accident rates. Traffic accident response would continue to be provided by the Skamania County Sheriff and Washington State Patrol, with support by local ambulance services and hospitals as needed.

Tower Failure

Structural failure of the turbine tower is very rare, though some instances of turbine failure have been documented in older turbine models. A review performed for the Kittitas Valley Wind Project EIS located five reported instances of tower failure worldwide. There are at least 55,000 wind turbines installed world-wide (EFSEC 2007). One insurance company representative whose company insured over 12,000 turbines reported that he was not aware of any instances of the failure of tubular turbine towers (EFSEC 2007).

Tower failure can be attributed to improper design, manufacturing defects, extreme weather events, or the wrong application of technology. Reasons for tower collapse can vary depending

on conditions and tower type, but may include blade strikes, very strong winds, and improper maintenance. While structural failure is more damaging than blade failure, the consequences and risks to human health are far lower since risks are confined to within a relatively short distance from the turbine (Caithness 2006). There is only one recorded death from a tower collapse, which occurred in Sherman County, Oregon (a construction worker who died during the testing phase and not during operation). A six-month investigation found that the operating company *"failed to properly instruct and supervise workers in the safe operation of tools and equipment. It also found that company procedures for working under potentially dangerous conditions fell short of OSHA [Occupational Safety and Health regulations]"* (Hill 2008). The investigation did not find any structural problems with the tower itself.

Blade Throw

Cases of blade throw are rare and have generally been linked to improper assembly or exceedance of design limits (AWEA 2008). In those rare instances where towers or blades have failed, the failure typically results in components crumpling or falling straight down to the ground, although in a small number of cases blades or parts of blades have been thrown from the nacelle. There is limited data available on how far blade components would be thrown since blade throw is extremely rare. In testimony for the Kittitas Valley Wind Project, a representative from Vestas Wind Systems in Denmark stated that there are approximately 10,000 Vestas turbines installed and operating worldwide. There has been only one noted occurrence of blade throw, with a Vestas V39-500kW turbine in Denmark in 1992 where a blade was thrown 50 to 75 meters (approximately 165 to 245 feet) (EFSEC 2007). Based on this information, the Applicant determined that using a minimum of turbine tip height to define the minimum safety setback distance is sufficient to protect against blade throw.

For the Project, members of the public would not have access to the Project Area, and signs would be used to discourage unauthorized access. The tip height of the turbines would be approximately 426 feet. The property boundaries of the Project Area would be greater than 426 feet in distance to the nearest turbine in all but a few isolated cases. Exact distances from the turbines to the property boundary would depend on the final design and placement of the turbines; however, it is possible that the nearest turbine would be within this distance of the Project boundary for small parts of turbine strings A and B (on the west of side of the Project Area), F and D (on the south side) and B and C (on the north side). However, most of this area is under control of the Applicant or in large-scale agriculture, and there are no residences within this buffer area:

- On the west side of the Project Area, there are six properties, of which only two are owned by a person or entity other than the Applicant. These two are owned by the State and managed by DNR. All these neighboring properties are managed as commercial forest land with no residential structures.

- On the south side, there are five adjacent off-project properties, located within the Scenic Area. Of these five properties, only one, totaling 29 acres, is owned by someone other than the Applicant. The 29-acre parcel is primarily managed as forest and orchard lands, with 1 acre used for residential purposes. The owner has received approval from Skamania County to relocate their existing home to within 50 feet of their north property line. This new location would bring the residence to within 2,000 feet of the closest

proposed turbine corridor. Except for this parcel, all adjacent lands to the south are in commercial timber production.

- On the north side, the land is owned by the State and managed for commercial timber harvest by the DNR.

The wind turbines for the Project would be equipped with sophisticated computer control systems to monitor variables such as wind speed and direction, air and machine temperatures, electrical voltages, currents, vibrations, blade pitch and yaw angles, etc. Each turbine would be connected to a central data control system. The system would allow for remote control and monitoring of individual turbines and the wind plant as a whole from both the central host computer or from a remote computer.

All turbines are designed with several levels of built-in safety and comply with the codes set forth by Occupational Safety and Health Administration and American National Standards Institute standards. The turbines would be equipped with two fully independent braking systems that could stop the rotor either acting together or independently. The braking system is designed to bring the rotor to a halt under all foreseeable conditions. The system would include aerodynamic braking by the rotor blades and by a separate hydraulic disc brake system. Both braking systems would operate independently such that if there is a fault with one system, the other could still bring the turbine to a halt. Remote restarting of the turbine would not be possible following an emergency stop. The turbine would be inspected in-person and the stop-fault reset manually to re-activate automatic operation. The turbines also would be equipped with a parking brake used to "park" the rotor while maintenance routines or stationary rotor inspections are performed.

Ice Throw

As noted above, during periods of ice build-up, the exposed parts of the turbine may be coated with ice. When a stationary blade accumulates ice followed by an increase in temperature, the ice on the blade can thaw. If the blades are stationary, the ice would fall near the turbine base, but once the blades begin to rotate, ice fragments may be thrown. The risk of impacts from ice throw is minimal. Most modern turbines include sensors that would shut down the turbine when ice build-up is detected. A 1998 study reported that there had been no injury from ice thrown from wind turbines (Morgan et al. 1998). A 2009 study reported one human injury due to ice-throw, although the specifics of the incident were not provided (Caithness 2009). As stated above, there are at least 55,000 wind turbines in operation world-wide.

Reported data on ice throws at other projects indicate that ice fragments were found on the ground from 50 to 328 feet from turbines (<33 to 197 feet blade diameter) and were in the range of 0.2 to 2.2 pounds in mass (Morgan et al. 1998, EFSEC 2007). When more than a few meters from the turbine, the risk of ice landing at a specific location was found to reduce quite quickly with the distance of the location from the turbine. It was also found that ice falls predominantly downwind of the rotor plane. Seifert et al. (2003) conducted risk analyses on ice throw primarily in Europe. The general conclusion was that wind turbines would not cause ice throw risks as they are normally set back from residences and roadways and that the hypothetical risk of being struck by ice is small. However, the actual throwing distance of the ice fragments would vary

based on many variables not included in this calculation, including rotor azimuth, rotor speed, local radius, ice fragment size and weight, and the wind speed.

Thus, a buffer based on tip height (approximately 426 feet) would provide adequate protection from ice throw. As discussed in the Blade Throw section above, the Project Area boundaries are usually farther than this distance from the nearest turbine, and where this is not the case the surrounding area is either under the control of the Applicant, managed for commercial timber harvest by Washington State, or managed for large-scale agriculture. The nearest residence is approximately 2,000 feet from the nearest proposed turbine string.

Shadow Flicker

Shadow flicker is the alternating change in light intensity when moving turbine blades cast shadows on the ground and objects, such as windows in residences. Shadow flicker is not caused by viewing the sun through rotating wind turbines blades or moving through the shadows of a wind energy facility, or sunlight reflected from turbine blades. Shadow flicker occurs when a turbine is located near a receptor (e.g., residence) with an unobstructed line of sight to the turbine, the sun is behind and perpendicular to the turning turbine blades and the receptor is located close enough to the turbine to be in its shadow.

The existence and intensity of shadow flicker are affected by a number of factors including:

- The strength of the sun as affected by cloud cover.
- The line of sight of the observer relative to the sun and the turbine. This is related to the sun's height in the sky, which varies with latitude and longitude, time of day, and time of year
- The distance between the observer and the turbine, which affects the distinctness of the shadows.
- The presence of obstructions such as buildings or vegetation.
- The orientation of the turbine depending on wind conditions. When the turbine is facing the sun, shadow flicker is greater behind the turbine; when the turbine is rotating in line with the sun, there is much less flicker (Committee for Renewable Energy 2008).

Potential shadow flicker from wind turbines can only occur when (1) the sun is very low in the sky; (2) a receptor is very close to the turbine; (3) the receptor is oriented toward a turbine; (4) the receptor has an unobstructed line of sight; and (5) the weather conditions include bright sun. When all these factors exist, they may produce a pulsating shadow which may or may not be perceptible. Shadow flicker frequency is related to the rotor speed and number of blades on the rotor, which can be translated into a "blade pass frequency" measured in alternations per second, or hertz (Hz). Although in some instances the flickering of light can induce epileptic seizures in people who are photosensitive (about 3- 5 percent of the 1 percent of Americans who are epileptic are photosensitive), shadow flicker from wind turbines is too slow to induce epileptic seizures. Whether light flicker would provoke a reaction depends on its frequency, light intensity, visual area, image pattern, and color (Epilepsy Foundation 2009). Flicker frequency

due to a turbine is on the order of the rotor frequency, i.e., 0.6–1.0 Hz (NRC/NAS 2007). The flicker frequency that provokes seizures in photosensitive individuals is 5–30 Hz, well above the maximum of approximately 1 Hz for wind turbines. There is no scientific data or peer-reviewed studies that suggest a link between epileptic seizures and rotor blade alternatives.

Analyses conducted at other wind energy facilities approved by EFSEC (Kittitas Valley Wind Power Project and the Wild Horse Wind Power Project) examined the potential effects of shadow flicker for residents near the proposed projects and recommended certain measures for minimizing these effects. EFSEC found that as the distance between the wind turbine generators and residences increases, the perception of shadow flicker decreases or attenuates. At a distance beyond 2,500 feet, shadow flicker is considered to be imperceptible. Even if shadow flicker were a proven impact (as the Council found in the Kittitas Valley Wind Power Project case), none of the planned turbines are within 2,500 feet of existing residences (Figure 3.7-1 Noise Level Contours in Section 3.7 shows the locations of the closest residences.). If shadow flicker were found to occur, operational controls could be implemented to completely eliminate this perceived impact. For instance, turbine speed or orientation could be controlled during specific periods.

Electromagnetic Fields

The Project would include 34.5-kV collector lines and systems, primarily located underground. There would be a new collector substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line and a new interconnection from the proposed BPA substation to the 230-kV transmission line.

Electrical transmission lines, distribution lines, and substations create electromagnetic fields, which also exists in nature and around all types of electrical devices and appliances. As shown in Table 3.6-4, much of typical daily exposure to electromagnetic fields from human-made sources is a result of using electric home appliances. Electromagnetic field strength is expressed with a unit of measure called a milligauss (mG), and is measured using a special monitoring device. The strength of electromagnetic fields falls rapidly as one moves away from the source.

Table 3.6-4
Electromagnetic Field Readings for Common Equipment

Source	Readings (mG)
Video Display Terminals (VDTs)(distance 6 inches)	14 mG
Portable Heaters (distance 6 inches)	100 mG
Vacuum Cleaner[a] (distance 6 inches)	300 mG
Can Opener[a] (distance 6 inches)	600 mG
Hair Dryer[a] (distance 6 inches)	300 mG
Distribution Line 37.5-kV[b] (distance 100 feet)	<1-2 mG
Transmission Line 115-kV[a] (distance 100 feet)	1.7 mG
Transmission Line 230-kV[a] (distance 100 feet)	7.1 mG

[a] National Institute of Environmental Health Sciences (2002). , EMF: Questions and Answers, 2002.
[b] Gauger, J.R. (1985), Silva et al. (1988)

Electromagnetic fields from the Project would be lower than those of many common household appliances and would not have health and safety impacts. Electromagnetic field readings for

items commonly found in homes compared to electrical transmission lines are shown on Table 3.6-4.

Given the low strength of electromagnetic fields from the Project and the distance to the nearest residences and the Operations and Maintenance facility, the Project would have no impacts from electromagnetic fields.

Other Potential Impacts

Other potential adverse impacts to ~~environmental~~ public health during operation could occur from the following:

- ***Weather.*** Weather emergency includes hail, high winds, thunderstorms, extreme cold weather, and any other naturally occurring weather situation that may endanger equipment, or require adjustments to the normal operations of the facility. Risks to personnel at the Project would be minimized through preparation of and implementation of an Emergency Plan that includes planning for weather contingencies.

- ***Geological.*** This type of emergency deals with seismic activity and related geological phenomena. As discussed in Section 3.1 Earth, the likelihood of earthquake at the site is very low.

- ***Security.*** This type of emergency includes bomb threats, civil unrest, sabotage, or any other man made threats to the facility or personnel. The risk of a security emergency in this location and to this type of facility is considered very low.

- ***Lighting.*** The FAA, requires structures over 200 feet be equipped with red or white flashing lights mounted on the nacelle of a wind turbine to avoid aircraft collisions during the day and night.

Project Decommissioning

The health and safety risks associated with decommissioning would be similar to those during the construction process. In compliance with WAC 463-72 Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major public health ~~environmental health~~ issues presently anticipated. If impacts to public health ~~environmental health~~ are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures would be proposed as part of the plan.

3.6.2.2 No Action Alternative

Under the No Action Alternative, the proposed Project would not be built. The risk of fire due to lightning strikes or human activity in the general area would continue at their present levels, as

would the risk of hazardous waste release, vandalism, and traffic accidents. The electrical energy that would otherwise be produced by the Project would need to be obtained from another generating source.

3.6.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential impacts to public health and safety to the extent feasible.

- Prepare Emergency Plans for the Project containing the following components:

  - ***Fire Protection and Prevention Plan.*** A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. As part of the plan, the construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting DNR and implementing any necessary fire precautions.

  - ***Personal Injury Response Plan.*** Procedures would be developed for construction, operation and maintenance of the Project to describe procedures to be followed in the event of a personal injury, including who is to be alerted, contacting 911, how to alert others in the immediate vicinity, remaining with the employee, and administering first aid until medical assistance arrives.

  - ***Safety Plan.*** Prior to the commencement of any construction work, the construction contractor would be required to prepare a Safety Plan that would apply to all contractor and subcontractor personnel working at the site. The plan would be designed to ensure compliance with all laws, ordinances, regulations, and standards concerning health and safety. The contractor would assign a safety manager with the authority to issue a "stop work" notice when health and safety issues arise.

  - ***SPCC Plan.*** While storage of chemicals on site would be minimal, the Project could require an SPCC Plan that would protect groundwater. The SPCC Plan would apply to both construction and operation if hazardous materials were stored on site in quantities sufficient to trigger the plan requirement.

  - ***Hazardous Waste Management Plan.*** Hazardous materials to be used or stored on site would be limited to small quantities of materials used for maintenance (cleaning and painting), lubrication of equipment, and possibly fuel. During construction, the construction contractor would be required to prepare a Hazardous Waste Management Plan that complies with state and federal hazardous waste management laws for handling, storage, and disposal. A similar plan would be prepared and implemented for operation.

- Report conditions affecting the safety of the Project to EFSEC, including any condition, event, or action that might compromise the safety, stability, or integrity of any facility or the ability of any equipment to function safely; or that might otherwise adversely affect life, health, or property.

- Develop agreements related to emergency planning with Skamania County Department of Emergency Management prior to Project construction. This agreement would be provided to EFSEC and attached to the Emergency Plan prior to implementation.

- Comply with all applicable local, state, and federal safety, health, and environmental laws, ordinances, regulations, and standards. Some of the main laws, ordinances, regulations and standards that would be reflected in the design, construction, and operation of the Project are as follows:

  - Occupational Safety And Health Act of 1970 (29 USC 651, et seq.) and 29 CFR 1910, Occupational Safety and Health Standards;
  - Uniform Fire Code;
  - Americans with Disabilities Act;
  - Uniform Fire Code Standards;
  - Uniform Building Code;
  - National Fire Protection Association design standards for the requirements of fire protection systems;
  - National Institute For Occupational Safety And Health requirements that safety equipment carry markings, numbers, or certificates of approval for stated standards;
  - American Society of Mechanical Engineers plant design standards.

- American National Standards Institute plant design standards:

  - National Electric Safety Code;
  - American Concrete Institute Standards;
  - American Institute of Steel Construction Standards;
  - National Electric Code.

- Utilize the following measures to mitigate the risk of fire or explosion:

  - The construction manager would be responsible for staying abreast of fire conditions in the Project Area by contacting DNR and implementing any necessary fire precautions;
  - A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented by the Applicant, in coordination with the Skamania County Fire Marshall and appropriate agencies;
  - Both the wind turbine generators and the substation would be equipped with lightning protection systems.

Table 3.6-5 lists sources of potential fire and explosion along with measures to mitigate the risk of either occurring.

- Require that all on-site operations employees would be responsible for contributing to ongoing fire prevention in the Project Area through the following programs:
  - Operational Safety Program;
  - Operations Written Safety Program;
  - Emergency Action Plan;
  - Fire Prevention Plan.
- Develop on-site emergency plans would be prepared for the Project in case of a major natural disaster or accident relating to or affecting the Project. The plans would describe the emergency response procedures to be implemented during various emergency situations that may affect the Project or surrounding community or environment. In addition to the above measures, the Applicant would:
  - Provide detailed maps that show all access roads to the Project;
  - Provide keys to a master lock system that would enable emergency personnel to unlock gates that would otherwise limit access to the Project;
  - Use spark arresters on all power equipment, e.g., cutting torches and cutting tools;
  - Inform workers at the Project Area of emergency contact phone numbers and train them in emergency response procedures;
  - Carry fire extinguishers in all maintenance vehicles;
  - Coordinate with DNR when the fire danger is high;
  - Comply with equipment rules and regulations required by DNR for work conducted in wildland/forested lands.

Table 3.6-5
Fire and Explosion Risk Mitigation

Construction or Operation	Potential Fire or Explosion Source	Mitigation Measures
Construction and Operation	General Fire Protection	• All on-site service vehicles fitted with fire extinguishers. • Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on site along roadways during summer fire season. • Minimum of one water truck with sprayers must be present on each turbine string road with construction activities during fire season.
Construction and Operation	Dry vegetation in contact with hot exhaust catalytic converters under vehicles	• No gas powered vehicles allowed outside of graveled areas. • Mainly diesel vehicles (i.e. w/o catalytic converters) used on site. • Use of high clearance vehicles on site if used off-road.
Construction and Operation	Smoking	• Restricted to designated areas (outdoor gravel covered areas).
Construction and Operation	Explosives used during excavation	• Only state-licensed explosive specialist contractors are allowed to perform this work—explosives require special detonation equipment with safety lockouts. • Clear vegetation from the general footprint area surrounding the excavation zone to be blasted. • Standby water spray trucks and fire suppression equipment to be present during blasting activities.
Construction and Operation	Electrical fires	• Use generally high clearance vehicles on site. • No gas powered vehicles allowed outside of graveled areas. • All major construction equipment used is to be diesel powered (i.e., without catalytic converters).
Construction and Operation	Lightning	• Specially engineered lightning protection and grounding systems used at wind turbines and at substation. • Footprint areas around turbines and substation are graveled with no vegetation.
Construction	Portable generators – hot exhaust	• Generators not allowed to operate on open grass areas. • All portable generators to be fitted with spark arrestors on exhaust system.
Construction	Torches or field welding equipment	• Immediate surrounding area would be wetted with water sprayer. • Fire suppression equipment to be present at location of welder/torch activity.
Construction and Operation	Electrical arcing	• Electrical designs and construction specifications meet or exceed requirements of the National Electric Code and National Fire Protection Agency.

- Prepare in advance to reduce the potential for traffic accidents. Mitigation for lowering the risk potential of traffic accidents includes:
  - A Transportation Management Plan (TMP) that would direct and obligate the contractor to implement procedures to minimize traffic impacts would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval. The TMP would include requirements for coordination of project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic.
  - The Applicant and its contractors would be required to comply with State and County permitting requirements for over-size and over-weight vehicles.
  - The Applicant would be required to notify land owners in the Project vicinity prior to construction of transportation routes that would be used for construction equipment and labor.
  - Approved State and/or County advanced warning construction signs would be placed prior to and during construction.
  - Certified flaggers would be used when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.
  - Pilot cars would be used both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways.
  - Traffic flow would not be restricted for more than 20 minutes during the construction phase.
  - All loads over 10 feet wide traveling on SR 14 from east of the proposed Project Area between MP 76.77 and 76.91 would require three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500-foot separation. The lead pilot car in front of the load would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible to stop all oncoming traffic.

3.6.4 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts to public health ~~environmental health~~ are anticipated to be minimal.

Because there would be no need to transport, store, or combust fuel to generate power, the risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations would be minimal. The risk of accident during construction would be no higher than for any large construction Project and would be minimized through standard construction safety requirements and procedures. The risk of accident during operation would be minimal.

3.6.5 REFERENCES

American Wind Energy Association (AWEA). 2008. *Wind Energy Siting Handbook.* February.

Caithness Windfarm Information Forum (Caithness). 2006. Summary of Wind Turbine Accident data to November 1st 2006. Accessed at: www.caithnesswindfarms.co.uk.

———. 2009. Summary of Wind Turbine Accident Data to 31st December 2009. Accessed at ttp://www.caithnesswindfarms.co.uk.

Committee for Renewable Energy for Barrington. 2008. Health and Safety Report of the Health and Safety Subcommittee. Committee for Renewable Energy for Barrington, Rhode Island. Updated August 21.

Carlson, John. Skamania County Emergency Management. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

Cox, Dave. Undersheriff, Skamania County Sheriff's Office. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 17, 2008.

Energy Facility Site Evaluation Council (EFSEC). 2007. Kittitas Valley Wind Power Project Final Environmental Impact Statement. February.

Epilepsy Foundation. 2009. Shedding Light on Photosensitivity, One of Epilepsy's Most Complex Conditions. By Guiseppe Erba, M.D. Accessed at: http://www.epilepsyfoundation.org/about/photosensitivity/gerba.cfm.

Fullerton, Gail A. and Ole Helgerson. 2008. Underwood Community Wildfire Protection Plan Accessed December 12, 2008 at http://www.skamaniacounty.org/Wildfire/UnderwoodCWPP/Underwood%20CWPP%20Draft.pdf.

Gauger, J.R. 1985. IEEE Transactions on Power Apparatus and Systems. PA-104. September.

Hill, Gail Kinsey. 2008. Siemens fined $10,500 for wind turbine tower collapse that killed worker. *The Oregonian*. February 26.

Hovey, Russ. Department of Natural Resources. Phone conversation with Katie Carroz, Carroz Consulting LLC. January 13, 2009.

Klickitat and Skamania Counties. 2006. Klickitat and Skamania County, Washington Community Wildfire Protection Plan. April 26. Accessed at: http://skamania.wsu.edu/documents/KliciktatandSkamaniaCWPP-nosig.pdf.

Morgan, Colin, Ervin Bossanyi, and Henry Seifert. 1998. Assessment of Safety Risks Arising from Wind Turbine Icing. April.

Municipal Research and Services Center of Washington (MSRC). 2008. MSRC Website. Accessed December 17, 2008 at http://www.mrsc.org/Subjects/PubSafe/Fire.

National Institute of Environmental Health Sciences. 2002. EMF: Questions and Answers.

National Research Council and National Academy of Sciences (NRC/NAS). 2007. Environmental Impacts of Wind-Energy Projects.

Seifert, Henry, Annette Westerhellweg, and Jürgen Kröning. 2003. Risk Analysis of Ice Throw from Wind Turbines. Paper presented at BOREAS 6, 9 to 11 April 2003. Pyhä, Finland.

Skamania County Emergency Medical Service (EMS). 2008. Website. Accessed December 19, 2008 at http://www.skamaniaems.com/index.html.

Silva, M., N. Hummon, and D. Rutter. 1988. Power frequency magnetic fields in the home. February. IEEE-PES, Paper 88 WM 101-8. ...

Skyline Hospital. 2008. Skyline Hospital Website. Accessed December 19, 2008 at http://www.skylinehospital.com/index.html.

Washington Association of Sheriffs and Police Chiefs (WASPC). 2008. Criminal Justice Information: Crime in Washington. Accessed December 19, 2008 at http://www.waspc.org/index.php?c=Criminal%20Justice%20Information%20Support.

Washington State Patrol. District 5 Public Information Contact, Phone conversation with Katie Carroz, Carroz Consulting LLC. January 26, 2009.

Weeks, Joe. Southeast (Ellensburg) Region of the Washington State Department of Natural Resources Fire Service. Phone conversation and email with Katie Carroz, Carroz Consulting LLC. February 5, 2009.

3.7 NOISE

This section describes the existing noise levels in the vicinity of the Project and the potential noise impacts from construction and operation of the proposed Project.

3.7.1 AFFECTED ENVIRONMENT

3.7.1.1 Analysis of Environmental Noise

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several

variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in Hz, while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if minus 10 dB, halving) of the sound's loudness.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. First, if the intensity of a sound is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to sound pressure level (SPL). In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (μPa). SPL depends not only on the acoustic power of the source, but also on the distance from the source and on the acoustic characteristics of the space surrounding the source, the receiver, and the path between them. A sound power level, on the other hand, is analogous to the wattage of a light bulb: it describes a source's rate of emitted acoustical energy and is not distance dependent. Using the same light analogy, SPL would be the brightness or intensity of light that can be measured at a specific distance from a source. To clarify the distinction between sound power level and SPL, the latter should always be specified with a location or distance from the noise source.

The distance value associated with SPL is an important metric, as the decrease in measurable sound level due to increasing distance from any single sound source normally follows the inverse square law. In other words, SPL changes in inverse proportion to the square of the distance from the sound source. As a general rule, at distances greater than 50 feet from a noise generator such as a wind turbine, SPL drops at a rate of 6 dB with each doubling of distance. Additionally, some sound energy is absorbed in the medium (e.g., air) through which it travels as a function of temperature, humidity, and the frequency of the sound. This attenuation can be up to 2 dB over 1,000 feet. The overall sound propagation drop-off rate would vary based on other conditions such as natural terrain and intervening obstructions.

Sound frequency (Hz) is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived—by way of the inner ear organs and their connection to the brain—as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating frequencies of sound according to a weighting system that reflects that human hearing sensitivity: less sensitive at low frequencies and extremely high frequencies than at the mid-range (e.g., speech) frequencies. This is called "A-weighting," and the measured decibel level adjusted by the A-weighting constants is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve of adjustment constants across the audible spectrum.

C-weighting is another type of filter, with adjustments that help expose low-frequency sound sources that the ear does not detect well, such as compressors, pumps, and diesel engines. For the same measured sound, it is not uncommon for corresponding dBC and dBA levels to vary. As an example, the difference between dBC and dBA levels within an office building may be 20 dB (i.e., 40 dBA and 60 dBC). These wind turbines are not a source of substantial low-frequency noise. Because low frequency sound is less audible to human hearing, C-weighting is often used to assess potential annoyance from rattling due to low frequency noise that may excite vibration in structures.

Although the dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded 10 percent, 50 percent, and 90 percent of the measured time interval, respectively. Sound levels associated with L_{10} typically describe transient or short-term events. For the L_{50} descriptor, half of the sounds during the measurement interval are softer than L_{50} and half are louder. Levels associated with L_{90} often describe background noise conditions and/or sound sources that exhibit continuous, "steady-state" characteristics.

Finally, another sound descriptor known as the day-night average sound level (Ldn) represents the average sound level for a 24-hour day and is calculated by adding a 10 dB penalty only to sound levels during the night period (10:00 PM to 7:00 AM). The L_{dn} is typically used to define acceptable land use compatibility with respect to noise. Because of the night-time penalty associated with the L_{dn} descriptor, the L_{eq} for a continuously operating sound source during a 24-hour period would be numerically less than the day-night level. Thus, and by way of example,

for a power plant operating continuously for periods of 24 hours, the L_{eq} would be 6 dB lower than the L_{dn} value.

Table 3.7-1 provides sound levels of typical noise sources and environments to provide a frame of reference.

Aside from industrial and other settings where workers may be exposed to very high noise levels and the risk of hearing loss, environmental noise effects are typically limited to subjective impacts (e.g., annoyance, nuisance, dissatisfaction) and activity interference (i.e., impacts to sleep, speech, and learning). Despite attempts by prominent acousticians to satisfactorily quantify the association between measurable sound levels and corresponding reactions of annoyance and dissatisfaction, there is no way to measure the subjective impacts of noise. Further, the aforementioned variability of individual human sensitivity and/or tolerance to noise defies creation of a common standard.

3.7.1.2 Regulatory Overview

Washington State and Skamania County Noise Limits

WAC 463-62-030 states that energy facilities shall meet the noise standards established in Chapter 70.107 RCW, also known, in short, as the "Noise Control Act of 1974", as implemented in the requirements of WAC 173-60. SCC Title 8 Chapter 22: Noise Regulations identifies limits and exceptions specific to noise in Skamania County. SCC 8.22 was adopted pursuant to, and is consistent with, WAC 173-60. Environmental designations for noise abatement (EDNA) are established in SCC Section 8.22.080 and WAC 173-60-030. These rules establish maximum permissible environmental noise levels and are based on the EDNA, which is defined as an area or zone (environment) within which maximum permissible noise levels are established. There are three EDNA classes:

- ***Class A.*** Lands where people reside and sleep (such as residential);
- ***Class B.*** Lands requiring protection against noise interference with speech (such as commercial/recreational);
- ***Class C.*** Lands where economic activities are of such a nature that higher noise levels are anticipated (such as industrial/agricultural).

The noise limits that a new source can impose for each land use classification are presented in Table 3.7-2.

Table 3.7-1
Common Noise Levels and Subjective Human Responses

Noise Source (at a given distance)	A-Weighted Sound Pressure Level in Decibels	Noise Environment	Human Judgment of Noise Loudness (relative to a reference SPL of 70 decibels)
Military jet take-off with after-burner (50 feet), civil-defense siren (100 feet)	140, 130	Aircraft Carrier Flight Deck	
Commercial jet take-off (200 feet)	120	Thunderclap	Threshold of Pain 32 Times as Loud
Pile driver (50 feet)	110	Rock Music Concert	Average Human Ear Discomfort 16 Times as Loud
Ambulance siren (100 feet), newspaper press (5 feet), power lawn mower (3 feet)	100		Very Loud 8 Times as Loud
Motorcycle (25 feet), propeller plane flyover (1,000 feet), diesel truck, 40 miles per hour (50 feet)	90	Boiler Room Printing Press Plant	OSHA threshold for 8-Hour Exposure 4 Times as Loud
Garbage disposal (3 feet)	80		2 Times as Loud
Passenger car, 65 miles per hour (25 feet), vacuum cleaner (10 feet)	70	Data Processing Center, Department Store	Reference Loudness Moderately Loud
Normal conversation (5 feet), air-conditioning unit (100 feet)	60	Private Business Office, Restaurant	1/2 as Loud
Light traffic (100 feet)	50	Lower Limit of Daytime Urban Ambient Sound	1/4 as Loud
Bird calls (distant)	40	Quiet Urban Nighttime	1/8 as Loud
Soft whisper (5 feet)	30	Recording Studio, Library	Very Quiet 1/16 as Loud
	20	Whistling, Rustling Leaves	Just Audible 1/32 as Loud
	10	Breathing	Barely Audible 1/64 as Loud
	0		Threshold of Hearing 1/128 as Loud

Source: URS internal information and Table N-2136.2 on p. 18 of the Technical Noise Supplement (Caltrans 1998).

Table 3.7-2
Washington Maximum Permissible Sound Levels
(Leq(1) in dBA)

EDNA of Noise Source	EDNA of Receiving Property		
	Class A[a] (Residential)	Class B (Commercial)	Class C (Agricultural, Industrial)
Class A	55/45	57	60
Class B	57/47	60	65
Class C	60/50	65	70

[a]Sound limits shall be reduced by 10 dBA between the hours of 10 PM and 7 AM at Class A EDNAs
Source: WAC Chapter 173-60. Standard applies at property line of receiving property.

The Project is sited on land zoned as Forest Land 20 (FL 20) and Unmapped (UNM) zones. Approximately 0.9 mile west of the Project Area, the alternative Operations and Maintenance facility site would be located in the R-5 zone. Both the Project Area and the alternative Operations and Maintenance facility site are used for commercial timber harvest. Based on current zoning and land use, a reasonable interpretation would classify the Project Area as a noise source having an environmental designation of Class C EDNA, and the alternative Operations and Maintenance site as having an environmental designation of Class A EDNA. With respect to the receiving land uses, this noise analysis has identified some receiver locations being within agriculturally zoned lands that could normally be classified as Class C EDNA. Since the WAC does not specifically address the situation of an occupied residential structure located on an agricultural parcel, one might assess the residence as Class A EDNA and the outlying property line as Class C EDNA. EFSEC has accepted such an interpretation for other wind energy projects such as Wild Horse and Kittitas Valley, the latter of which had approval upheld by the Washington Supreme Court. While other interpretations may be feasible, Table 3.7-3 illustrates the Class A (Residential) receiver noise level limitations for noise generated from a Class C (Commercial) EDNA (SCC 8.88.090, 100) source, including adjustments based on the duration of noise exposure time.

Table 3.7-3
Class A EDNA Receiver Noise Limits
(dBA)

Equivalent Noise Level Exposure Time (Time / Statistic)	Daytime (7 AM – 10 PM)	Nighttime (10 PM – 7 AM)
1 hour / L_{eq}	60	50
15 minutes / L_{25}	65	55
5 minutes / $L_{16.7}$	70	60
1.5 minutes / $L_{2.5}$	75	65

Levels shown are at the property line of the receiving property and indicative of a source that is located in a Class C EDNA

Notwithstanding the above and per 173-60-050 WAC, there are exemptions to the limits for certain noise-producing activities or source types as follows:

- Construction noise (including blasting) between the hours of 7 AM and 10 PM;
- Motor vehicles when regulated by 173-62 WAC ("Motor Vehicle Noise Performance Standards" for vehicles operated on public highways);
- Motor vehicles operated off public highways, except when such noise affects residential receivers; and
- Noise from electrical substations (WAC 173-60-050[2][a]).

Despite these exemptions, 173-60-50(6) WAC states, *"Nothing in these exemptions is intended to preclude the Department from requiring installation of the best available noise abatement technology consistent with economic feasibility."*

US Environmental Protection Agency and Occupational Safety and Health Administration

While the US Environmental Protection Agency (EPA) has no regulations governing environmental noise, the EPA has conducted extensive studies to identify the effects of certain sound levels on public health and welfare. An EPA document (USEPA 1974) identifies sound levels *"requisite to protect the public health and welfare with an adequate margin of safety."* The EPA specifies a day-night sound level (L_{dn}) of 55 dBA for outdoor areas, where quiet is a basis for use. The L_{dn} is similar to the 24-hour L_{eq} except that a 10-decibel penalty is added to sound levels between 10 PM and 7 AM to account for sleep interference. For a potentially continuous source of noise such as operation of the Project, the 55 dBA L_{dn} effectively translates to a 49 dBA hourly L_{eq}, which is generally consistent with the 50 dBA $L_{eq(1)}$ required by Skamania County and the State of Washington. However, this EPA finding is guidance, not regulation.

The EPA's 49–50 dBA $L_{eq(1)}$ sound level is far less than what is usually associated with hearing loss. The federal Occupational Safety and Health Administration (OSHA) has developed noise standards designed to address worker health and safety risks associated with noise exposure and the potential for noise-induced hearing loss. The action level under these OSHA standards is an 8-hour time-weighted average of 85 dBA. Exposure to sound in excess of this standard requires the employer to initiate a hearing conservation program to evaluate the exposure, its duration, possible engineering controls to reduce noise and the provision of hearing protection to employees. The decibel levels covered by the state standards in WAC 173-60-110 are well below OSHA hearing impact standards.

Low Frequency Noise

Low frequency sound typically ranges from 100 Hz to 20 Hz, the latter of which is the generally understood limit audible to the human ear. WAC 173-60-110 uses the A-weighting scale because it is a standard that characterizes sound frequencies that are more sensitive to the human ear. Local jurisdictions within the State of Washington that have a C-weighted scale standard do not apply it to wind turbines. There is no Washington State standard associated with the C-weighted scale for low-frequency noise because the C-weighted scale is primarily used as an indicator of low frequency induced noise vibrations.

3.7.1.3 Affected Environment

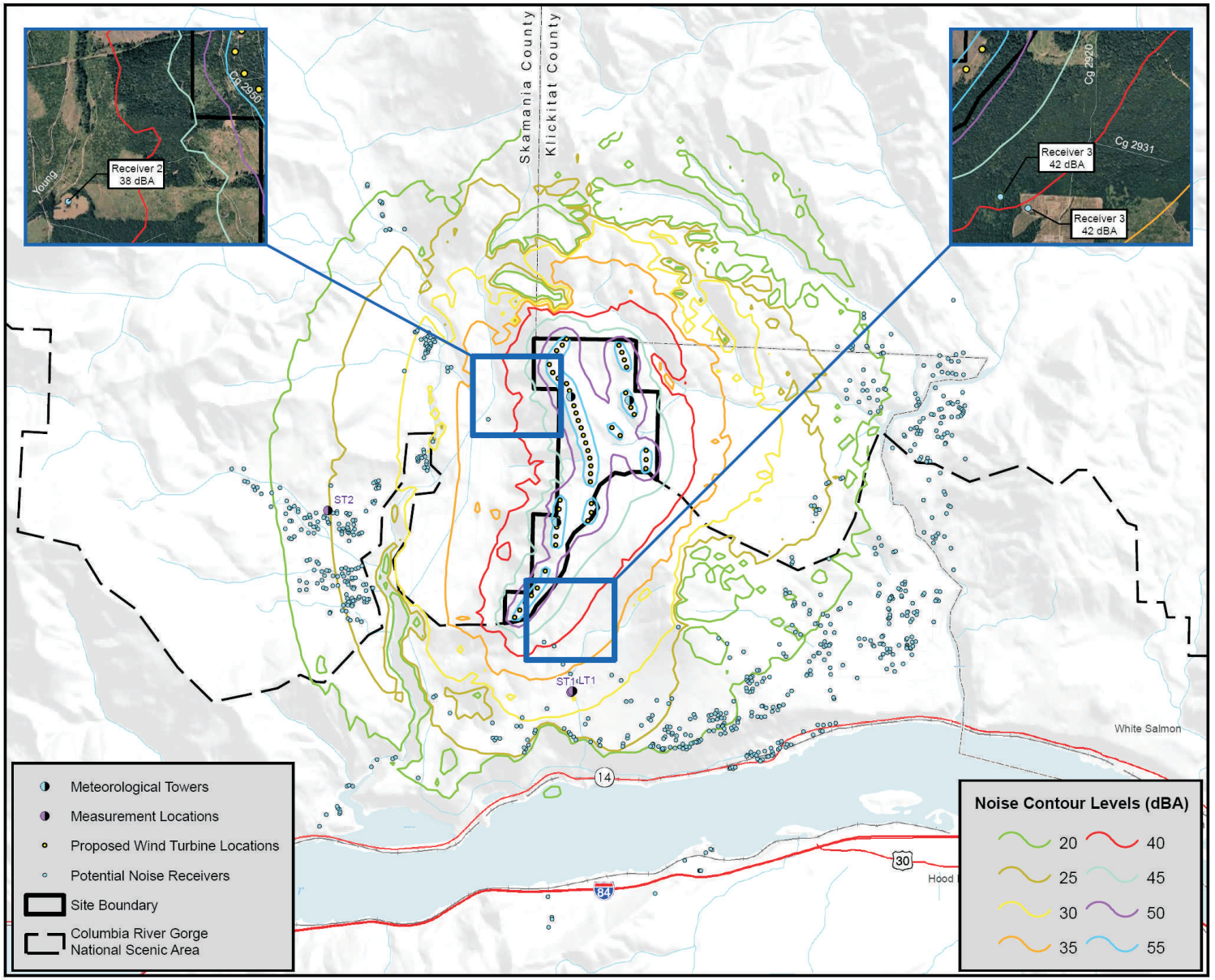
Noise Receivers

Although Figure 3.7-1 shows that there are many potential noise-sensitive receivers surrounding the Project vicinity, the three receivers closest to the Project wind turbine tower locations are the two closest residences, which are approximately 0.48 mile (2,560 feet) southeast of Tower A1 (R1 on Figure 3.7-1) and 0.8 mile (4,265 feet) southwest of Tower B16 (R2 on Figure 3.7-1). A potential future residence (R3 on Figure 3.7-1) is approximately 0.38 mile (2,000 feet) from Tower A1.

Existing Sound Levels

While some reference materials such as the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Guide* (FTA 2006) offer techniques to make a coarse estimate of existing noise levels for an area based on parameters such as population density, the reality is that at residences in or near any project proposed for development, there is no such single and consistent background noise level. The background noise level can vary at a given location or across different locations on a Project Area due to factors such as changing climate conditions and the presence of contributing noise sources (including flows of water associated with creeks or canals, agricultural equipment operations, irrigation pumps and equipment, livestock, road, rail and air traffic, wildlife such as birds or insects, dogs, and routine human activities). Hence, a field survey that includes documentation of observed or perceived noise events and monitoring of ambient sound at different times of day at different locations helps to accurately depict actual conditions that influence pre-project ambient sound level. These conditions and their influence on ambient sound level offer clues as to how the increase in noise level resulting from the operation of any project, including those that emit a constant level, would likely vary with location and time of day.

To help establish representative baseline ambient sound levels for the Project vicinity and characterize the existing noise environment in the areas occupied by the receivers shown in Figure 3.7-1, a set of long and short-term sound level measurements were conducted from January 20 to 22, 2009. The locations of the short-term and long-term measurement sites were selected to approximate the existing ambient sound in the vicinity of Ausplund Road (and hence, Receiver 1). Likewise, the location of ST2 was chosen to generally represent the ambient sound level for the Mill A community and its surroundings west of the Project, on which Receiver 2 is located.



Data Source: Publically available data from USGS NED, BLM, Washington DOT, City of Bingen, City of White Salmon, and ESRI.

0 0.5 1 2 3
Miles

Job No. 33758687

Figure 3.7-1
Noise Level Contours

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

The measurement locations included a position near the intersection of Ausplund Road and Kollack-Knapp Road (ST1), and a position near the intersection of Jessup Road and Manzanola Road (ST2). For purposes of the impact analysis described in this document, these measurement locations are considered reasonably representative for each general area, and more specifically R1 and R2, respectively, on the basis of similar expected ambient sound sources, despite the dissimilarity of locations. For instance, the ambient sound environment measured at ST1 likely contains the same typically identifiable sound components (e.g., distant bird song, dog barks, roadway traffic) and a generally unidentifiable "background" that one might measure at the precise geographic location of R1.

A Bruel+Kjaer 2250 (SN: 2653963) ANSI Type-1 real-time sound analyzer, fitted with a standard microphone windscreen and mounted on a five-foot tall tripod, was used for the short-term measurements. The instrument was field calibrated before and after each measurement period with an acoustic calibrator. All sound level measurements were performed in accordance with International Organization for Standardization guidelines (ISO 1996a, b, and c). Weather conditions during the survey period were seasonably cold with overcast skies, but there was no precipitation during the measurement periods. The air temperature varied from 30 to 44 degrees Fahrenheit, with 33 to 53 percent relative humidity. Measured ground wind speeds in the vicinity of the measurement positions were low, with averages ranging from 0 to 1 mph, and directed toward the north for all measurements. Detailed weather conditions for individual noise measurements and a summary of the short-term measurement data are included in Table 3.7-4.

A long-term measurement (LT1) was conducted at a position near the corner of Ausplund Road and Kollock-Knapp Road using a Larson Davis 720 (SN: 0436) ANSI Type 2 Integrating sound level meter. With only the windscreen-covered microphone exposed to the outdoor environment, the sound level meter was placed in a locked, weather-resistant case and secured to a nearby tree. The long-term measurement consisted of consecutive 15 or 30 minute averages conducted over an uninterrupted 24-hour period. The instrument was field calibrated before and after the measurement period with an acoustic calibrator (CAL 200 s/n: 5789). Data from the long-term measurement is presented in Table 3.7-5.

Field observations associated with the short and long-term measurements are as follows:

ST1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road. There are several residential receivers located in this general area. The first short-term measurement at this location was conducted between 11:52 AM and 12:12 PM on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, dogs barking in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:00 PM and 6:20 PM on January 21, 2009. The second measurement noise sources included distant aircraft, distant roadway traffic, and dogs barking in the distance. The third short-term measurement at this location was conducted between 11:32 PM and 11:52 PM on January 21, 2009. Noise sources during the third measurement included distant roadway traffic and dogs barking in the distance. The first measurement L_{eq} one-minute interval values ranged from 34 to 59 dBA, the second measurement 1-minute L_{eq} values ranged from 27 to 66 dBA, and the third measurement 1-minute L_{eq} values ranged from 25 to 49 dBA. L_{eq} for the entire duration of each of these three measurement periods appears in Table 3.7-4.

ST2. This measurement location was in front of the John Schwab Memorial Tennis Courts on the corner of Jessup Road and Manzanola Road. The sound level meter was approximately 15 feet from Jessup Road. The first short-term measurement at this location was conducted between 12:48 PM and 1:08 PM on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, children playing in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:36 PM and 6:56 PM on January 21, 2009. The noise sources for the second short-term measurement included distant aircraft and distant roadway traffic. The third short-term measurement was conducted between 12:08 AM and 12:28 AM on January 22, 2009. Noise sources present during the third short-term measurement included distant roadway traffic. The first measurement L_{eq} one-minute values ranged from 35 to 52 dBA, the second measurement 1-minute L_{eq} values ranged from 34 to 54 dBA, and the third measurement 1-minute L_{eq} values ranged from 31 to 39 dBA. L_{eq} for the entire duration of each of these three measurement periods appears in Table 3.7-4.

Table 3.7-4
Short-Term Noise Measurement Data Summary

Measurement Location		Measured Sound Data									
ID	Description	Time	L_{eq}, dBA	L_{10}	L_{50}	L_{90}	L_{eq}, dBA without Cars	Temp (F)	%RH	Wind Speed (mph)	Wind Direction
ST 1	Corner of Ausplund Road and Kollock-Knapp Road	11:52 - 12:12	46	39	35	34	38	35	53	1	North
		18:00 - 18:20	49	36	31	28	32	32	35	1	North
		23:32 - 23:52	35	32	28	26	30	30	34	0	-
ST 2	Just north of the John Schwab Memorial Tennis Courts	12:48 - 13:08	41	40	36	35	37	44	40	1	North
		18:36 - 18:56	44	40	36	35	36	32	34	1	North
		00:08 - 00:28	35	36	35	34	35	30	34	0	-

Measurements conducted on January 21 and 22, 2009

Table 3.7-5
Long-Term Noise Measurement Data Summary

Site ID	Measurement Location	Measurement Period			24-hr Measurement Results (dBA)			
		Start Date	Start Time	Duration (hh:mm)	L_{eq}	L_{10}	L_{50}	L_{90}
LT1	Corner of Ausplund Road and Kollock-Knapp Road	01/21/09	11:40 am	24:00	46	41	39	38

LT1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road, on the north side of the roadway. The sound level meter was placed in a locked, weather-resistant case and secured to a tree near the side of the road. The windscreen-covered microphone, connected to the meter by cable, was attached to the tree trunk at approximately 3 to 4 feet above the ground. Concurrent with these short and long-term ambient sound measurements, Applicant meteorological stations 320, 321, and 323 collected data on wind speed, direction, and temperature at various elevations above grade. Average reported wind velocities from the station NRG Type 40 anemometers were quite low, and while apparently consistent with the low average wind velocities measured on the ground at the sound measurement positions, were considered potentially compromised by icy conditions due to the low recorded temperatures and high moisture content of the air.

Table 3.7-4 shows the considerable decibel differences between the L_{eq} measurements and the adjusted values when intervals containing documented automotive pass-by events were removed from the short-term measurement data sets (i.e., "without cars"). This change is unsurprising due to the proximity of the real-time sound analyzer to the roadway at ST1 and ST2. Upon removing these intervals, the remaining collected data more accurately depicts the background or a measurement position that is considerably distant from passing road traffic.

Table 3.7-6 presents the arithmetic average L_{eq} of ST1 and LT1.

Table 3.7-6
Average Ambient for ST1/LT1 Measurement Area

	Daytime (L_{eq}, dBA)	Evening (L_{eq}, dBA)	Nighttime (L_{eq}, dBA)
Average L_{eq} without cars	(39+38)/2 = 38	(39+32)/2 = 35	(38+30)/2 = 34
Average L_{eq} with cars	(44+46)/2 = 45	(42+49)/2 = 45	(38+35)/2 = 36

3.7.2 IMPACTS

3.7.2.1 Methodology

Construction

Project construction would take place over a period of 12 months between the hours of 7:00 AM and 7:00 PM Monday through Friday. During construction activities, a varying number of construction equipment and personnel would occupy the Project Area, which would result in varying levels of construction noise. The Project would use conventional construction techniques and equipment, including excavators, bulldozers, heavy trucks (e.g., water truck, dump truck), and similar heavy construction equipment. Specialized construction equipment for logging, foundation building and other tasks using special equipment (e.g., heavy duty cranes) may be needed.

Conventional construction activities would result in a short-term temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would be experienced primarily close to the noise source. The magnitude of the noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction phase(s), and the distance between the noise source and receiver.

Construction noise impacts associated with the Project were assessed with spreadsheet-based noise calculations. User inputs include:

- Distance from source—the distance between the edge of the construction site and the considered receiver.
- Duty cycle—the portion of an hour, in aggregate, that a piece of equipment is energized (stationary or mobile) and creating noise.
- Quantity—the number of equipment pieces or noise-producing events over a specific time period (e.g., equipment utilization per month).
- Hours—the number of daytime hours (up to 12) that represent a typical daily work shift.

These inputs allow sound propagation prediction using the following formula:

$$L_{eq} = \text{Source SPL} + 10 * \log_{10}(\text{Duty Cycle}) + 10 * \log_{10}(\text{Quantity}) +$$

$$10 * \log_{10}(\text{Hours}/12) - 20 * \log_{10}(\text{Distance from Source} / \text{Reference Distance})$$

where source SPL and reference distance describe the typical noise, associated with a single piece of equipment, measured at a pre-defined distance. For instance, a chainsaw may have a source SPL of 78 dBA measured at a distance of 50 feet from its operator. Values for source SPL and reference distance have either been reproduced from available manufacturers' data or calculated from industry-accepted formulas linking sound generation to the rated engine

horsepower of the equipment. Note that for purposes of model conservatism, air and ground absorption effects are not included.

Operation

Once the Project is commissioned and operating normally, the new ambient sound level that can be perceived would be a logarithmic sum of background and Project noise. For a wind project, and aside from non-dominant sources such as electrical substations, operation noise level varies with wind speed at the turbines. When available winds are relatively calm, the turbines emit very little noise compared to what occurs when stronger wind conditions have turbines operating at their highest power generation and, concurrently, highest noise levels. Thus, a wind project's noise level at a particular receptor is primarily determined by the wind speed occurring at the turbine and the distance to the closest turbines.

The Cadna/A® Noise Prediction Model (Version 3.71.125) was used to estimate the project-generated sound pressure levels at the property lines and noise-sensitive receivers. Cadna/A® is a Windows® based software program that predicts and assesses noise levels near industrial noise sources based on International Organization for Standardization (ISO) 9613-2 standards for noise propagation calculations. Routinely used by acoustical professionals to develop sound level predictions from a variety of complex industrial sources, including wind turbines, the model uses these industry-accepted propagation algorithms and accepts sound power levels (in dB re: 1 picowatt) for the nine standard octave bands ranging from 31.5 Hz to 8,000 Hz, as typically provided by the equipment manufacturer and other sources. A comparison of overall reference sound power level (Lw, dBA) for a variety of different manufactures and models, with the power capacity being the primary differentiator is presented in Table 3.7-7. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. Intervening natural and man-made topographical barrier effects were considered as appropriate, including those from structures such as major buildings, tanks, and large equipment.

Table 3.7-8 summarizes octave band sound power level inputs from each type of pre-defined noise source. Given that the exact turbine model to be used for the Project has not yet been determined at the time of this report, conservative but realistic and representative values for the type of equipment being considered for this Project have been used. For example, the model currently uses data from an industry leading 1.8 MW 50/60 Hz wind turbine, at wind speeds of about six meters per second and nine meters per second at 33 feet (10 meters), in accordance with the protocol established in International Electrotechnical Commission Standard 61400-11:2002[16]. The decibel values shown for the two wind turbine generator wind speeds in Table 3.7-8 at each octave band center frequency include a +2 dB margin, which produces an A-

[16] As noted, the modeling is based using conservative and representative values for the type of equipment being considered. The noise model currently uses data from an industry leading 1.8 MW 50/60 Hz wind turbine. The project may use larger wind turbines, up to 2.5 MW, and these could have a different noise profile. However, total project noise would be limited by the 75 MW EFSEC certification. If 1.8 MW turbines were selected, the project could use up to 42 turbines, however if 2.5 MW turbines were selected, only 30 turbines could be built, and overall project noise could be lower.

weighted overall level that represents the top end of a range associated with the manufacturer's warranty values.

Table 3.7-7
Commercial Wind Turbine Sound Reference Data

Manufacturers and Model Nos.	Rating (MW)	dBA	Remarks	References
Enercon E112	4.5	107	at 50 ft (15 m)	(1) Alberts (2006)
Enercon E70	2.0	102	at 50 ft (15 m)	
Vestas V80	1.8	98	lower range	
		109	upper range	
Typical Utility Turbines	unspecified	90	lower range	(2) Rogers (2006)
		105	upper range	
Repower MM92	2.0	105	L_W (weighted)	(3) Illingworth & Rodkin
General Electric 1.5 SLE	1.5	104	L_W (weighted)	
Various Utility Turbines	3.0	109	L_W (weighted)	(4) confidential
	3.0	107	L_W (weighted)	
	1.8	105	L_W (weighted)	
	2.0	108	L_W (weighted)	
Typical	2.4	106		

Sources: (1, 2) Cardno ENTRIX; (3, 4) URS
Notes:
Typical Rating is arithmetic average; Typical dBA is logarithmic average
Noise proximate to a wind turbine comprises gearbox, generator, yaw drive, cooling fans, and related systems inside the nacelle in addition to aerodynamic noise from the rotor blades

Table 3.7-8
Noise Model Sound Level Parameters

Project Component	Type of Source	Sound Power Level in dB at Octave Band Center Frequency (Hz)									Unweighted (linear)	A-Weighted	Acoustic Height (feet)
		31.5	63	125	250	500	1,000	2,000	4,000	8,000			
Wind Turbine at 6m/s wind speed	Point	82.7	88.7	95.3	99.7	101.9	100.7	97.4	88.9	82	106.8	104.7	262
Wind Turbine at 9m/s wind speed	Point	84.9	90.9	97.3	101	103.3	102.6	99.5	91.6	84.4	108.4	106.4	262
Turbine Transformers	Point	60	66	68	63	63	57	52	47	40	72	63	7
Sub Station component	Point	80	86	88	83	83	77	72	67	60	92	83	13

Source: URS internal information and Thomas Mills, personal communication

The Project layout configuration (i.e., the arrangement of wind turbine generators and ancillary equipment on the site) was imported into Cadna/A® from Project files provided by the client. The Cadna/A model consequently predicts hourly sound levels, which would be equal at all times of the day in this case. The formula used to derive the overall SPL (in dBA) from sound power level (PWL) is as follows:

$$SPL = PWL - 20 \text{ Log } (r) - 10.9 + C$$

where r is in meters and C is a dimensionless absorption constant (Harris 1998).

At each studied receptor, the model calculates the acoustical contribution from each input source, which in this exercise using Cadna/A includes all expected wind turbines associated with the Project at locations depicted in Figure 3.7-1. When Project micrositing occurs and final turbine layout and turbine model are arrived at, additional noise modeling can be performed to re-predict operation noise level and re-evaluate anticipated project compliance with the standards discussed in this EIS.

3.7.2.2 Proposed Action

General Construction Noise

Table 3.7-9 shows the predicted construction noise levels experienced at the closest residences to the Project. As per 173-60-050 WAC, construction noise between the hours of 7:00 AM and 10:00 PM are exempt from the receiver noise limit guidelines. Consequently, the calculated values at the three closest receivers comply with the applicable noise standard.

Table 3.7-9
Predicted Construction Noise Levels at Receivers Closest to Project

ID	Description (distance/direction)	EDNA Classification	Construction Sound Level Limit (dBA)	Maximum Project Construction Sound Level (dBA)	Complies with Standard
Receiver 1	Residence 0.48 mile (2560') SE of Tower A1	Class A	Exempt	70	Yes
Receiver 2	Residence 0.8 mile (4265') SW of Tower B16	Class A	Exempt	66	Yes
Receiver 3	Residence 0.38 mile (2000') SE of Tower A1	Class A	Exempt	72	Yes

If it is determined to be necessary, blasting would occur during the turbine foundation portion of the construction schedule and only during daytime hours. Blasting noise could possibly be audible at a considerable distance from the construction site and noticeable at residences near the Project Area. Sound levels from blasting at a receiver would not be extreme, however, and the occurrence would be low in frequency, intermittent, and confined to a period of one to two months. The WAC 173.60.050 exemption for temporary construction noise includes noise from blasting activity, from the aforestated state noise limits between the hours of 7 AM and 10 PM.

The large distances between much of the Project Area and potentially affected residences, the temporary nature of construction, and the restriction of construction activities to daytime hours would serve to minimize potential noise impacts from construction activities. Based on the anticipated noise levels and the timing aspects of these impacts, construction noise impacts are expected to be low.

If Project construction occurred in phases, the effect on the level of noise impacts would be to extend the total duration of temporary disturbance from Project construction, but to reduce the intensity or magnitude of impacts for any individual phase. Construction noise impacts would still be temporary, localized, and low in magnitude, and overall Project impacts during construction would remain low in a phased-construction scenario.

General Operation Noise

The predicted operational noise levels at the three closest residences to the Project are supplied in Tables 3.7-10 and 3.7-11. This analysis evaluates the existing noise levels at the closest receptors, and evaluates increases in dBA at these locations. The Washington noise regulations do not require this information; however, the Applicant supplied this information to fully inform EFSEC during the Application for Site Certificate process. Table 3.7-12 shows the results of a refined predictive noise analyses using the same Cadna/A modeling program as used for the draft EIS, but applying or adding new parameters.

Table 3.7-10
Nighttime Operational Noise Impact Assessment

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
6 m/sec at 10m height							
1	Class A	50	34	36	38	4	Yes
2	Class A	50	35	38	40	5	Yes
3	Class A	50	35	40	41	6	Yes
9 m/sec at 10m height							
1	Class A	50	34	37	39	5	Yes
2	Class A	50	35	39	40	5	Yes
3	Class A	50	35	42	43	8	Yes

Figure 3.7-1 depicts these three residential receivers (for the 9 m/s wind speed, 10°C temperature and 70% relative humidity operation case) in two detail maps as part of a larger aerial plan on which predicted noise contours and other known receiver locations have been superimposed. The operation of the Project would comply with all applicable noise regulations.

Table 3.7-11
Daytime Operational Noise Impact Assessment

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
6 m/sec at 10m height							
1	Class A	60	38	36	40	2	Yes
2	Class A	60	38	38	41	3	Yes
3	Class A	60	38	40	42	4	Yes
9 m/sec at 10m height							
1	Class A	60	38	37	41	3	Yes
2	Class A	60	38	39	41	3	Yes
3	Class A	60	38	42	43	5	Yes

Table 3.7-12
Refined Noise Analysis

Key DEIS Scenario Parameter	Scenario A	Scenario B	Scenario C	Scenario D	Original Results
Wind Turbines Operating	All ON	All ON	A1-A7 OFF	All ON	All ON
Wind Speed (meters per second)	12	12	12	12	12
Wind Speed (miles per hour)	27	27	27	27	27
Wind Direction	West	West	West	West	West
Temperature (°C)	0	0	10	10	10
Temperature (°F)	32	32	50	50	50
Relative Humidity (percent)	10	90	70	70	70
Cadna/A Modeling Results (Project only)					
Residence 1 (SPL, dBA)	36.6	43.3	28.4	44.3	39.4
Residence 2 (SPL, dBA)	19.3	28.1	29.2	29.4	38.2
Residence 3 (SPL, dBA)	40.2	45.5	24.9	46.3	41.6
Difference Between Original and Refined Results (Project only)					
Residence 1 (SPL, dBA)	-2.8	3.9	-11.0	4.9	n/a
Residence 2 (SPL, dBA)	-18.9	-10.1	-9.0	-8.8	n/a
Residence 3 (SPL, dBA)	-1.4	3.9	-16.7	4.7	n/a

Source: URS

Under certain conditions, there is the potential for one or more of the following phenomena to occur that may temporarily cause a variance in the predicted sound levels:

- In the Cadna/A prediction model, all studied wind turbine generators were assumed to operate at the same speed. In reality, very slight differences in operating rotor speeds due to non-uniformities in the passing wind profile can result in intermittent constructive and destructive interference—or what one might call "beats," that can have a perceptible frequency as current research suggests (van den Berg 2006).

- The atmosphere can either be "stable" or "unstable," which in summary are descriptors for how layers of air mass interact. The latter of these two is usually associated with cold air near the ground that is not well coupled to higher air masses. This effect can explain why high wind speeds at wind turbine generator hub height can be substantially greater than those near ground level (van den Berg 2006).

- The relative humidity and ambient temperature have a substantial effect on the attenuation of outdoor sound at high frequencies and long distances through air absorption. Relative humidity and temperature effects can produce a variance of approximately +/- 2 dBA.

- The uncertainty range for the PWL of each wind turbine generator is +/- 2 dBA.

- Due to the very low ground wind speeds recorded during the short-term measurements, actual ambient noise levels at any receiver in the Project vicinity may be higher as a result of noise generated by turbulence from wind streaming through vegetative ground cover (i.e., trees and grasses). Further, since wind-generated noise tends to rise at a rate of 2.5 dBA per 1 m/s increase in wind speed, and generally turbine aerodynamic noise rises at a rate of only 1 dBA per 1 m/s increase in wind speed, high wind speeds near the ground may cause background sound (i.e., not Project operation) to dominate the perceptible and even measurable ambient sound environment (BLM 2005).

Because predicted Project operation sound pressure levels at the nearest noise-sensitive receivers are at least 7 dBA lower than the 50 dBA L_{eq} compliance threshold, none of these above conditions is expected to result in the Project operation exceeding noise regulations.

Low Frequency Sound

Low frequency noise produced by a wind turbine generator can include tonal components produced by the generator and gearbox within the nacelle downstream of the rotor hub, atop the tower mast. The source sound power levels in Table 3.7-8 already include these noise contributors. Modern wind turbine design typically includes sound attenuation features in the nacelle to help reduce the magnitude of these electro-mechanical noise components to the aggregate, so that the spectrum of sound levels at the octave band center frequencies shown in Table 3.7-8 largely describes the aerodynamic effects of the rotor blades interacting with the passing wind profile. Even though there are no relevant regulations and standards related to dBC, the turbine sound power level manufacturer ratings show that C-weighted levels are within

2 dB of A-weighted levels. Therefore, low frequency noise is not anticipated to be an issue for this Project.

In earlier generations of wind turbine design, the practice of using downwind rotors allowed turbulence from the tower mast to disrupt favorable aerodynamic conditions for the passing blades, causing considerable low frequency noise. This practice has been abandoned by the contemporary upwind rotor design of virtually all wind turbine generators built in the past five years, including the models contemplated for this Project.

The noise produced by air interaction with the rotor blades tends to be broadband noise, but is amplitude-modulated as the upstream blades pass the tower, resulting in what some call a characteristic "swoosh." The blade passage frequency of this "swoosh" is only a temporal modulation of sound and should not be confused with low frequency sounds. Research studies of low-frequency noise emissions from wind turbines have determined that low frequency noise is a function of the wind itself, and that the "swoosh" of the turbines is actually in the readily audible range of frequencies (500 to 1 kiloHertz) (Leventhall 2006). Virtually any sound can be time-modulated without changing its pitch. Thus, low frequency modulation of audible sound does not imply the presence of actual low frequency sound or infrasound, which is discussed in the following subsection.

Table 3.7-13 shows differences in dBA and dBC predicted at the three representative receivers R1, R2, and R3 rather than at the source (the wind turbines). Information regarding potential impacts from exposure to low frequency noise is inconclusive. Scientific articles suggest that low frequency noise does not pose a health risk (Leventhall 2006). There may, however, be some correlation between an individual receptor's psychological sensitivity to the noise source (like or dislike for the noise source) and complaints regarding discomfort from that noise source. These are sometimes associated with complaints regarding sleep disturbance. Figure 3.7-2 illustrates the thresholds of human hearing at low frequencies. Because sensitivity to noise can be influenced by such psychological factors and can subjectively be deemed significant by an affected individual, regardless of measurable frequency or amplitude level, it is difficult to quantify these impacts or to impose mitigation. However, modern turbine designs have been modified to reduce or eliminate low frequency sound.[17]

[17] See, for instance, http://www.bwea.com/ref/lowfrequencynoise.html.

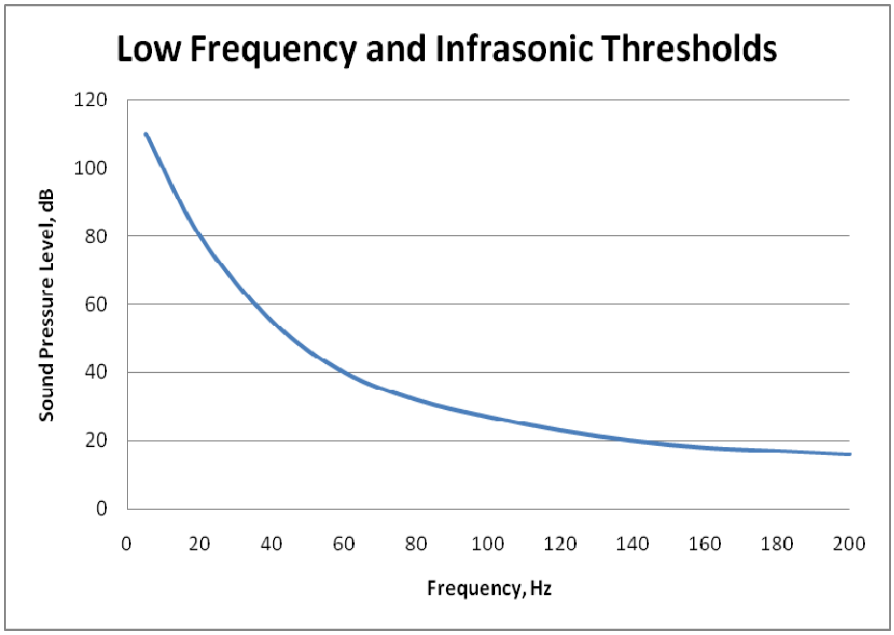
Table 3.7-13
Results of Comparison of dBC vs. dBA Levels

Key DEIS Scenario Parameter	Scenario A	Scenario B	Scenario C	Scenario D	Original Results
Wind Turbines Operating	All ON	All ON	A1-A7 OFF	All ON	All ON
Wind Speed (meters per second)	12	12	12	12	12
Wind Speed (miles per hour)	27	27	27	27	27
Wind Direction	West	West	West	West	West
Temperature (°C)	0	0	10	10	10
Temperature (°F)	32	32	50	50	50
Relative Humidity (percent)	10	90	70	70	70
Cadna/A Modeling Results (Project only)					
Residence 1 (SPL, dBA)	36.6	43.3	28.4	44.3	39.4
Residence 2 (SPL, dBA)	19.3	28.1	29.2	29.4	38.2
Residence 3 (SPL, dBA)	40.2	45.5	24.9	46.3	41.6
Cadna/A Modeling Results (Project only)					
Residence 1 (SPL, dBC)	41.4	45.9	33.0	46.6	42.0
Residence 2 (SPL, dBC)	32.3	35.2	35.3	35.5	41.5
Residence 3 (SPL, dBC)	43.7	47.6	30.3	48.2	43.8
Difference Between dBC and dBA Results (Project only)					
Residence 1 (SPL, dBC minus dBA)	4.8	2.6	4.6	2.3	2.6
Residence 2 (SPL, dBC minus dBA)	13.0	7.1	6.1	6.1	3.3
Residence 3 (SPL, dBC minus dBA)	3.5	2.1	5.4	1.9	2.2

Source: URS

Figure 3.7-2
Low Frequency and Infrasonic Normal Hearing Thresholds

Figure 1, Leventhall 2006	
Frequency, Hz	**SPL, dB**
5	110
20	80
40	55
60	40
80	32
100	27
120	23
140	20
160	18
180	17
200	16



Source: Leventhall, Geoff. 2006. Infrasound from Wind Turbines - Fact, Fiction or Deception. Canadian Acoustics, Volume 34, Number 2.

Infrasound

The term infrasound describes sound with frequencies of 20 Hz or less that are generally considered below the threshold of human hearing. Such sound, if sufficiently high in magnitude, can still be perceived or even heard as induced by vibration. Natural sources of infrasound include waves, thunder, wind, and even certain species of wildlife.

A review of wind turbine noise measurement studies conducted by Jakobsen (2005) concluded that operation of contemporary wind turbine generators featuring rotors "upwind" of tubular tower masts generated infrasound in the range of 70 G-weighted decibels (dBG) at a distance of one hundred meters. (The G-weighting scale, like the oft-used A-weighting scale for audible sound spectra, is a filter applied to low-frequency sound as described in ISO 7196:1995E.) Jakobsen also notes that this infrasound, usually associated with aerodynamic effects of blade passage past the tower mast, tends to ignore atmospheric sound absorption and ground attenuating effects due its very large wavelength. Hence, one could reasonably expect infrasound to attenuate only with increasing propagation distance.

Recent studies performed for the Canadian Wind Energy Association have described usage of 85–90 dBG as a criterion for human perception of infrasound and, by reasonable extension, the likely threshold for infrasound complaint (HGC Engineering 2006).

The horizontal distances of the Project wind turbines to the nearest noise-sensitive receivers are at least 615 meters, which provides sufficient attenuation to offset the amount of decibels that one might add to account for the quantity of wind turbines of the Project. Thus, the expected infrasound at the nearest existing receivers (i.e., R1 and R2) would remain under an estimated value of 70 dBG, which is 15 dBG less than the previously stated criteria. This estimated Project aggregate wind turbine generator infrasound level also is far below what NASA studies determined (125 dB, linear) as a threshold for potential health impacts (HGC Engineering 2006).

Project Decommissioning

In compliance with WAC 463-72 Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days of Project decommissioning. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major noise issues presently anticipated, including noise impacts from construction activities related to removal of the wind generation equipment and site restoration. If impacts to noise are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.7.2.3 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed. Existing sound levels would be expected to remain largely the same. Although the generally quiet ambient noise levels in the Project Area would continue, occasionally elevated noise levels in the immediate Project vicinity would be expected from ongoing timber harvest activities at the Project Area.

3.7.3 MITIGATION

The following mitigation measures are identified to avoid, minimize, and compensate for potential noise-related impacts during construction and operation of the proposed Project to the extent feasible.

- Equip all noise-producing Project equipment and vehicles using internal combustion engines with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.

- Regulate all mobile or fixed noise-producing equipment used on the Project for noise output governed by local, state, or federal agency regulations, to comply with such regulations while in the course of Project activity.

- Designate that the use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, would be for safety warning purposes only. Unless required for such safety purposes, and as allowable by applicable regulations, no construction-related public address, loudspeaker, or music system would be audible at any adjacent noise-sensitive land use.

- Implement a noise complaint process and hotline number for the surrounding community. The Applicant would have the responsibility and authority to receive and resolve noise complaints.

3.7.4 UNAVOIDABLE ADVERSE IMPACTS

Construction noise is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA L_{eq} per Washington State and Skamania County regulations.

The analysis of noise impacts presented here was based on specific design features of the proposed Project that were current as of the date of this Draft EIS. These features, such as the turbine manufacturer and model selection, the layout of the turbines in the Project Area and their corresponding distances to identified closest noise-sensitive receivers, can greatly influence the analysis results. However, assuming that final turbine selections and siting locations are comparable to those features used in this analysis, no substantial adverse construction or operation noise impacts are anticipated for the Project.

3.7.5 REFERENCES

Bureau of Land Management (BLM). 2005. Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States. U.S. Department of the Interior. FEIS 05-11. June. Accessed October 30, 2009 at: http://windeis.anl.gov/documents/fpeis/index.cfm.

California Department of Transportation (Caltrans). 1998. Technical Noise Supplement. October.

Federal Transit Authority (FTA). 2006. *Transit Noise and Vibration Impact Assessment.* FTA-VA-90-1003-06. Office of Planning and Environment.

Harris, Cyril M. 1998. *Handbook of Acoustical Measurements and Noise Control*. Third Edition. p. 3-2, Eq. 3.2a.

HGC Engineering. 2006. *Wind Turbines and Infrasound*. Submitted to Canadian Wind Energy Association. November.

International Organization for Standardization (ISO). 1996a. Acoustics – description and measurement of environmental noise – Part 1: Basic quantities and procedures. Ref. No. ISO 1996/1-1982 (E).

———. 1996b. Acoustics – description and measurement of environmental noise – Part 2: Acquisition of data pertinent to land use. Ref. No. ISO 1996-2:1987 (E).

———. 1996c. Acoustics – description and measurement of environmental noise – Part 3: Application to noise limits. Ref. No. ISO 1996-3:1987 (E).

Jakobsen, Jorgen. 2005. Infrasound Emission from Wind Turbines. *Journal of Low Frequency Noise, Vibration and Active Control* 24, no. 3:150.

Leventhall, Geoff. 2006. Infrasound from Wind Turbines – Fact, Fiction or Deception. *Canadian Acoustics* 34, no. 2:29-36.

Mills, Thomas. Vestas Wind Systems. Email to Mark Storm, URS Corporation, October 19, 2007.

US Environmental Protection Agency (USEPA). 1974. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. EPA 550/9-74-004.

van den Berg, G. P. 2006. The sound of high winds: the effect of atmospheric stability on wind turbine sound and microphone noise. *Rijksuniversiteit Groningen*.

3.8 LAND USE AND RECREATION

This section describes the existing land uses and recreation areas at the Project Area and in surrounding areas, and identifies potentially applicable land use policies and zoning ordinances. This section also discusses potential Project impacts on land use and recreation, as well as the consistency of the proposed Project with local land use plans and zoning ordinances.

3.8.1 AFFECTED ENVIRONMENT

3.8.1.1 Existing Land Use

Project Area

The Project Area is located in an unincorporated portion of southeastern Skamania County, Washington, about two miles north of the Columbia River (see Figure 1-1). The primary use at the Project Area is commercial forestry. The site has been used for this purpose for the last century. During this time, the owners and operators have logged the property over a series of approximately 50-year logging rotations. Ongoing tree farming activities include regular clearing, replanting, and harvesting.

Portions of the Project Area are also used for utility corridors. A natural gas pipeline, owned and operated by Williams Gas, runs from east to west across the Project Area near the north boundary of the site. Two existing transmission line corridors also cross the Project. These approximately 250-foot wide corridors, which generally run in an east-to-west direction, are owned and maintained by BPA. Each corridor is occupied by a high-voltage transmission line and its associated support towers and access roads. The corridors are routinely maintained to remove all tall growing vegetation, as well as any adjacent "danger trees" (i.e., those trees with the potential to fall into the existing lines) in order to avoid interference with these lines.

Surrounding Areas

Land use in the Project vicinity is predominately commercial forestry with other typical rural uses and both incorporated and unincorporated communities dispersed throughout (see Figure 3.8-1). The incorporated cities of White Salmon and Bingen, Washington are located adjacent to each other approximately 7 miles southeast of the Project Area, along the north side of the Columbia River. Directly south and across the Columbia River from Bingen is the City of Hood River, in Hood River County, Oregon. The city of Stevenson, the Skamania County seat, is located approximately 15 miles southwest of the Project Area along the Columbia River. These incorporated cities have mixed urban uses typical of small communities.

In the more immediate vicinity of the Project Area, the unincorporated community of Willard is located approximately 2.25 miles northwest of the Project Area, and the unincorporated community of Mill A is located approximately 1.5 miles west of the site. Other residential uses in the immediate vicinity of the Project Area are generally rural, low- to medium-density single-family homes between 30 and 50 years old. There are approximately 400 residences and businesses within three miles of the Project Area (see Figure 3.8-2). A new homesite location has been approved approximately 2,000 feet (0.38 mile) from the south property line of the Project Area.

Commercial forestry areas and the Gifford Pinchot National Forest are generally located to the north of the Project Area. East of the Little White Salmon River, lands are currently being used for commercial timber production under ownership by S.D.S. Co., LLC, Broughton Lumber Company, and Washington State. The Washington State lands are managed by DNR for commercial harvest to support the State's schools.

To the south of the Project Area is the Columbia River Gorge National Scenic Area (see Figure 3.8-3). The Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. In addition to forested areas, land uses within the Scenic Area near the Project Area on the Washington side of the Columbia River include limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards. On the Oregon side of the Columbia River, land use within the Scenic Area is predominantly commercial timber production and residential. Further south of the Scenic Area in Oregon, land uses include commercial forestry, agriculture (primarily pears, apples, and cherries), and some residential.

SR 14 and the Burlington Northern Santa Fe Railway are located between the Project Area and the Columbia River, within the Scenic Area. I-84 is located on the Oregon side of the Columbia River, within the Scenic Area.

3.8.1.2 Recreation

The primary recreation activities within Skamania County are camping, hiking and fishing. Major recreation locations include the Gifford Pinchot National Forest; the Mount St. Helens National Volcanic Monument; the Lewis and Clark Trail Highway, which follows the Columbia River through Skamania County; and the Columbia River Gorge National Scenic Area south of the Project Area. Informal recreational activities such as hunting, hiking, and mountain biking also take place on private land, subject to landowner approval. There are no formally designated recreational areas within the Project Area; however, the Applicant would allow informal recreational use of their land with approval.

Summer recreational activities include water sports such as fishing, swimming, boating, river rafting, kayaking, water skiing, and wind surfing; as well as camping, biking, hiking, horseback riding, hunting, picnicking, and other outdoor sports. Some of these activities continue into the winter, weather permitting. Sightseeing is a popular year-round activity in the Columbia River Gorge. Recreational facilities within approximately 25miles of the Project Area are shown in Figure 3.8-3 and listed in Table 3.8-1.

The closest recreational facility is the Underwood Park and Community Center, located near Underwood just off of Cook-Underwood Road, approximately 1.5 miles east of the Project Area. The community center has a large gymnasium, stage, kitchen, and meeting room; while the park has soccer fields, a pavilion, and a playground. Recreational facilities or activities available closest to the Project Area include hiking and horseback riding along Buck Creek Trail, Husum Hills Golf Course, BZ Corners Boat Launch, Underwood Park/Community Center, and Drano Lake Boat Ramp.

There are no Skamania County recreation facilities within five miles of the proposed Project. However, two national trails, the Lewis and Clark National Historical Trail and the Oregon National Historic Trail, are located within 5 miles of the Project Area. These trails roughly follow SR 14 and I-84, respectively. Also within 5 miles of the site, the White Salmon River is designated as a Wild and Scenic River, and within 25 miles, the Klickitat River is also so designated.

There are no new parks or recreation facilities planned within a 5-mile radius of the site, either as part of the Skamania County Parks and Recreation Master Plan or the Columbia River Gorge National Scenic Area Management Plan. No federal recreation regulations apply to the site, nor are there federal or state plans for recreation facilities on or near the site.

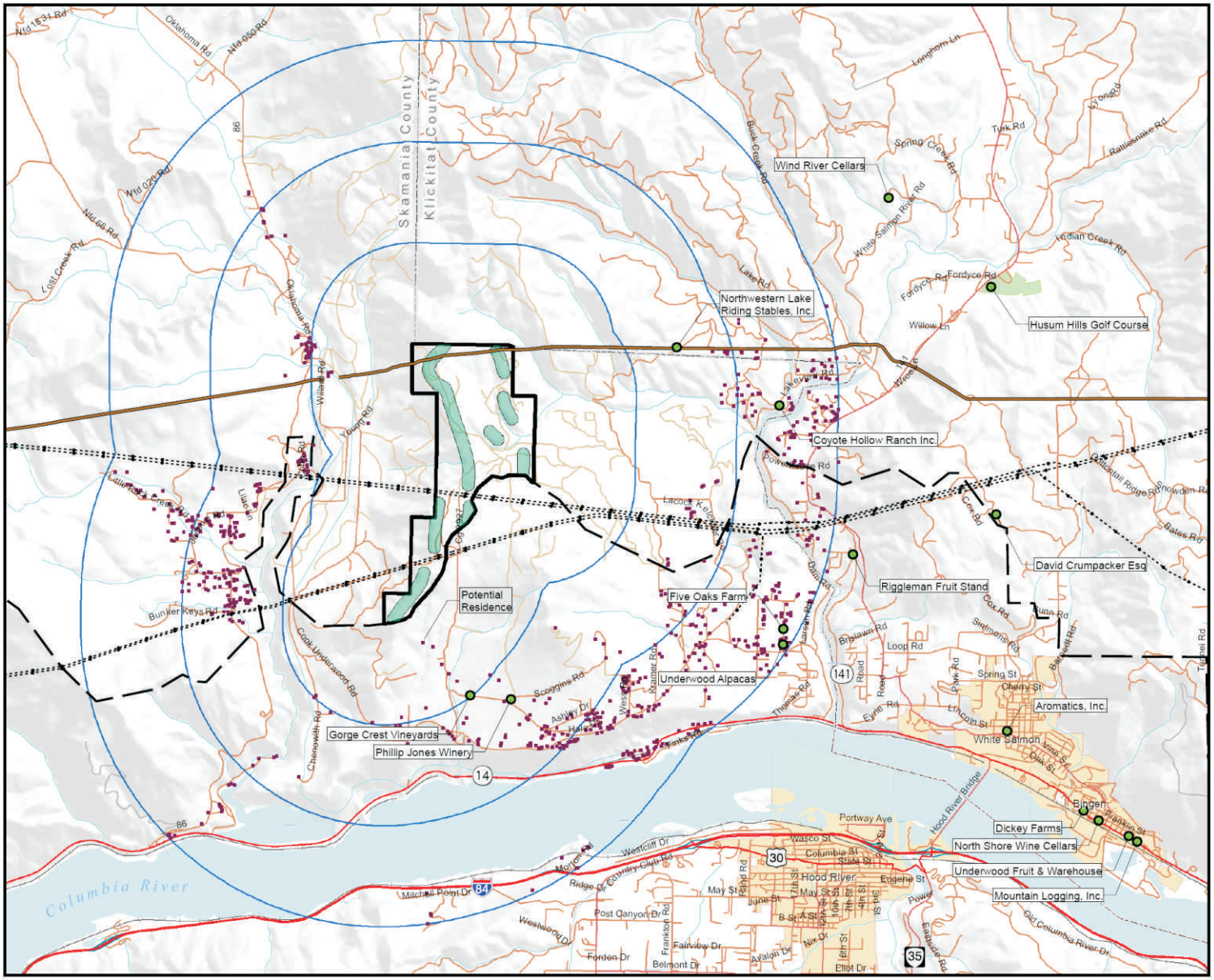


Figure 3.8-1

Residences within Three Miles of the Project Site

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

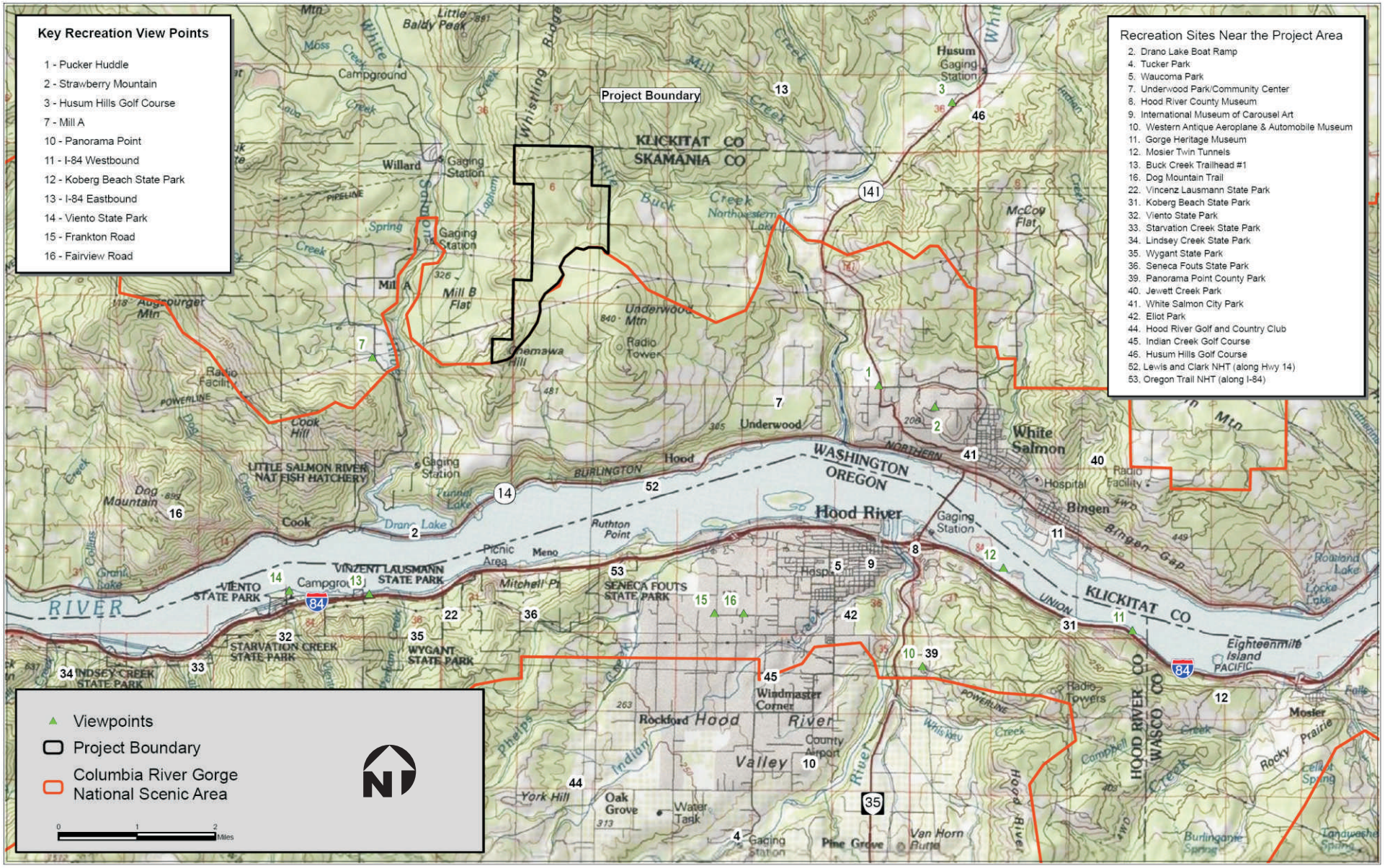


Figure 3.8-2

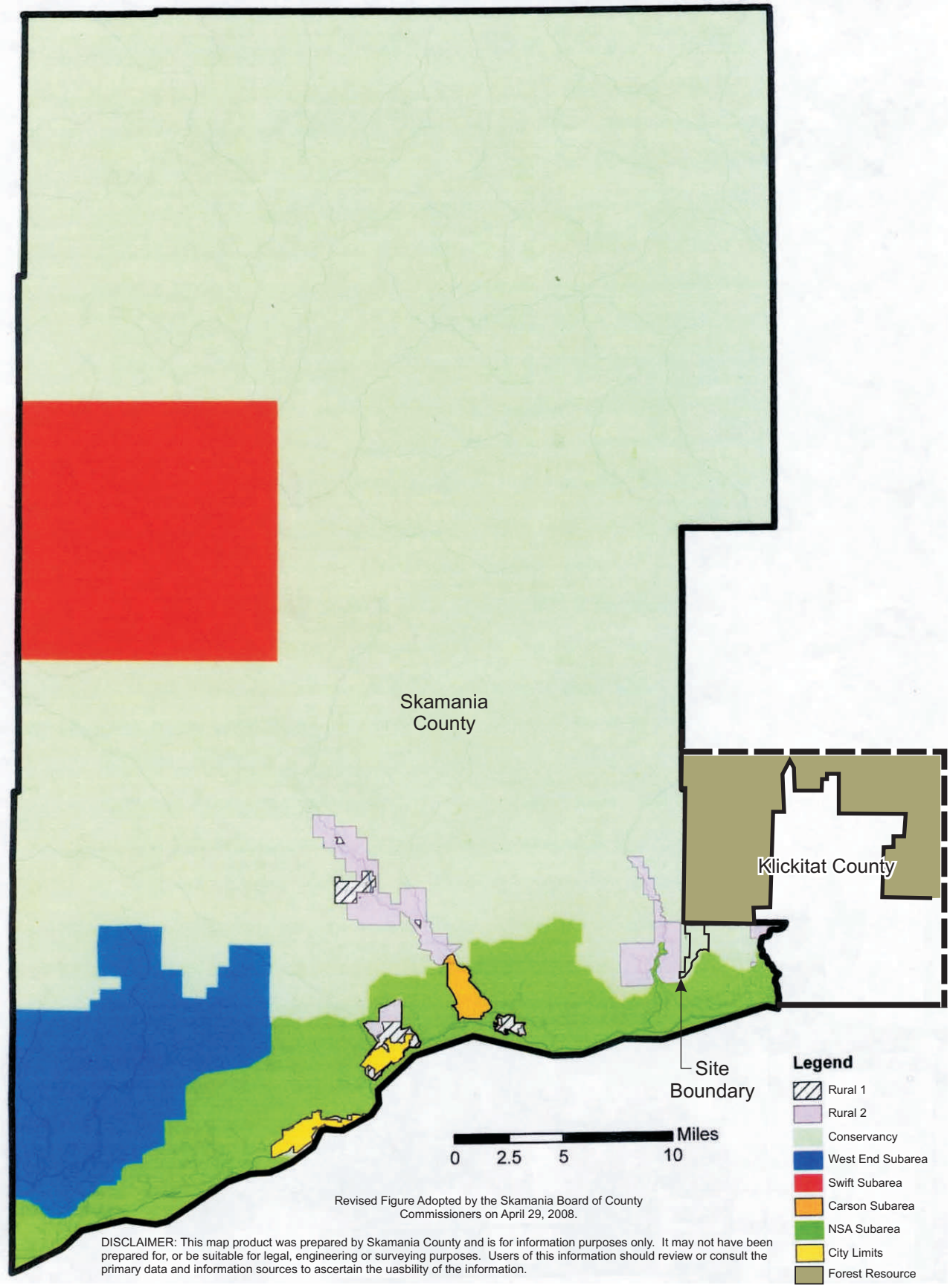
Recreation Facilities within Five Miles of the Project Site

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

33758687_107.cdr



N

Source: Skamania County.

Figure 3.8-3

Skamania and Klickitat Counties Comprehensive Plan Designations

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.8.2 APPLICABLE LAND USE REGULATIONS

Skamania County has two independent sets of land use regulations. The first is a stand-alone zoning code (SCC Title 22) that regulates uses and development within the General Management Area (GMA) and Special Management Area (SMA) of the Columbia River Gorge National Scenic Area). The Scenic Area Code is based on the Management Plan for the Scenic Area, which is overseen by the USFS and Columbia River Gorge Commission, as directed by the National Scenic Area Act.

The remainder of unincorporated Skamania County, as well as those portions of the Scenic Area classified as Urban Areas (such as White Salmon, Bingen, and Hood River), is governed by the Skamania County Comprehensive Plan, zoning regulations in SCC Title 21, and Titles 20, Shorelines, and 21A, Critical Areas.

Because the Project Area is located outside of the National Scenic Area, land use at the site is regulated by the Skamania County Comprehensive Plan and SCC Titles 21, 20, and 21A. In addition, although the Project Area is immediately adjacent to the National Scenic Area, the National Scenic Area Act expressly provides that land use regulations developed for the National Scenic Area do not apply to adjacent area. Section 544O(a)(10) of the Act states:

> *Nothing in Sections 544 to 544p of this title shall establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas*.

16 USC §544O(a)(10). The remainder of this section therefore focuses on describing potentially applicable provisions of the Skamania County Comprehensive Plan and SCC Titles 21, 20, and 21A. For additional information of the provisions of the National Scenic Area Act, see Section 4.11 of this EIS.

Table 3.8-1
Public Park and Recreation Facilities within 25 Miles

National Scenic Areas and Trails	Klickitat County Parks
Columbia River Gorge National Scenic Area	Klickitat County Park
Lewis and Clark National Historic Trail	Hood River County Parks
Oregon Trail National Historic Trail	Tucker Park
Washington State Parks	Panorama Point County Park
Columbia Hills State Park	Tollbridge County Park
Doug's Beach State Park	City of White Salmon
Oregon State Parks/Campgrounds/Trails	Jewett Creek Park
Lindsey Creek State Park	White Salmon City Park
Starvation Creek State Park	City of Hood River
Viento State Park	Eliot Park
Wygant State Park	Waucoma Park
Seneca Fouts State Park	Golf Courses
Koberg Beach State Park	Husum Hills Golf Course
Memaloose State Park	Indian Creek Golf Course
Mayer State Park	Hood River Golf and Country Club
Lang Forest State Park	Carson Hot Springs Golf Course and Resort
Wyeth Campground	Skamania Lodge Golf Course
Historic Columbia River Highway State Trail - Twin Tunnels Segment (Mosier Twin Tunnels)	The Dalles Country Club
USFS Wilderness Area / Parks / Trails/Boat Launches	Northwest Aluminum Golf Club
BZ Corners Boat Launch	Museums and Sightseeing
Mark O. Hatfield Wilderness	Hood River County Museum
Balfour-Klickitat Park	Western Antique Aeroplane & Automobile Museum
Dog Mountain Trail	International Museum of Carousel Art
Herman Creek Trail	Gorge Heritage Museum
Washington State Department of Natural Resources	Columbia River Gorge Interpretive Center
Buck Creek Trail	Bonneville Lock and Dam Visitor Complex
Skamania County Parks/Campgrounds/Launches	Columbia Gorge Discovery Center
Home Valley Campground	Wasco County Historical Museum
Underwood Park/Underwood Community Center	Fort Dalles Museum
Big Cedars County Park	Sternwheeler Cruises
Wind River Boat Ramp	
Drano Lake Boat Launch	
Skamania County Fairgrounds	
Rock Creek Community Center	

3.8.2.1 Skamania County Comprehensive Land Use Plan

On July 10, 2007, Skamania County adopted its current Comprehensive Plan, which includes three Subarea Plans. The Project Area is not located in one of these subareas. There are three land use designations outside of the specific subarea plans: Rural I, Rural II, and Conservancy (see Figure 3.8-4). The Project Area is designated as Conservancy. The Comprehensive Plan

identifies zoning that is consistent with the Conservancy designation, including: Residential 10 (R-10), Rural Estates 20 (RES-20), Resource Protection (FOR/AG 10 and 20), Commercial Resource Land 40 (CRL 40), Natural (NAT), and Unmapped Classification (UNM).

The alternative location of the Operations and Maintenance facility is in the Rural II designation of the Comprehensive Plan. Most residential zoning classifications are consistent with the Rural II designation, as are the FOR/AG 10 and 20, NAT, and UNM zoning classifications.

The overall Comprehensive Plan vision statement is:

> *Skamania County is strongly committed to protecting our rural character and natural resource based industries while allowing for planned future development that is balanced with the protection of critical resources and ecologically sensitive areas, while preserving the community's high quality of life.*

Natural resources-based industry is further encouraged in the Comprehensive Plan's description of the intent of the Conservancy designation:

> *The Conservancy land use area is intended to provide for the conservation and management of existing natural resources in order to achieve a sustained yield of these resources, and to conserve wildlife resources and habitats. Much of the Conservancy land use area is characterized by rugged terrain, steep in slope, and unsuitable for development of any kind. Logging, timber management, agricultural and mineral extraction are main use activities that take place in this area. Recreational activities of an informal nature such as fishing, hunting, and hiking occur in this area, although formal recreational developments may occur from time to time. Conservancy areas are intended to conserve and manage existing natural resources in order to maintain a sustained resource yield and/or utilization.*

Among the uses identified as appropriate in the Conservancy designation are: public facilities, utilities, utility substations, forest management (including temporary logging and mining camps), and surface mining (by conditional use).

The Rural II designation is described in the Comprehensive Plan as follows:

> *"The Rural II land use area is intended to provide for rural living without significant encroachment upon lands used for agriculture and timber. This land use area is the middle developmental range level suggested by this plan. The lower density will help to protect agricultural and timber lands from dense residential type development, and should maintain the rural character of this designation."*

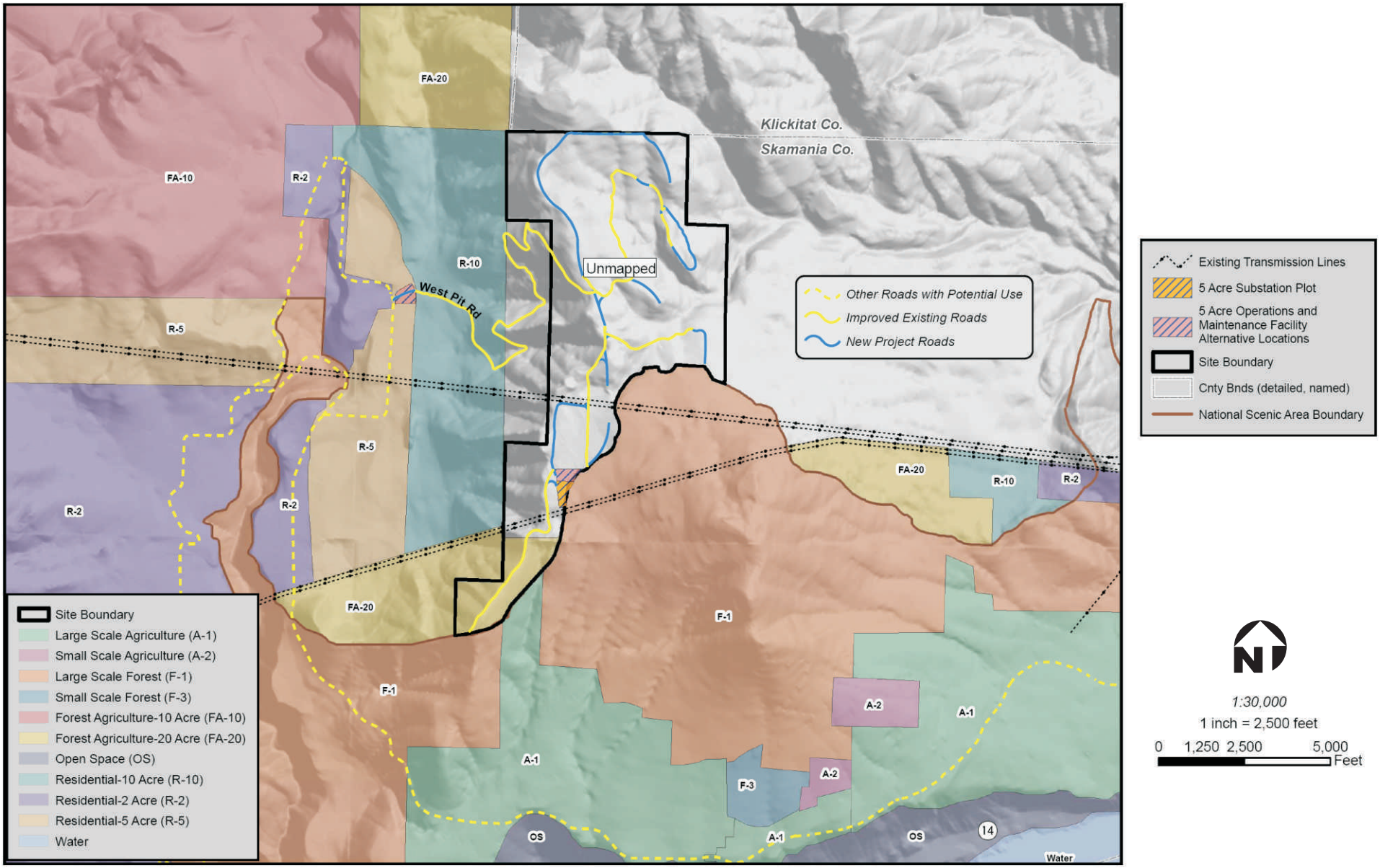


Figure 3.8-4
Skamania County Zoning

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Among the non-residential uses identified in the Comprehensive Plan as appropriate in the Rural II designation are public facilities, utilities, utility substations, telecommunication facilities, hospitals, meeting halls, agriculture, forest management including temporary logging and mining camps, and surface mining.

The following identifies potentially applicable goals and policies in the Comprehensive Plan.

Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).

Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possible by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.

Goal LU.2: To provide for orderly future physical development of Skamania County.

Policy LU.2.4: Encourage new commercial enterprises to locate within or near existing commercial areas to avoid further scattering and to better serve the public.

Goal LU.3: To coordinate public and private interests in land development.

Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.

Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.

Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.

Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.

Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.

Policy LU.5.6: Encourage commercial development that is convenient, safe and pleasant to the general public by: requiring that new establishments provide off-street parking adequate for its needs. Encourage pooled or joint use parking areas for adjacent developments may be utilized; Regulate access points for vehicular traffic for commercial areas to prevent unsafe conditions; the design of commercial sites, buildings, and signs should be compatible with surrounding areas; and, landscaping may be required as a buffer when commercial use adjoins residential or farm property.

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water, and energy resources.

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.2: Continue the priority of increasing safety of the Skamania County rural 2-lane road system. The majority of the Public Works Department's future efforts will be to reduce the accident rate with Skamania County.

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance.

Goal AHP.2: Increase recognition of historic, archaeological, and cultural resources.

Goal AHP.3: Protect historic, archaeological and cultural resources through a comprehensive planning approach.

3.8.2.2 Skamania County Zoning Ordinance SCC Title 21

Title 21 of the Skamania County Zoning Ordinance is the county zoning that applies to the Project Area. Although extensive updates of SCC Title 21 have been proposed for adoption, the last-adopted version is still in effect ~~because the proposed updates are currently under appeal by local interest groups~~.

Under SCC Title 21, the Project Area is located primarily in the UNM zone, with the southern tip of the Project Area in the FOR/AG 20 zone (see Figure 3.8-5). Both of these zoning classifications are consistent with the Comprehensive Plan's Conservancy designation for this area. None of the Project Area is designated as farmland.

Approximately 7,152 acres of the 1,152-acre Project Area are located in the UNM zone. UNM zones are those areas of the county where no formal adoption of any zoning map has taken place. The Skamania County Code provides:

> *In the UNM zone all uses which have not been declared a nuisance by statute, resolution, ordinance or court of jurisdiction are allowable. The standards, provisions, and conditions of this title [SCC Title 21] shall not apply to unmapped areas.*

SCC 21.64.020. Nuisances established by the Board of County Commissioners by resolution and ordinance are identified in SCC 8.30.010; this provision of the County Code does not identify wind energy facilities as a nuisance. In addition, neither the RCW nor the WAC designate wind energy facilities as a nuisance.

In July 2007, the County adopted a moratorium on unincorporated UNM-zoned lands outside the Swift Subarea. The moratorium does not prohibit all development in UNM lands. Rather, it restricts three types of land uses: (1) issuance of building permits on lands created by deed since January 2006 that are 20 acres or larger; (2) land divisions (short plat and subdivision); and (3) acceptance of SEPA checklists in support of converting land to non-forestry uses.

The remainder (approximately 400 acres) of the Project Area is located within the FOR/AG 20 zoning classification (see Figure 3.8-5). Pursuant to SCC 21.56.010[A]), the purpose of this zone is:

> *To provide land for present and future commercial farm and forest operations in areas that have been and are currently suitable for such operations, and to prevent conflicts between forestry and farm practices and nonresource production uses by not allowing inappropriate development of land within this zone classification.*

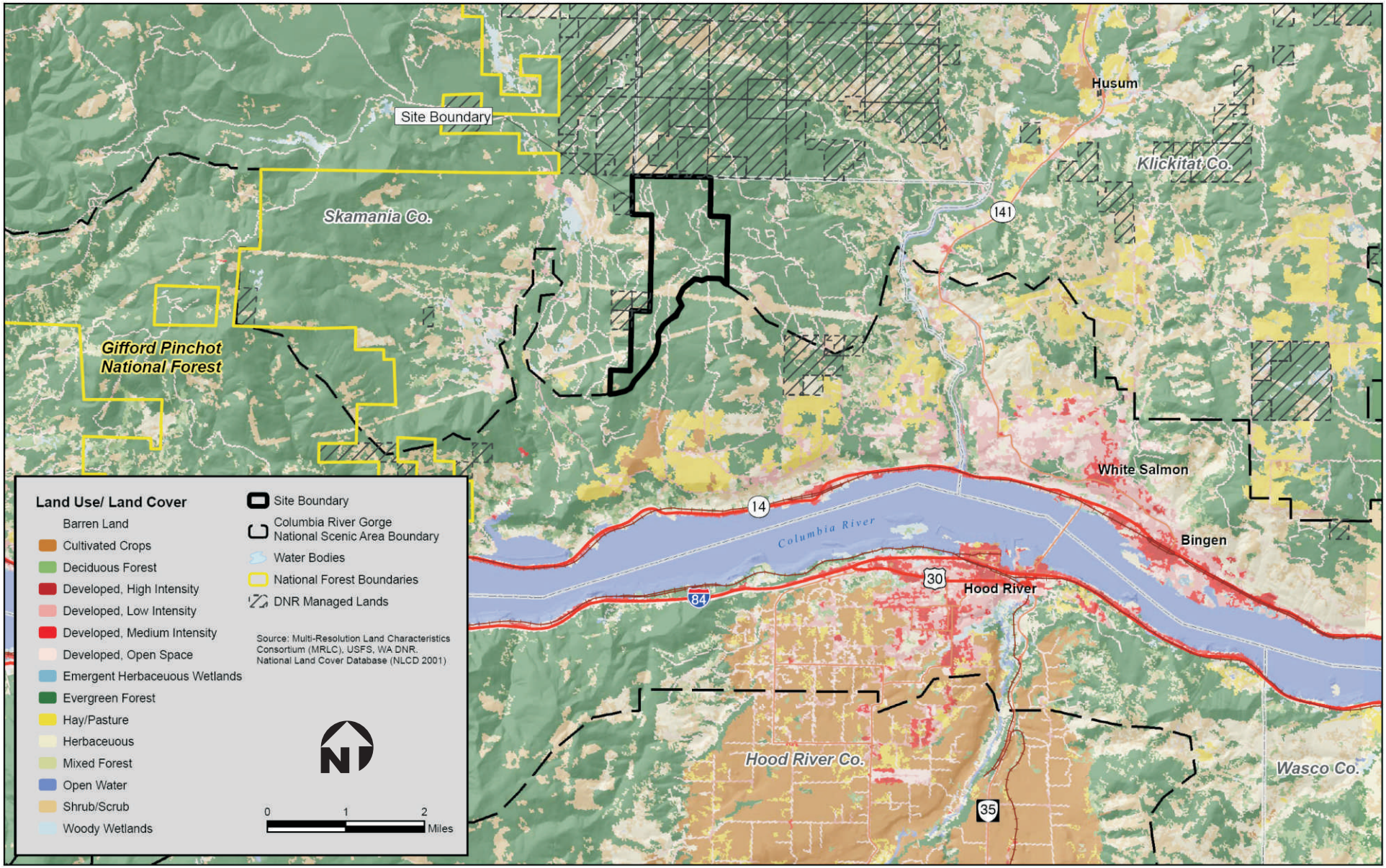


Figure 3.8-5

Land Use within Five Miles of the Site

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Uses allowed outright in the FOR/AG 20 zone include the following:

A. *Forestry practices and associated management activities of any forest crop in accordance with Washington Forest Practices Act of 1974 including timber, Christmas trees, nursery stock, and surface mining.*
B. *Commercial and domestic agriculture.*
C. *Orchards and vineyards.*
D. *Horticulture.*
E. *Cottage occupation (in accordance with Chapter 21.70).*
F. *Light home industry (in accordance with Chapter 21.70).*
G. *Management of unique biological areas.*
H. *Management and propagation of fish and wildlife.*
I. *Water resources management facilities.*
J. *Storage of explosives, fuels and chemicals.*
K. *Accessory uses normally associated with an allowable use.*
L. *Public and private conservation areas or structures for retention of water, soil, open space, forest, or wildlife resources.*
M. *Log sorting and storage areas, scaling stations, temporary crew quarters, forest industry storage and maintenance facilities.*
N. *Family day care home (in accordance with Section 21.86.020).*
O. *Residential care facilities (in accordance with Chapter 21.85).*
P. *Farm labor housing.*
Q. *Accessory equipment structures.*
R. *Attached communication facilities not located on BPA towers (in accordance with Section 21.70.160).*

Uses allowed by Conditional Use Permit in the FOR/AG 20 zone include:

A. *Individual single-family residences not provided in conjunction with forest or farm management, including residential and resource related development may be permitted conditionally, provided they meet (…additional listed conditions).*
B. *Recreational facilities.*
C. *Semi-public facilities and utilities.*
D. *Sawmills, shake and shingle mills, chippers, pole and log yards.*
E. *Geothermal energy facilities.*
F. *Aircraft landing fields.*

G. Cluster developments.

H. Child mini-day care center (in accordance with Section 21.86.030).

I. Child day care center (in accordance with Section 21.86.040.

The alternative Operations and Maintenance facility site is located approximately 0.9 mile west of the Project Area in the R-5 zoning classification (see Figure 3.8-5). This zoning classification is consistent with the Comprehensive Plan's Rural II designation for this area. Pursuant to SCC 21.36.010, the purpose of the R-5 zone is:

> *To provide a transition zone of medium to low density residential development which will maintain a rural character of the area in the Rural II Land Use Area of the County Comprehensive Plan A.*

Uses allowed outright in the R-5 zone include the following:

A. Single-family dwellings

B. Commercial and Domestic agriculture

C. Forestry

D. Public facilities and utilities

E. Cottage occupation (In accordance with Chapter 21.70)

F. Light home industry (In accordance with Chapter 21.70)

G. Residential care facilities (In accordance with Chapter 21.85)

H. Family day care home (In accordance with Chapter 21.86.020)

I. Safe home

J. Accessory equipment structures

K. Attached communication facilities located on BPA towers. (in accordance with Section 21.70.160)

Uses allowed by Conditional Use Permit in the R-5 zone include:

A. Surface mining

B. Recreational facilities

C. Professional services

D. Geothermal energy facilities

E. Public displays

F. Cluster developments

G. Semi-public facilities

H. Small and Large-Scale Recreational Vehicle Parks.

I. Child day center (In accordance with Chapter 21.86.040)

3.8.2.3 Skamania County Code, Title 20, Shorelines

Because the Project Area is not located near or on any shorelines of State, County or other significance, there are no applicable provisions of this county code.

3.8.2.4 Skamania County Code, Title 21A, Critical Areas

The Washington State Growth Management Act, RCW 36.70A.060, requires counties to identify and regulate critical areas.[18] Critical areas include:

- Fish and wildlife habitat conservation areas
- Frequently flooded areas
- Geologically hazardous areas
- Ponds and lakes
- Streams, creeks, and rivers

In Skamania County, critical areas regulations are found in SCC Title 21A. The Project Area is not located within any critical recharge areas, frequently flooded areas, ponds and lakes, or rivers. Portions of the Project Area are located near geologically hazardous areas due to steep slopes classified as Class II and III LHAs. There are wetlands, fish and wildlife habitat areas, streams, and creeks on the site.

3.8.3 IMPACTS

Adverse impacts to land use can are defined two ways:

- ***Changes to existing land use activities and development patterns.*** The Project could cause adverse impacts if it were to preclude the continuance of existing land uses or cause major changes to the existing patterns of land use activities or development.
- ***Inconsistency of a proposed project with existing land use regulations.*** The Project could cause adverse impacts if it was found to be inconsistent with the Skamania County Comprehensive Plan, Zoning Code, or Critical Areas regulations.

[18] See: http://www.commerce.wa.gov/_CTED/documents/ID_892_Publications.pdf

3.8.3.1 Proposed Action

Changes to Existing Land Use Patterns and Recreation

Project Construction

During construction, earth movement and construction-related traffic would generate noise and dust that could temporarily affect nearby homes and businesses located along the site access route (described in Section 3.11, Transportation). Cook-Underwood Road would be the primary access route for construction materials and workers. However, construction impacts would not be sufficient to cause changes to existing land use patterns.

Land clearing for the construction of the alternative Operations and Maintenance facility site would occur concurrently with roadway improvements to West Pit Road. The additional earth movement and construction-related traffic would generate slightly more noise and dust in that area along West Pit Road over anticipated levels for roadway construction without the facility. The additional noise and dust could temporarily affect nearby homes along Willard Road. Construction impacts would not be sufficient to cause changes to existing land use patterns.

Construction would not directly affect local recreational facilities beyond the potential for construction workers to use local recreational facilities during the one year construction period. Existing limits on the length of stay in public camping areas would minimize any potential impacts on park users from construction workers staying in parks, and a majority of the construction workers are expected to be within daily commuting distance of the site. Additionally, workers who did stay at local parks would most likely do so on weekdays and would thus not be there on the days with the highest levels of use.

Construction activities could affect some recreation users such as users of the Underwood Park and Community Center located along Cook-Underwood Road, through temporary increases to traffic, and from construction-related dust and noise. These impacts would be temporary and are expected to be minor.

Construction of the Operations and Maintenance facility at the West Pit Road location would not impact local recreational facilities. Existing limits on the length of stay in public camping areas would minimize any potential impacts on park users from construction workers staying in parks, and a majority of the construction workers are expected to be within daily commuting distance of the site. Additionally, workers who did stay at local parks would most likely do so on weekdays and would thus not be there on the days with the highest levels of use.

Construction of the Operations and Maintenance facility at the West Pit Road could affect some recreation users through temporary increases to traffic, and from construction-related dust and noise. Impacts would be primarily limited to recreational users traveling on Cook-Underwood Road. This impact would not be noticeably different from the construction of the on-site location. Construction impacts would be temporary and are expected to be minor.

Project Operation

Project operation also would not cause changes to existing land uses or land use activities or development patterns. The surrounding land uses are predominantly commercial forestry,

agriculture and residential, and these uses would not be directly negatively affected by the Project (Figure 3.8-5). The majority of the Project Area itself would remain in commercial forest production, with a maximum of approximately 56 acres of land (under 5 percent) converted to non-forestry uses related to new and widened roads, the turbine strings, the Operations and Maintenance facility, and the substation. At decommissioning, all of these facilities would be removed and the area returned to commercial forest.

Project operation would not force any changes in forestry operations or activities on the rest of the Project Area or on surrounding properties. The Project would not generate sufficient amounts of noise, traffic, visual changes, energy use, air emissions or water use to cause changes to these existing land use patterns.

Concern was expressed during scoping that the visibility of the turbines would cause a negative impact on agricultural tourism, specifically visits to area wineries. Wind power and winery tourism already co-exist in the Columbia River area. For example, four wind power facilities are located between Walla Walla and Kennewick (Canyon, Stateline, Vansycle, and Combine Hills). This area is home to a thriving wine industry with over 60 wineries. Section 3.9 Visual Resources discusses visual impacts.

Project operation would not result in a sufficient increase in population or traffic to impact local recreational facilities. The only potential impact to recreation users would be the minor to moderate visual impacts discussed in Section 3.9 Visual Resources.

Operation of the alternative Operations and Maintenance facility would not change existing land use patterns. The surrounding land uses are predominantly commercial forestry, agriculture and residential, with the nearest home approximately 0.25 mile away. The site is adjacent to West Pit Road, which would be used for access to the Project Area during both construction and operation. Use of the alternative site for the Operations and Maintenance facility would generate noise, traffic, new lighting, energy use, air emissions, and water use, but not at levels sufficient to cause changes to the existing surrounding land uses. The Operations and Maintenance facility thus would be compatible with surrounding land use and would not hinder the development of permitted land uses on neighboring properties.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential changes to land use, recreation or recreational access. If impacts to land use or recreation are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

Consistency with Applicable Land Use Regulations

~~Overall, the proposed project would be consistent with applicable land use regulations.~~ The Project would not involve subdividing any land parcels nor applying for changes to zoning or Comprehensive Plan designations. In a letter to EFSEC dated May 4, 2009, Skamania County found that the proposed Project is consistent with the Skamania County Comprehensive Plan, SCC Title 21 Zoning Code, SCC 21A Critical Areas, Title 24 Clearing and Grading, and resource maps. On December 22, 2009, the Skamania County Board of County Commissioners passed Resolution 2009-54, resolving that the revised project, including the use of the alternative location of the Operations and Maintenance facility and the use of the West Pit Road as an access route, is consistent with Skamania County Land Use Plans and applicable zoning ordinances (see Appendix D Land Use Consistency Determination). When a county certifies consistency with its local land use plans and ordinances, pursuant to WAC 463-26-090, the plan states that *"such certificates will be regarded as prima facie proof of consistency and compliance with such land use plans and zoning ordinances absent contrary demonstration by anyone present at the hearing."*

The following further evaluates the consistency of the proposed Project with applicable land use regulations.

Skamania County Comprehensive Land Use Plan

The Project would be consistent with the Comprehensive Plan vision and the Conservancy designation in that it would conserve and manage existing natural forest and wind resources to maintain a sustained yield and utilization of both. Within the Conservancy designation, public facilities, utilities, and utility substations are allowed. Wind energy facilities are consistent with the Conservancy designation because they are utilities. The Project would provide an alternative source of electrical energy generation that is not reliant on either fossil fuels or hydropower, while allowing forest management activities to continue around the turbine corridors. In addition, the staff report attached to Skamania County Resolution 2009-54 documents the County's determination that the proposed Project would be a semi-public facility under SCC Title 21 (see Appendix D). Semi-public facilities are defined in SCC 21.08.010 as *"facilities intended for public use which may be owned and operated by a private entity."* The Project thus would be a utility consistent with the Conservancy designation's appropriate uses.

The alternative location for the Operations and Maintenance facility on West Pit Road would include an approximately 3,000-square-foot building, located on a 5-acre parcel in an area designated as Rural II in the Comprehensive Plan. The facility would be similar in size to a larger single family home. The Project would be a utility that is consistent with the Rural II designation and would not conflict with any of the goals or policies expressed in the Comprehensive Plan.

Skamania County Zoning Ordinances

The portion of the proposed Project that would be located in the UNM zoning classification would be considered consistent with this zoning. There is no conflict from siting wind energy facilities in the UNM zone, and these facilities have not been identified as a nuisance by statute, resolution, ordinance, or court order. Concerning the County's moratorium on unincorporated UNM-zoned lands, the Project is not sited on lands created by deed since January 2006 and does not involve any land division. Because of Washington EFSEC's preemptive role in permitting wind energy facilities, including acting as Lead Agency for associated SEPA review, the County's moratorium on acceptance of SEPA checklists for forest practices conversions does not affect the Project.

Turbine Corridor A1–A7, with approximately seven turbines, would be located in the small portion at the southern tip of the Project Area that is within the FOR/AG 20 zone. If the proposed Project were being permitted through Skamania County rather than through Washington EFSEC, it is probable that a Conditional Use Permit from the County would be required for siting these turbines. Since Washington EFSEC is the permitting authority in this case, no such permit is required. Nonetheless, this portion of the proposed Project would be consistent with the purpose and intent of the FOR/AG 20 zone in which it would be located, and while not an outright allowed use, this Project is considered to be semi-public facility that would be a conditional use in this zone. As discussed above, the Project also would provide renewable energy generation while allowing forest management activities to continue around the turbine corridors. The portion of the proposed Project that would be located in the FOR/AG 20 zone thus would be considered consistent with this zoning.

The proposed alternative Operations and Maintenance facility located along West Pit Road would be within an area zoned R-5. Like turbine Corridor A1–A7, if the County was the permitting authority for the alternative Operations and Maintenance facility, a Conditional Use Permit likely would be required. However, Washington EFSEC is the permitting authority and no such permit is required. Nonetheless, the alternative Operations and Maintenance facility would be consistent with the purpose and intent of the zone in which it would be located. The Operations and Maintenance building would be located on a 5-acre site, and, at 3,000 square feet, would be similar in size to a larger single-family residence. The building would meet all applicable setback requirements, and would not pose a hazard to the health, safety or welfare of the surrounding community. Traffic associated with the facility would be similar to traffic from staff currently involved in ongoing timber management in the area. A well and on-site septic system would be installed to provide potable water for the Operations and Maintenance building. The anticipated demand for fire and police services would be low, and similar to other commercial operations in the Project vicinity. Development of the facility would not hinder or discourage development or continuation of timber management activities on nearby properties, or of residential properties in the area. Finally, the facility would not conflict with the goals and policies expressed in the current version of the County's Comprehensive Plan. Accordingly, location of the alternative Operations and Maintenance facility in the R-5 zone would be considered consistent with this zoning.

The proposed Project also would be consistent with the critical areas regulations found in SCC Title 21A. The Project Area is not located within any critical recharge areas, frequently flooded

areas, ponds and lakes, or rivers. Portions of the Project Area are located near geologically hazardous areas due to steep slopes classified as Class II and III LHAs. There are wetlands, fish and wildlife habitat areas, streams, and creeks on the site. The Project has been designed to minimize impacts to these areas, as discussed in Section 3.8.4, Mitigation Measures, and primarily in Section 3.3 Water and 3.4 Biological Resources.

Improvements to West Pit Road to widen it in places also would be consistent with SCC Title 21A. The use of the West Pit Road would not create safety concerns. While no new construction would occur within wetlands, streams, or their buffers, West Pit Road crosses one unnamed drainage in the Lapham Creek watershed. In July 2009, the drainage had observed flow through the existing culvert under West Pit Road, but the surface flow and the channel disappeared downstream of the culvert. The drainage is classified as a Class V stream under SCC 21A.04.020(B),Appendix C. Buffers are established for Class V streams, within which expansion of existing uses is allowed. As long as the proposed expansion or widening is 100 percent or less than the existing footprint, no development review is required under SCC 21A.05 and SCC 21A.06 in fish and wildlife protection areas or geologically hazardous areas. The road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold. For a full discussion of fish, wildlife, their habitats, and Project impacts to these, please see Section 3.4 of the Application for Site Certification.

Columbia River Gorge National Scenic Area Management Plan

While the proposed Project would be located entirely outside of the Columbia River Gorge National Scenic Area, concerns have been raised regarding the compatibility of the Project with the objectives and policies of the National Scenic Area Management Plan. The following identifies key objectives and policies, along with a discussion of Project consistency with each of these objectives and policies.

- ***Protection of Resources.*** The Project would not decrease any resources within the Scenic Area. Neither the site nor its access roads are within the Scenic Area, and no recreation resources would be lost.

- ***Scenic Appreciation and Scenic Travel Corridors.*** The Project would have minor to moderate impacts on visual quality as viewed from travel corridors inside the Scenic Area. See Section 3.9 Visual Resources.

- ***Resource Based Recreation.*** No resource-based recreation resources are within or in proximity to the Project Area. The only potential impact to recreation in the Scenic Area would be incidental recreational use by construction workers during the construction period. Such use is expected to be minimal.

- ***River Access and Protection of Treaty Rights.*** This Project is on private lands outside of the Scenic Area and would have no effect on river access or treaty rights.

- ***Interpretation/Education.*** An opportunity to provide alternative energy interpretation and education could be included in this Project and further the goals of the Scenic Area.

- ***Trails and Pathways.*** The Project would not directly affect any trails or pathways in the Scenic Area. There may be some distant views of wind turbines from trails; the impact is expected to be "low to moderate." See Section 3.9 Visual Resources.

- ***Transportation.*** Portions of SR 14 and portions of Cook-Underwood Road that are within the Scenic Area would be used to access the Project. Increased traffic would cause a temporary and limited impact to recreational travelers during the construction period.

- ***Coordination.*** The Project Area and access roads are located outside of the Scenic Area. No coordination is required.

3.8.3.2 No Action Alternative

Under the No Action Alternative, the Project would not be built. The site would continue to be used for commercial forestry and timber harvest would continue on a regular rotating schedule. Accordingly, existing land uses at the Project Area would remain unchanged. In addition, the informal recreation activities at the Project Area would remain largely the same, and no effect on recreational uses in surrounding areas would occur. The current level of consistency with land use plans and regulations also would continue to exist under this alternative.

3.8.4 MITIGATION MEASURES

No substantial impacts to land use are identified and no mitigation measures are required. The only potential impact to recreation users from operation would be the minor to moderate impact to visual resources from some viewpoints. Mitigation for this potential impact is identified in Section 3.9, Visual Resources.

3.8.5 UNAVOIDABLE ADVERSE IMPACTS

The 1,152-acre Project Area would continue to be predominantly used for commercial forestry operations. A maximum of approximately 56 acres of forestry land (under 5 percent of the Project Area) would be converted to energy facility use for the life of the Project. This conversion would not constitute a substantial change to area land use patterns given the area of the Project retained for active forestry operations, and given the acreage surrounding the Project in both private and state ownership that would be maintained in commercial forestry operations.

3.9 VISUAL RESOURCES

This section describes potential impacts to visual resources. It assesses the potential for visual impacts using accepted methods of evaluating visual landscape quality and predicts the type and degree of effects the Project would likely have on those attributes. This section also identifies mitigation measures designed to minimize those impacts.

3.9.1 METHODOLOGY

This section summarizes the visual impact assessment performed for the Application for Site Certification Agreement. The visual assessment used the Scenery Management System defined in *Landscape Aesthetics, A Handbook for Scenery Management* (USFS 1995) and *Visual Impact Assessment for Highway Projects* (FHWA 1988). The study was also designed to respond to the provisions of WAC 463-42-362, Built Environment–Land and Shoreline Use, which specifies the analysis of aesthetic and light and glare issues as part of the EFSEC process.

The Federal Highway Administration (FHWA) methodology is widely used for visual assessment of private lands such as the Project area, where visual quality objectives have not been established. A visual quality objective is a resource management objective established by a district manager or contained in a plan that reflects the desired level of visual quality based on the physical characteristics and social concern for the area. Five categories of visual quality objectives commonly used are preservation, retention, partial retention, modification, and maximum modification.

The FHWA methodology has been used to evaluate other recent wind power projects, including the Desert Claim project[19], Lower Snake River (FHWA and BLM) and the Kittitas Valley project (FHWA and USFS methodologies)[20]. The FHWA method is also used where linear features of the Project such as roads or turbine strings move into differing landscapes and visual corridors with differing view groups.

Three methodologies are commonly used to analyze visual impacts in federal and state EISs: the FHWA and USFS methodologies used for this Project, and the Visual Resource Management system used by the BLM[21]. The BLM methodology is generally used where projects are proposed on or in proximity to BLM lands and visual resource objectives for specific planning areas are already established. Under the BLM methodology a contrast rating can be completed and compared to the established BLM visual classifications. In order to use the BLM process for projects on private lands where no visual resource objectives have been established, it would be necessary to complete a full visual management inventory to delineate all lands in question and then classify each delineated area using the BLM classifications. The FHWA process provides for establishing existing visual quality objectives at a smaller scale or project level.

The BLM analysis would then determine whether and how the project features meet the objectives of the classification using the Visual Resource Management process for contrast rating. The FHWA process also follows this process, but is more conducive to a project of this scale and complexity. Full-scale Visual Resource Management delineation and classification are more appropriate for land management planning on a large scale and for providing visual objectives for public lands with multiple management objectives and uses.

---

[19] See: http://www.efsec.wa.gov/Desert%20Claim/FEIS/3.10Aesthetics.pdf

[20] See: http://www.efsec.wa.gov/Desert%20Claim/FEIS/3.10Aesthetics.pdf

[21] See: http://www.blm.gov/nstc/VRM

While the FHWA process does not rely on pre-existing visual quality objectives, it does incorporate elements of the Scenery Management System, which is part of both the USFS and BLM methodologies establishing existing visual quality and process for determining visual contrast. The FHWA process incorporates Scenery Management System and Visual Resource Management components, including landscape features, ecological conditions, cultural settings, and social needs to establish the existing visual conditions and the effects of a project on the visual environment.

The methodology used is appropriate since it provides a clear understanding of how the proposed Project would affect the visual landscape as seen from the key viewing areas. This methodology portrays the differing viewer groups and their sensitivity to visual change, defines distance zones (foreground, middle ground and unseen areas) and evaluates the contrast between pre- and post-project conditions as seen from the different viewpoints, by different viewer groups, and from different distances.

This analysis of visual effects was based on field observations and review of wind energy facilities' visual effects, public perception, design measures to reduce visual impacts, and local planning documents. Project maps, drawings, technical data, and computer-generated viewshed maps were used to determine areas where the Project would be visible, and visual simulations were generated (described in Section 3.9.1.3) to illustrate the change from the existing conditions if the Project is implemented. The analysis included systematic documentation of the visual setting, evaluation of visual changes associated with the Project, and measures designed to mitigate these visual effects. Mitigation measures include restoration or enhancement activities in areas that would be disturbed during construction.

3.9.1.1 Scenic Quality Assessment

Scenic quality ratings were developed based on observations in the field, photographs of the affected area, methods for assessing visual quality, and research on public perceptions of the environment and scenic quality ratings of landscape scenes. The final assessment of scenic quality was made based on professional judgment that took a broad spectrum of factors into consideration, including:

- Natural features, including topography, watercourses, rock outcrops, and vegetation
- The positive and negative effects of human alterations and built structures on visual quality
- Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape, defined as:
    - Vividness refers to the memorability of the visual impression received by the viewer from contrasting landscape elements as they combine to form a striking and distinctive visual pattern;

- Intactness is the integrity of visual order in the natural and human landscape, and the extent to which the landscape is free from visual encroachment;

- Unity is the degree to which the visual resources of the landscape join together to form a coherent and harmonious visual pattern.

Each viewpoint was assigned a final rating based on the rating scale shown in Table 3.9-1. This rating scale incorporates the landscape assessment concepts developed in the USFS and FWHA methodologies.

Table 3.9-1
Landscape Scenic Quality Scale

Visual Quality Rating	Explanation
Outstanding 6	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as "picture postcard" landscapes. People are attracted to these landscapes to view them.
High 5	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.
Moderately High 4	Landscapes that have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to human or natural features contained within the landscape, to the arrangement of spaces in the landscape, or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high.
Moderate 3	Landscapes that are common or typical landscapes with average scenic value. They usually lack significant human or natural features. Their scenic value primarily results from the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average.
Moderately Low 2	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant human alterations, but these features do not dominate the landscape. They often lack spaces that people perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low 1	Landscapes that have below average scenic value. They may contain visually discordant human alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are below average.

Source: Buhyoff et al. (1994), FHWA (1988), and USFS (1995)

3.9.1.2 Visual Sensitivity Assessment

The analysis also assessed visual sensitivity, which involves predicting the general impact on the quality of views from a given viewpoint. A combination of three factors determines how sensitive a landscape scene is:

- The number and type of viewers
- The viewing conditions
- The quality of the view

Residential areas with unobstructed views of a regionally important and memorable scene would be very sensitive to objects or structures that would impede views. A view from a seldom-traveled rural road where motorists have only distant, oblique views of wind turbines in an unremarkable setting would likely qualify as an area of low sensitivity.

The principal types of viewers in the Project Area who have predictably high levels of sensitivity to visual impacts include:

- Resident viewers;
- Roadway viewers (drivers and passengers); and
- Recreating viewers such as hikers, water recreationists, and mountain bikers.

This analysis defines three levels of visual sensitivity:

- ***Low.*** Viewer types representing low visual sensitivity include agricultural and industrial/warehouse workers. Compared with other viewer types, the number of viewers is generally considered small and the duration of view is short. Low levels of sensitivity are assigned to areas 5 miles or more from the closest turbine, where a wind power project would be a distant and a relatively minor element in the overall landscape.

- ***Moderate.*** Viewer types representing moderate visual sensitivity consist of highway and local travelers. The number of viewers varies depending on location; however, on average they tend to be moderately large, based on overall densities of surrounding areas and highway commuters. Viewer awareness and sensitivity are also considered moderate because destination travelers often have a focused orientation. Moderate levels of sensitivity were assigned to areas where turbines would be visible from 0.5 mile to 5 miles within the primary view of residences and roadways. The primary view refers to the central area that the eye can see clearly without moving and is surrounded by the peripheral vision. In distinguishing between moderate and low levels of sensitivity in the 0.5-mile to 5-mile zone, contextual factors were also considered, including the viewing conditions in the immediate foreground of the view.

- ***High.*** Residential, recreational, and viewers congregating in public gathering places (churches, schools, trails, designated scenic viewpoints, etc.) are considered to have comparatively high visual sensitivity. The visual setting may in part contribute to the enjoyment of the experience. Views may be of long duration and high frequency. High levels of sensitivity are generally assigned in those cases where turbines would be potentially visible within 0.5 mile or less from residential properties, heavily traveled roadways, or heavily used recreational facilities. The principal types of viewers in the Project Area who have predictably high levels of sensitivity to visual impacts include residential viewers, roadway viewers (drivers and passengers) and recreating viewers such as hikers, water recreationists, and mountain bikers.

These criteria were used to establish the sensitivity levels of each view using a systematic approach based on the distance of the Project from the viewpoint, the number of turbines or

percentage of the Project Area that could be viewed from this viewpoint, and the dominant viewer types for each view. Through this analysis, an overall sensitivity rating was established for each existing landscape view.

3.9.1.3 Preparation of Visual Simulations

Visual simulations were developed using photographs taken with a 35 mm digital SLR camera. Various focal lengths from 40 to 70 mm were used with the intent to capture the maximum pixels and resolution for the simulation. Visual Nature Studio, a widely-used three-dimensional Geographic Information System (GIS) software, manufactured by 3D Nature, LLC, was used to model the turbine locations on terrain built from USGS digital elevation model data. The photo locations were camera-matched in the software to render the turbines from the same viewpoint as the photographs taken on the ground. The resulting rendered turbine images were then photo-composited into the photographs to create the simulations. Existing topographic and site data provided the basis for developing the initial digital model.

In preparing the visual simulations, the turbine model used was the 2.5-MW Clipper Liberty model C93, which was considered a likely model to be selected based on information provided by the Applicant. This model has an overall height to nacelle of 80 m (262 feet) and blade diameter of 93 m (305 feet), and a blade length of 45.2 m (153 feet). The overall height to the tip of a stationary, vertical blade is 126.5 m (415 feet). The actual turbine size has not been determined, but potential turbines are estimated to have a height to nacelle of 262 feet and blade length between 129 and 164 feet.

Simulations were prepared assuming a conservative scenario of 50 turbines. This approach to creating simulations most likely overstates the visual impacts. This is because the Applicant has applied for EFSEC certification for a maximum of 75 MW. If 2.5 MW turbines were to be used, only 30 turbines could be built, and overall visual impact would be less. If lower-power turbines were used, the turbines would be smaller and thus less visible. Further, in evaluating impacts, the turbine is considered visible if any part of a vertical turbine blade is visible. In practice, turbines with only a part of the blade visible would not be seen when the blade is moving or is stationary but not vertical.

Atmospheric haze varies by location, season, time of day, and weather patterns. In creating photo composite visual simulations, the aim is to match the haze level on the rendered turbines to the observable haze present in the photograph. This is done by comparing the haze effects on the photographed terrain near the turbines to the rendered haze effects on the rendered terrain. This is then translated into a worst-case (lower than expected) haze visibility setting for the turbine renders. The result is that the turbines would be slightly more visible in the final composites than they would actually be if an observer were standing on the ground viewing them from the exact place, date, and time that the photos were taken.

The sky depicted in some of the visual simulations includes clouds, simulating the cloudy conditions that are common at the site.

Site plans and specifications for the proposed wind turbines were used to create three-dimensional digital models of the planned turbine placements. These models were combined

with the digital terrain model to produce a complete computer model of the wind facility. For each viewpoint, a render camera was placed in the Visual Nature Studio software. The aspect ratio of each render was then matched to the corresponding photograph and the rendered terrain was visually matched to the photographed terrain to confirm scale. Finally the resulting turbine images were matched in perspective, scale, and aspect ratio, are photo-composited into the original digital photo base using Adobe Photoshop. This process produces accurate portrayals of how the given turbine models and placements would look on the given terrain and from the specified viewpoints after construction. Seasonal conditions including weather, air quality, vegetation (foreground and background) and color impact the quality of the compositions. These compositions are a representative example of the area without subjectivity.

Simulations were not developed for nighttime conditions. Night simulations are inherently inaccurate, since they do not show the periodic flashing of the air warning lights, which is the impact most often mentioned. Night simulations are not typically performed as part of the analysis of wind power projects, and have not been requested by EFSEC. The potential impact of air warning lights is discussed in Section 3.9.3.1.

3.9.2 AFFECTED ENVIRONMENT

Each landscape has a specific quality that gives a geographic area its visual and cultural image, and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. The character of an existing landscape may range from a predominantly natural landscape to landscapes that are heavily culturally influenced. The existing scenic quality of an existing landscape includes the natural scenic attributes of the landscape in combination with the existing land use patterns. The list of attributes includes naturally evolving, natural appearing, pastoral, agricultural, or even urban landscapes and generally are at the broadscape or landscape level of the analysis, but can be analyzed for each specific viewpoint at a project level.

The sensitivity of a landscape or view of that landscape is based on the scenic integrity of the landscape and the types of viewers. A landscape that has a high degree of integrity is a landscape that has a sense of wholeness, intactness, or being complete. Its scenic quality is near-perfect, with no evident discordant elements or deviations from the existing character, making it highly sensitive to most changes and to the perceptions of the viewer types.

The existing visual resources are the natural and built features open to view in the Project landscape. The combination of land, water, and vegetation patterns represent the natural landscape features that define an area's visual character, while built features such as buildings, roads, and other structures reflect human or cultural modifications to the landscape. These natural and built landscape features or visual resources contribute to the public's experience and appreciation of the environment. This section describes the broad scale regional and local landscape settings that were used to establish appropriate viewpoints from which the Project would be visible.

3.9.2.1 Regional Landscape Setting

The Project is set in two distinct landscapes. One landscape is the areas were the turbines would be sited along ridges located on the northern plateau of the Columbia River Gorge on Underwood Mountain (Figure 1-1). The other landscape is the Columbia River Gorge National Scenic Area, which is outside the Project but within the viewshed looking into the Project Area. The Project Area is completely outside the Scenic Area, and therefore is not subject to the Columbia River Gorge Scenic Area Management Plan or related regulatory requirements. No improvements to Project Area roadways would take place in the Scenic Area.

The Scenic Area extends 85 miles along the Columbia River, and includes portions of three Oregon and three Washington counties. Formed by ancient volcanoes and sculpted by floods, the Columbia River Gorge carves a corridor through the Cascade Mountains in Oregon and Washington as the river journeys to the Pacific Ocean.

The National Scenic Area Act designated 292,500 acres on both sides of the Columbia River for special protection from the outskirts of Portland-Vancouver in the west to the semi-arid regions of Wasco and Klickitat counties in the east. The Scenic Area is categorized as SMAs, GMAs, and Urban Areas:

- SMAs contain the most sensitive resources. They total 114,600 acres and are managed by USFS.

- GMAs total 149,400 acres and include a mixture of historic land uses such as farming, logging, and cattle grazing. The Columbia River itself is currently designated as a GMA as well. Development on GMA lands is administered by the Gorge Counties and the Gorge Commission.

- Thirteen Urban Areas in the Gorge are exempt from any Scenic Area regulations: Cascade Locks, Hood River, Mosier, and The Dalles in Oregon, and North Bonneville, Stevenson, Carson, Home Valley, White Salmon, Bingen, Lyle, Dallesport, and Wishram in Washington. The Act's second purpose is to protect and support the economy of the Gorge by encouraging growth in existing Urban Areas and by allowing future economic development in a manner that is consistent with protection and enhancement of resources.

The Project Area is outside of the Scenic Area Management Plan and no visual quality objectives or management designations have been established for the area. Areas south of the Project within the Scenic Area are designated as Urban or GMA. The views from the Gorge into the Project Area were examined through viewpoint selection. This area of the Gorge, closest to the Project, is considered to have a high visual quality with a moderate sensitivity based on the vividly memorable, and although the area is not free of visual encroachment, the visual resources join together with a moderate degree of unity.

3.9.2.2 Local Landscape Setting

The Project Area is on land managed for commercial forestry by the Applicant. All of the parcels on which the Project is located are managed for a continual cycle of growth, harvest, and

replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the Project is proposed. Many of the stands of trees on the sections of land that would have turbines on them are recently harvested and reforested. The Applicant implemented timber harvest plans on approximately 50 acres during 2003. Additional harvests covering approximately 100 acres are planned as part of the ongoing commercial forestry operations (Figure 2-3).

In areas surrounding the proposed wind turbines that have not been recently harvested or that are not planned to be harvested before Project construction, trees would be harvested and most of the land would be replanted with seedlings. This clearing would allow for safe construction, and would reduce the potential for tree growth to interfere with the wind resource on the site during the commercial life of the Project. Low vegetation would be maintained in some areas to provide safe areas around the turbines (Figure 2-4).

No visual quality objectives have been established in the Project Area beyond the harvest size and configuration requirements of the Washington Forest Practices Act. These cleared areas are considered a "forest conversion" under the Forest Practices Act and have no established visual quality objectives. These openings, to the extent feasible, would be reforested in accordance with typical commercial forestry management practices.

S.D.S. Co., LLC and Broughton Lumber Company own this commercial property in Skamania County, Washington. The Project and the West Pit Road used for Project access are not located inside the Scenic Area. In relationship to the visual quality of the area, there are views from the Scenic Area into the Project Area. The viewpoints and viewer types in relation to the roadway improvements within the Scenic Area have been considered in this analysis for consistency with the Scenic Area guidance and conformance.

SR 14 in this area is a recognized scenic roadway. Typically, this designation means that a scenic corridor management plan would be prepared to provide policy-level guidance in the local adoption of comprehensive plan policies, zoning, and other land use regulation. There is no scenic corridor management plan for SR 14 and, therefore, no regulatory control of aesthetic impacts within the corridor. However, the scenic roadway designation carries an additional level of care and scrutiny in the review of potential aesthetic impacts based on recognition, but not regulation.

The local landscape visual appearance is of moderate visual quality with a moderate level of sensitivity. The levels of vividness (memorability), intactness (freedom from visual encroachment), and unity are average within the broader landscape. The immediate area of the Project Area is currently characterized by several types of visual disturbance. These include:

- BPA power transmission lines running east-west through the south and center portions of the Project Area;
- Williams gas pipeline running through the north portion of the Project Area, and compressor station just to the northwest of the Project Area;
- Two rock quarries west of the Project Area;

- Cell towers south of the Project Area in the Scenic Area;
- Forest openings from clear-cutting throughout and surrounding the Project Area; and
- Land clearing for agriculture especially south and east of the Project Area.

3.9.2.3 Viewpoints

To analyze the Project's effects on visual resources, viewpoints were selected to characterize the aesthetic character of the Project Area and the differing landscapes in or near the Project. Most of the viewpoints are at publicly accessible locations which would have the largest number of viewers. Within the Columbia River Gorge National Scenic Area, Key Viewing Areas (KVAs) have been established as *"those portions of important public roads, parks, or other vantage points with the scenic area from which the public views scenic area landscapes."* (SCC 22.04.010). Viewpoints included KVAs from which the Project could be seen, other viewpoints within the Scenic Area, and viewpoints outside the Scenic Area.

Figure 3.9-1 illustrates (with colored shading) how many of the turbines would be visible. No turbines are visible from several of the KVAs. For example, SR 14 is a KVA; however, the section of SR 14 nearest the Project Area has steep hills to the north, which block views of the Project Area. KVAs with no turbines visible were not selected as viewpoints for visual simulations and were not further analyzed.

Individual viewpoints were chosen based on the following criteria:

- Viewpoints that are most representative of the different roads, population areas, and recreation areas where views of the wind turbines would occur;
- Locations that are most accessible to the public; and
- Locations with the largest number of viewers (including residences).

Figure 3.9-1 shows the locations of these viewpoints and the number of turbines visible from each viewpoint. Views were not modeled from every residence from which the Project would be visible; however, residences and representative businesses between one and three miles from the Project Area are shown on Figure 3.9-2.

Each viewpoint was assessed for its scenic quality and viewer sensitivity. Scenic quality was determined by evaluating each viewpoint using the six levels of landscape scenic quality defined in Table 3.9-1 (Outstanding, High, Moderately High, Moderate, Moderately Low and Low). Viewer sensitivity for each viewpoint was determined by evaluating each viewpoint using the three levels of viewer sensitivity explained in Section 3.9.1.2 (Low, Moderate, and High). A rating was then applied to provide an overall average for the area. This process established the existing conditions for each of the individual viewpoints, from which impact of the Project on these parameters could be measured.

During scoping, a request was received that a visual simulation be prepared to depict views from Dog Mountain, a popular local hiking area and a Scenic Area KVA. To address this request, photo were taken from potential viewpoints located on the northeast and south side of the mountain. The photographs were used to assess views of the proposed Project, and to identify potential impacts to visual resources from those locations. It was determined that views of the Project Area were blocked by Cook Hill at all potential viewpoints located both on and off the trail. The Project would be visible from Cook Hill; however, there is no known recreational use in this area. Because the Project Area is not visible from Dog Mountain, scenic quality and viewer sensitivity were not rated, and no visual simulation was prepared to further assess potential impacts to visual resources.

This section describes the existing views from representative viewpoints. The viewpoint numbering below matches the numbering used in the Application for Site Certification. Additional viewpoints, which were excluded from this EIS as duplicative, can be found in the Application for Site Certification (Appendix A). Simulated photos depicting the existing view with proposed turbines are included in Section 3.9.3.

Viewpoint 1: Pucker Huddle (Within Scenic Area)

Scenic Quality. Viewpoint 1 is taken from SR 141, which is approximately 4 miles from the Project and is a small connector providing access to the Indian Heaven Wilderness in the Gifford Pinchot National Forest. This highway also allows access to several rural communities, including White Salmon, Husum, and Pucker Huddle. Most areas are unincorporated and several of the residences are recreational in nature with some year-round residences. As discussed in the review of the regional and local landscapes, no public roads pass through or are immediately adjacent to the Project.

Viewpoint 1 is a wide panoramic view of Underwood Mountain from SR 141 adjacent to the Pucker Huddle area. The view encompasses the east side of the Project Area and the ridged lines of forest management areas are visible in the middle ground of the viewshed. Natural openings are prevalent from this viewpoint, with several natural appearing features of openings and vegetation that provide an interesting view. The BPA transmission lines bisecting the Project Area on the north and south ends can be seen from this viewpoint. The quality of the views from this viewpoint along SR 141 was rated as moderate, reflecting the fact that the visible landscape is relatively common in the region and has average scenic value. The ridge line along Underwood Mountain, which is in the area of the Project, provides a degree of topographic interest when viewed with the other natural appearing features. The landscape visual scenic quality from this viewpoint is moderate.

Viewer Sensitivity. Traffic volumes along SR 141 are minimal and used for local traffic and recreational traffic in the summer months. Considering the distance of the Project from this viewpoint (less than 5 miles), the minimal use of the highway, and the portion of the Project that is visible from the viewpoint, the level of view sensitivity is considered low. This is based on the duration of the view from SR 141, the low level of residential viewers from this viewpoint, and the scenic quality rating.

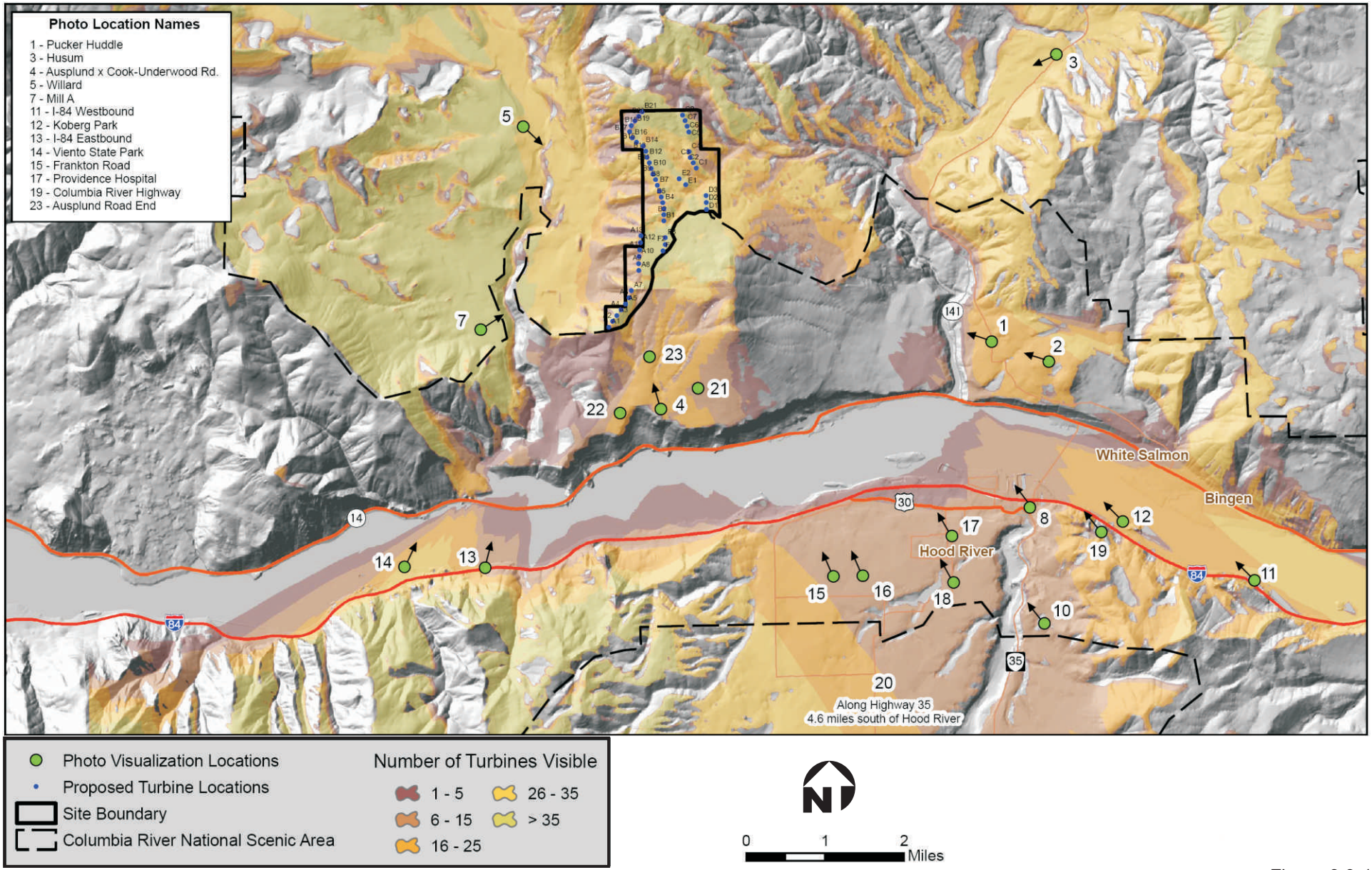


Figure 3.9-1

Locations of Simulation Viewpoints

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

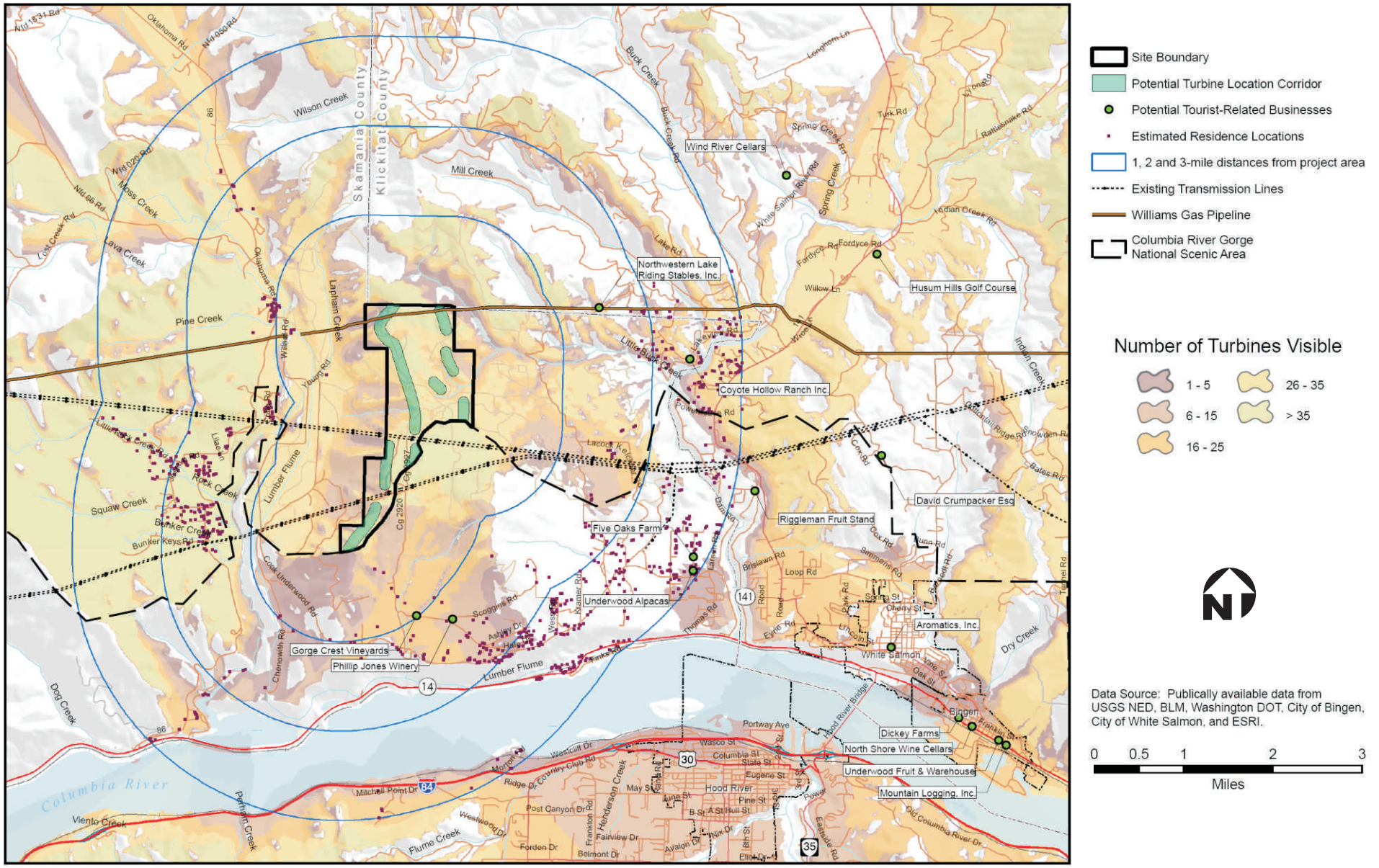


Figure 3.9-2

Residences with Visible Turbines

URS

Whistling Ridge Energy Project
Skamania County, Washington

Viewpoint 3: Husum

Scenic Quality. This viewpoint captures the view from SR 141 northeast of the Project Area. This viewpoint would be the first view of the Project from travelers moving south into the Project Area. The viewpoint encompasses the northern portion of the Project from the highway, which is the closest viewing area from that vantage point. The foreground of the viewpoint is pastoral with a middle ground view of the hillsides and a background view of Underwood Mountain and the Project Area. The view is natural appearing with moderate to high levels of vividness, unity, and intactness in the foreground, middle ground, and background of the photo. The quality of the view from this viewpoint was rated moderately high because of the above-average quality and the unity of the man-made and natural features on the landscape.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the duration of the view (roadway travelers), the portion of the Project that is visible from the viewpoint, the viewer types (minimal residential/recreational), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Viewpoint 4: Ausplund Road and Cook-Underwood Road (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from the Ausplund Road and Cook-Underwood Road where they meet and provide residential, agricultural, and forest management access to the area. These roads are connector and feeder roads that can be accessed from SR 14. This area is elevated from the Columbia River Gorge National Scenic Area but is within its boundaries. The area has a mix of uses including agriculture, forest management, and some recreation. The foreground from the roadway is an agricultural setting with middle and background views of forest vegetation and forest management areas. The view is natural appearing with moderate levels of vividness, unity, and intactness. The quality of the view from this viewpoint was rated moderate because of the average or typical views of this type in the Project Area.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (0.5 to 5 miles), the viewer types (roadway travelers), the portion of the Project that is visible from the viewpoint, the viewer types (residential/roadway), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Viewpoint 5: Willard

Scenic Quality. This viewpoint captures the view from the small residential community of Willard. This area is accessible by a County road from SR 14 and used by residential and private forest management users. The view looks southeast into the Project Area and provides a panorama of the longest string of turbines. The foreground is a mixture of mixed conifer second growth stands and the middle ground is of mixed timber harvest openings and a transmission corridor. The background view is similar and the mixture of vertical and horizon lines and formations detracts from the overall vividness and unity of the view. The intactness of the views is moderated by the changes in line and form. The quality of the view from this viewpoint was rated moderately low to moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the Project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Viewpoint 7: Mill A

Scenic Quality. This viewpoint captures the view from the old mill property west of the Project Area. This area is accessible from Willard Road and has a mixture of uses. The view looks northeast into the southern end of the A turbine string. The foreground view is obstructed by the vertical lines of transmission towers. The middle ground view is of transmission corridors and extensive timber harvest openings. Many of the residential views are partially screened from the valley floor. There is a visual discord with the man-made alterations. The vividness, unity, and intactness appear uninviting and of moderate to low visual quality. The scenic quality rating for this viewpoint is moderately low.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the Project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Viewpoint 11: I-84 Westbound (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from I-84 traveling westbound towards the Project Area from the east. I-84 travels along the Columbia River Gorge National Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of the highway and other corresponding structures the view is generally intact with average or above vividness, unity, and intactness. Viewers traveling along this corridor have multiple line-of-sight transitions, and this is considered to be average within those views. The scenic quality rating for this viewpoint was rated moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (8–10 miles), the portion of the Project that is visible from the viewpoint, the viewer types (roadway), and the scenic quality rating, the level of sensitivity was rated moderate.

Viewpoint 12: Koberg Park (Within Scenic Area)

Scenic Quality. This viewpoint captures the view across the Columbia River from Koberg Park. The foreground view of the river is a complete composition indicative of the area and the middle and backgrounds have a high level of vividness, unity, and intactness. The railway line that bisects the view in the middle ground tends to blend into the scenery without distraction. This view is considered to be above average for the types of views that are throughout the Scenic Area. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (8–10 miles), the portion of the Project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated moderate.

Viewpoint 13: I-84 Eastbound (Scenic Area KVA)

Scenic Quality. This viewpoint captures the view from I-84 traveling eastbound towards the Project Area from the west. I-84 travels along the Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of transmission structures the view is generally intact with average or above-average vividness, unity, and intactness. Viewers traveling along this corridor have multiple line of sight transitions and this view is considered to be above average within the context of those multiple views. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (3 to 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (roadway travelers with fleeting views), and the scenic quality rating, the level of sensitivity was rated as moderately low.

Viewpoint 14: Viento State Park (Within Scenic Area)

Scenic Quality. This viewpoint captures the view from Viento State Park, a popular recreation and rest area along the Columbia River. Landscape features are diverse and intact and the contrasts of the features have a high level of unity. This view is the open waters of the Columbia River in the foreground with rock features and vegetation in the middle ground and a background of mountains that provides an overall pleasing composition that is inviting to the viewer. This view is one of the less common views along the Gorge and has an above average scenic value. The scenic quality rating for this viewpoint was rated moderately high to high.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated as moderate to high.

Viewpoint 15: Frankton Road (Within Scenic Area)

Scenic Quality. This viewpoint represents the view from the higher-elevation residential areas west of Hood River. The view looks across the Columbia River into the Project Area. Frankton Road is a local access road and traffic is considered low. Residences in this area have views both north and south. Many of the views are screened to the north and take advantage of the view south into Oregon. The view has residential development in the foreground, which is common along this roadway. The middle ground is vegetation, some agriculture, and some forest management. The background is the ridge along the Project Area. These types of views are relatively common and of average scenic value when compared to the broader area. Vividness, unity, and intactness are moderate to high levels. The scenic quality rating for these viewpoints is moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (residential), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 17: Providence Hospital Hood River (Within Scenic Area)

Scenic Quality. This viewpoint represents the north view of the Project from the City of Hood River. The foreground is an urban setting with a middle ground of vegetation that screens the background to some degree, providing a diverse composition of features. The view has a somewhat vivid appeal based mostly on the man-made features; however, the unity and intactness are below average and are visually discordant. This detracts from the background view. Viewers would generally be more focused on the business of the urban environment. The scenic quality of these viewpoints was rated moderately low.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (more than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (urban/residential), and the scenic quality rating, the level of sensitivity was rated as low.

Viewpoint 19: Columbia River Highway (Within Scenic Area)

Scenic Quality. This viewpoint represents the view of the roadway traveler on the Columbia River Highway (Highway 30) southeast of the Project Area. This view has a higher scenic quality and is more representative of the high-quality views within the Columbia Gorge area. The foreground, middle ground, and background all have an above average arrangement of spaces in the landscape. The view appears intact and has a unity with the road and even the transmission line that is visible in the middle ground. The landscape provides diversity but not to the extent of clutter. This view is rated moderately high for scenic quality.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (greater than 5 miles), the portion of the Project that is visible from the viewpoint, the viewer types (roadway travelers/sightseers), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 23: Ausplund Road End (Within Scenic Area)

Scenic Quality. This viewpoint represents the view from local area roadways at specific intersections where local area travelers might converge. These roads are old logging roads that have been upgraded to meet the local residential use. However, they are still used for logging and would be used in the construction portion of this Project. This would include upgrading and in some instances widening the roads, which can affect visual quality. This view is from the end of the Ausplund Road~~which would be used to access the area for construction and maintenance~~. Very few viewers beyond those associated with the Project would see this viewshed. Without the vehicles in the foreground, the scenic quality rating assigned to this view is moderate.

Viewer Sensitivity. When considering the distance of the Project from this viewpoint (less than 1 mile), the portion of the Project that is visible from the viewpoint, the viewer types (local area workers and residence), and the scenic quality rating, the level of sensitivity was rated as low to moderate.

3.9.3 IMPACTS

Visual impacts are a primary consideration for wind power projects. The alteration of the landscape by the introduction of wind turbines, and the visual impacts of wind turbines on the landscape is a complex issue, and factors other than the attributes described above play a major role in the observer's reaction or perception of the visual impacts or change.

Wind turbines are relatively large, and being available to the wind requires the turbines to be in a location that is open and highly visible. Viewers' reaction to the visual impacts of wind turbines on the landscape is a complex issue, and is influenced by the generally positive perception of wind as a renewable energy alternative. However, many supporters of renewable energy projects express a desire that the projects be placed elsewhere. This message was voiced by several people in the public scoping meetings for this Draft EIS. Studies have shown that some negative opinions change once the wind projects are constructed and in operation.

3.9.3.1 Proposed Action

The appearance of the Project is determined by the Project facilities that may be seen by the public during operation of the Project. Project facilities include turbines, a meteorological tower, the BPA substation, the Operations and Maintenance facility (at one of two alternative locations) and roads. The substation, Operations and Maintenance facility, and Project Area roads would be difficult to see from outside of the Project Area, and would be typical of development in this rural area dominated by forest management and large-scale agriculture. The meterological tower is slender and would have no moving parts, and would not be as noticeable as a wind turbine. Consequently, the visual impact assessment focused on the potential impact of the turbines. This section describes Project facilities and their visibility from outside the Project Area.

The Project facilities are:

- ***Turbines.*** The turbines would be the most visible Project facilities. Commercial-scale turbines are similar in appearance and are composed of a tower, a nacelle, and turbine blades attached to a rotor. The tower would appear to be a steel pole, tapered from base to hub, with a base diameter of approximately 14 feet. At the top of and perpendicular to the tower, the nacelle would appear to be an elongated metal boxlike structure. Three aerodynamically shaped blades connected to a nose cone attach to the front of the nacelle. Depending on the turbine model chosen, each turbine would be up to approximately 426 feet tall (262-foot hub height and 164-foot radius blades, measured from the ground to the turbine blade tip), and would be mounted on a concrete foundation. Wind turbines would be grouped in "strings," with each turbine spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). Typically, wind turbines are painted white to comply with FAA daytime lighting requirements. A gravel buffer and crane pad would be maintained at each turbine site, and would not be visible from outside the Project Area.

  The tall turbines would introduce vertical lines into the viewshed. Blades would be visible when stationary and moving at low speeds, but would not be visible when moving more quickly. The visibility of the turbines would be affected by the angle of the sun and

climate conditions. At low sun angles (morning and evening) sunlight would reflect off a greater surface of the turbine and result in greater visibility. Conversely, when the sun is directly overhead, a relatively small surface of the turbine would reflect. On cloudy days, visibility of the light-colored turbines would be less since the turbines would blend with the background. Available data indicates that on average, there are 145 sunny days per year in Skamania County, Washington, that is, 39.7 percent of days are sunny.22 Therefore, the majority of the time some clouds are present. The turbines would therefore blend with the background the majority of the year.

- ***Electrical System.*** The electrical system would primarily be underground, and would connect the turbines to the BPA substation. The substation would occupy a portion of a fenced 5-acre area at the southwest end of the Project Area, immediately adjacent to the BPA 230-kV transmission line. A 50-foot cleared area would be maintained around substation. The substation would difficult to see from outside the Project Area.

- ***Operations and Maintenance Facility.*** The Operations and Maintenance facility would be a 3,000 square foot metal building approximately 16 feet tall, with a gravel parking lot and surrounding fence and gated entrance. The facility would be built at one of two alternative locations, either in the Project Area or to the west of the site on West Pit Road. In either location the visual impact of the facility would be minimal, and similar to small utility or agricultural facilities in the area.

- ***Roads.*** The Project would require 7.9 miles of new permanent gravel roads, and 2.4 miles of improved existing roads. New permanent and improved roads would be visually similar to existing secondary and gravel roads in the Project Area and most would be difficult to see from outside of the Project Area.

- ***Meteorological Tower.*** The Project would include one meteorological tower, approximately 221 to 262 feet tall. The tower height would be the same as the hub height for the selected wind turbine. Because meteorological towers are slender and do not have large components like turbine blades, the meteorological tower would be difficult to see from outside the Project Area.

The primary visual concern is the potential impacts of the proposed installation of up to 50 wind turbines on existing views and the overall aesthetic character of the Project Area. The specific turbine type and manufacturer have not been selected; however, it is likely that the turbines would be in the 1.2- to 2.5-MW range, and would measure approximately 426 feet in height (262-foot hub height and 164-foot radius blades). Each turbine would have three rotor blades made of laminated fiberglass. The diameter of the circle swept by each blade would be from 264 to 320 feet, depending on which turbine was selected. Turbine "strings" would include rows of from three to 21 turbines placed at approximately 350 to 500 foot intervals.

[22] See: http://www.bestplaces.net/County/Skamania-Washington.aspx#.

For many viewers, the location of the Project would minimize visual impacts. Location effects include the limiting effect of topography, tree cover, the relatively long distance to surrounding residences, and the orientation of the Project vis-à-vis viewers. Figure 3.9-2 shows the number of turbines visible from residences and a selection of local businesses. The figure does not attempt to show all businesses in the Project Area; the businesses added are for general reference. The figure shows that the Project would not be visible from many of the residences to the southeast of the Project, and would be most visible to residences to the west, in and around Mill A. This figure may overstate the visibility of the Project somewhat, for two reasons:

- Turbines are judged to be visible if any part of the turbine blades would be visible. In practice, if only the tip of a blade is visible then viewers would not see it when it is not vertical or when the blade is moving.

- The visual simulation is based on topography alone, and does not take into account the masking effect of trees.

However, public input and comments during EIS scoping indicated that for some viewers, the presence of the wind turbines represents a negative impact because it alters the appearance of the rural landscape over a large area. The flashing of aviation warning lights on the tops of turbines at night would similarly be considered a negative impact.

The visual impact assessment was based on evaluating the changes to the existing visual resources that would result from construction and operation of the Project. These changes were assessed, in part, by evaluating the "after" views provided by the computer-generated visual simulations and comparing them to the existing visual environment. Consideration was given to the following factors in determining the extent and implications of the visual changes:

- Changes in the affected visual environment's composition, character, and valued qualities

- The affected visual environment's context, including distance

- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration

- The number of viewers, their activities, and the extent to which these activities relate to the aesthetic qualities affected by the changes

- The distance factor was considered in the sensitivity rating for establishment of baseline and therefore becomes a factor in the impact assessment

Levels of impact were classified as high, moderate, and low:

- ***High.*** High levels of impact were assigned when turbines would be highly visible in areas with a high number of sensitive viewers, and would greatly alter levels of vividness, unity, and intactness, decreasing the level of visual quality. This is the largest number of viewers from that key viewpoint. The assessment accounts for the number of viewers and would add that into the discussion.

- ***Moderate.*** Moderate levels of impacts were assigned in situations when turbines would be visible in areas with moderate levels of visual sensitivity and viewers, where the presence of the turbines would moderately alter levels of landscape vividness, unity, and intactness.

- ***Low.*** Low levels of visual impact were found in situations when the Project would have relatively small effects on overall landscape level attributes, where existing levels of landscape aesthetic quality are low, or where there are low levels of visual sensitivity and a low number of viewers.

While only three levels of impact (High, Moderate, and Low) were used to describe the visual impacts of the Project on each viewpoint, it should be noted that each of these impact levels is based on the consideration of six levels of landscape visual quality (Outstanding, High, Moderately High, Moderate, Moderately Low and Low) and three levels of visual sensitivity (Low, Moderate and High) when determining the final anticipated level of visual impact. This approach, a result of the combined use of the FHWA/USFS methodology provides a credible explanation of how the proposed Project would affect each viewpoint by describing the contrast between pre- and post-project conditions as seen from the different viewpoints, by different viewer groups, and from different distances.

Construction

During construction, large earth-moving equipment, trucks, cranes, and other heavy equipment would be visible from some nearby areas. At times, small, localized clouds of dust created by road building and other grading activities may be visible at the site. Because of construction-related grading activities, areas of exposed soil and fresh gravel that contrast with the colors of the surrounding undisturbed landscape would be visible.

In close-up views the changes associated with the construction activities would be highly visible and would have a moderate to high visual impact. Close-up views would include those seen by travelers on the segment of the local roads that pass around the Project Area and those seen from the closest residences. From more distant locations, the visual effects of construction would be relatively minor and would have little or no impact on the quality of views.

Construction impacts would be short-term, lasting no more than the one-year construction period.

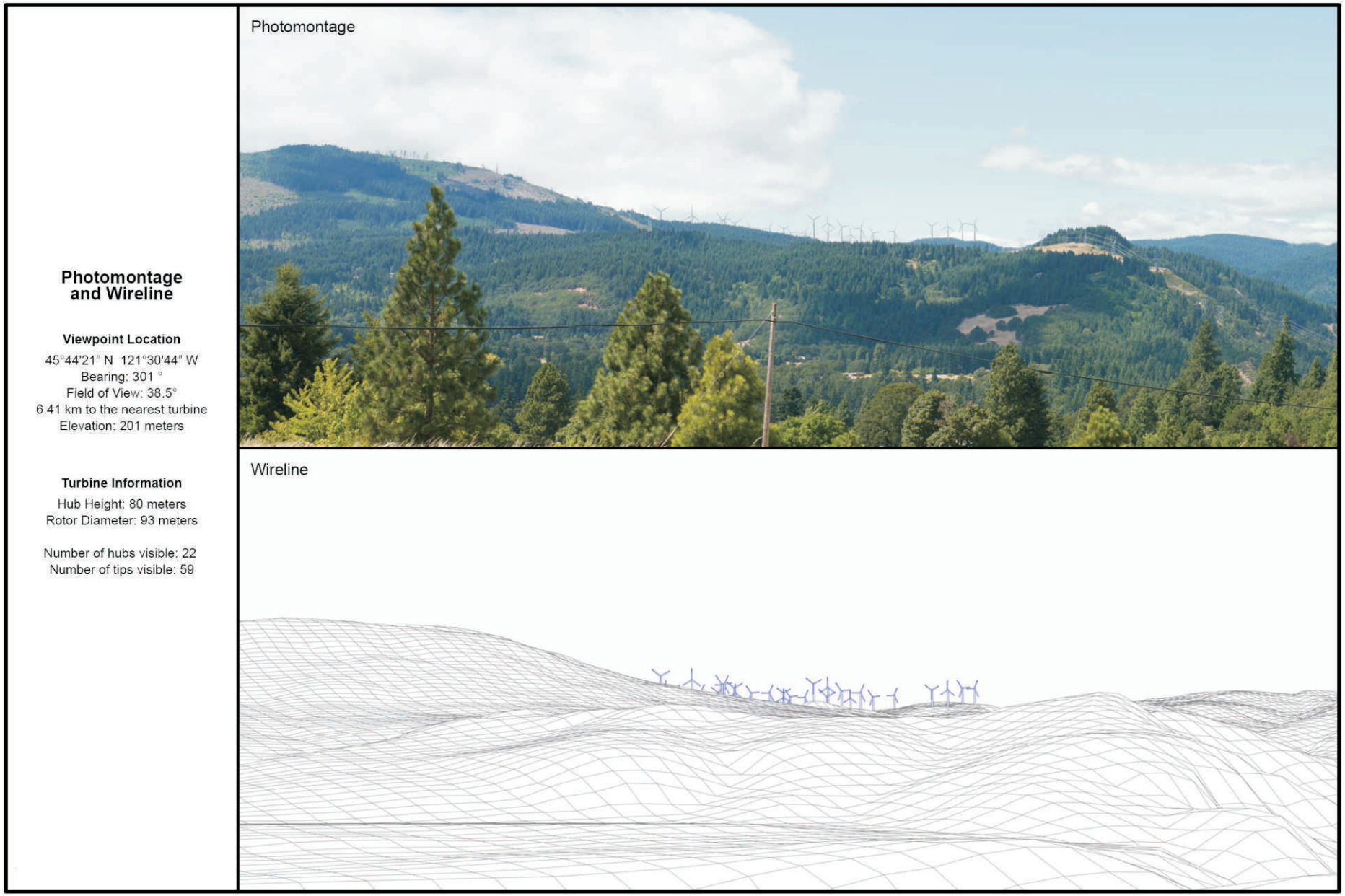
Operation

During Project operation, the turbines would be visible from some viewpoints. The potential level of visual impacts from key and representative Project viewpoints is summarized in Table 3.9-2 and shown on Figures 3.9-3 through 3.9-15. Additional viewpoints are analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A). A more detailed description for each viewpoint follows the summary table and figures. The visual impact analysis showed that the Project has the potential to create low to moderate levels of visual impact at key viewpoints.

Table 3.9-2
Summary of Existing Scenic Quality Assessment and Project Visual Impacts

Viewpoint	Within or Outside of Scenic Area[a]	Distance from Nearest Turbine (miles)	Existing Scenic Quality		Anticipated Level of Visual impact
			Visual Quality	Viewer Sensitivity	
Viewpoint 1: State Highway 141/Pucker Huddle (Figure 3.9-3)	SA	3.99	Low	Moderate	Low to Moderate
Viewpoint 3: Husum, Highway 141 north (Figure 3.9-4)	--	4.76	Moderate to Moderately High	Moderate	Moderate
Viewpoint 4: Ausplund Road, Cook-Underwood Road (Figure 3.9-5)	KVA	1.23	Moderate	Moderate	Moderate
Viewpoint 5: Willard (Figure 3.9-6)	--	1.35	Moderately Low to Moderate	Moderate	Moderate
Viewpoint 7: Mill A (Figure 3.9-7)	--	1.62	Moderately Low	Moderate	Low to Moderate
Viewpoint 11: I-84 Westbound (Figure 3.9-8)	KVA	8.39	Moderate	Moderate	Moderate to Low
Viewpoint 12: Koberg Park (Figure 3.9-9)	SA	6.60	Moderately High	Moderate	Moderate
Viewpoint 13: I-84 Eastbound (Figure 3.9-10)	KVA	3.43	Moderately High	Moderately Low	Moderate to Low
Viewpoint 14: Viento State Park (Figure 3.9-11)	SA	3.99	Moderately High to High	Moderate to High	Moderate ~~to High~~
Viewpoint 15: Frankton Road (Figure 3.9-12)	SA	4.51	Moderate	Moderate	Moderate
Viewpoint 17: Providence Hospital (Figure 3.9-13)	SA	5.07	Moderately Low	Low	Low
Viewpoint 19: Columbia River Highway (Figure 3.9-14)	SA	6.46	Moderately High	Moderate	Low
Viewpoint 23: Ausplund Road End (Figure 3.9-15)	SA	0.64	Moderate	Moderate	Moderate

[a] -- += not in Scenic Area; SA = within Scenic Area; KVA = Key Viewing Area within Scenic Area.



Source: GeoDataScape.

Figure 3.9-3

Viewpoint 1 - Pucker Huddle

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

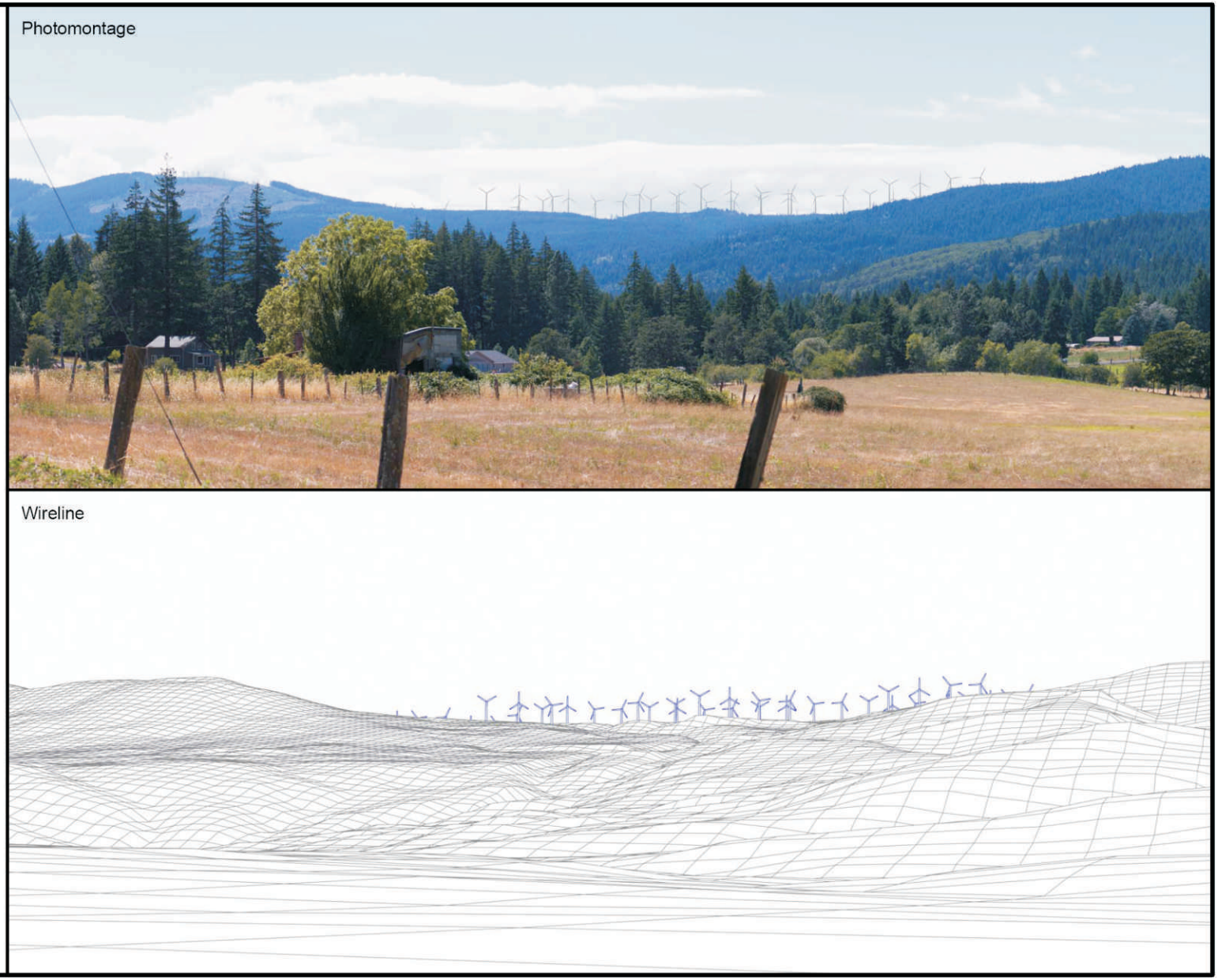
Viewpoint Location

45°47'30" N 121°29'38" W
Bearing: 250 °
Field of View: 35°
7.66 km to the nearest turbine
Elevation: 152 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 30
Number of tips visible: 87



Source: GeoDataScape.

Figure 3.9-4

Viewpoint 3 - Husum

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

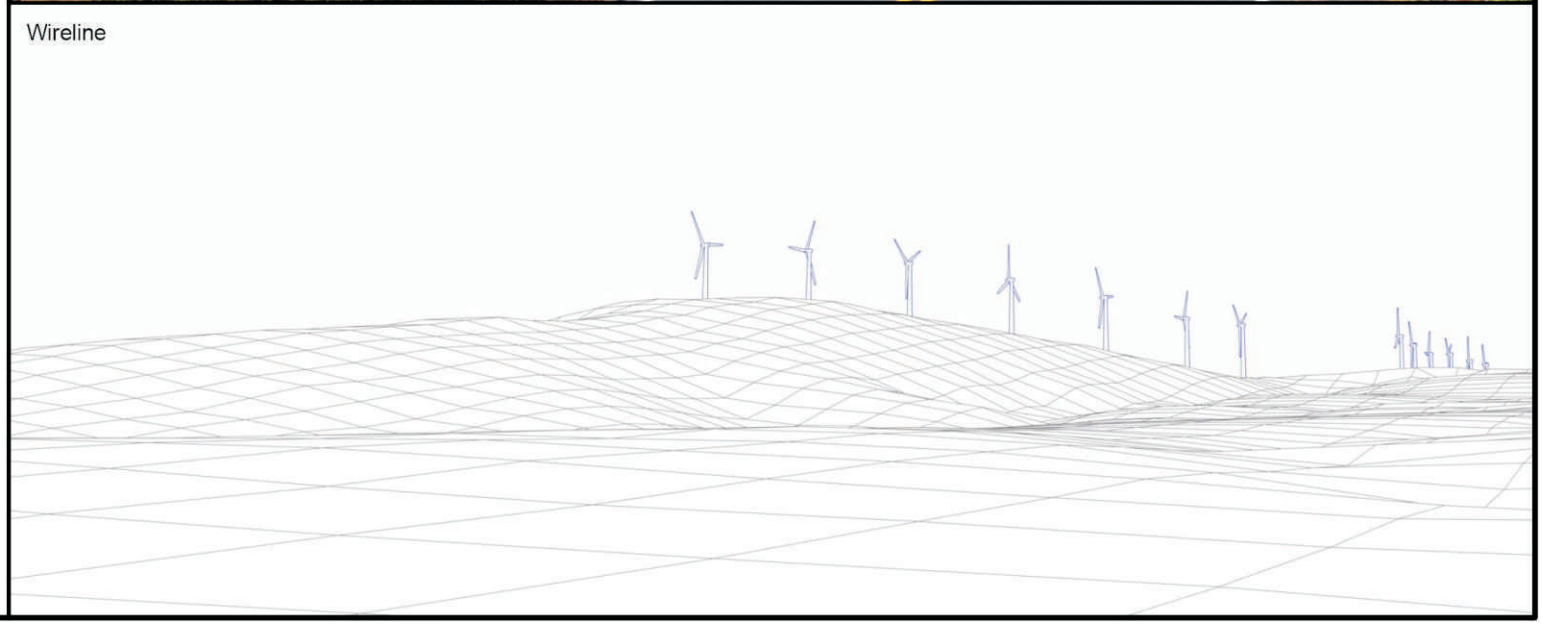
45°43'40" N 121°35'56" W
Bearing: 331°
Field of View: 50°
1.99 km to the nearest turbine
Elevation: 411 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 7
Number of tips visible: 21





Source: GeoDataScape.

Figure 3.9-5

Viewpoint 4 - Ausplund Road and Cook-Underwood Road

Photomontage and Wireline

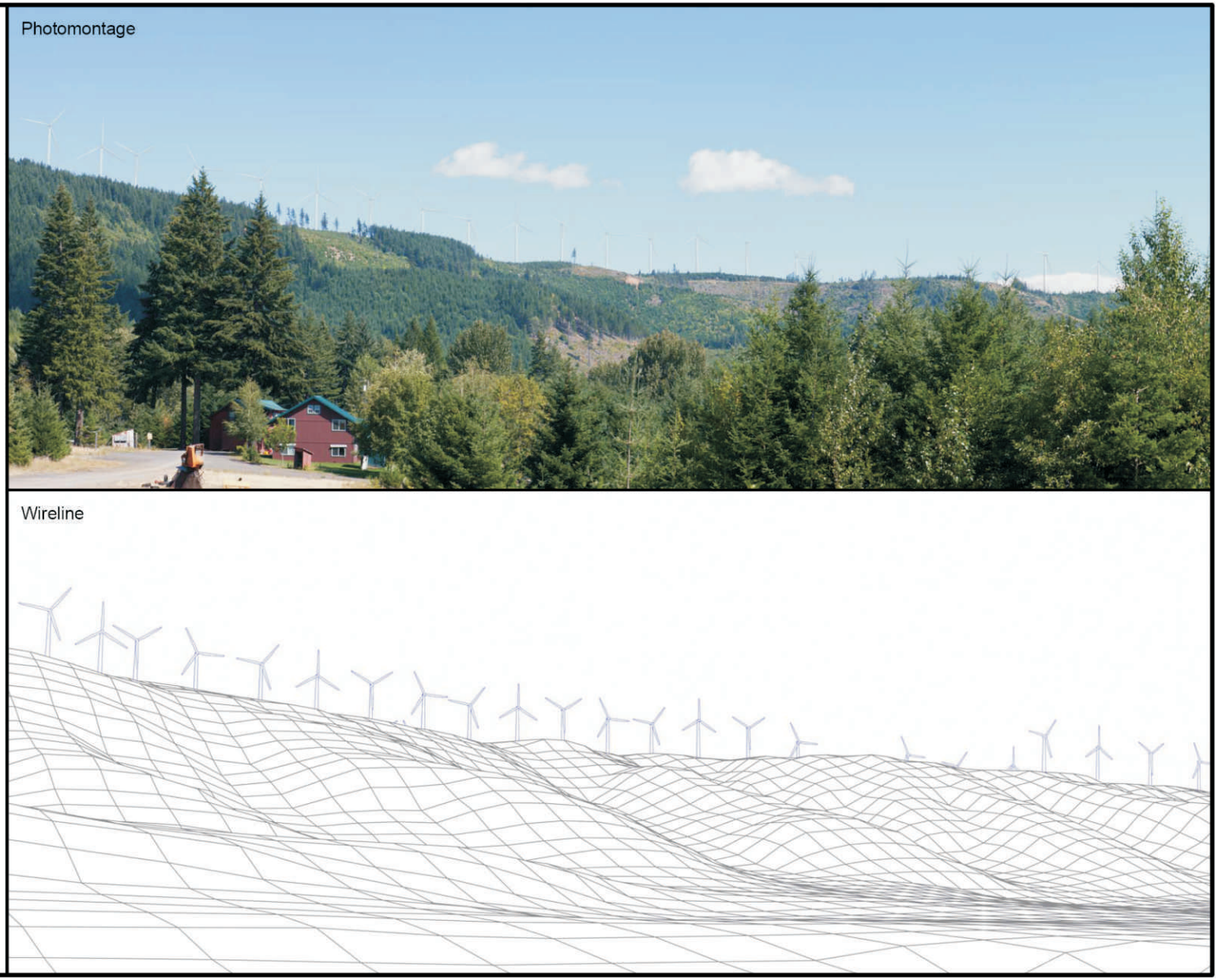
Viewpoint Location

45°46'48" N 121°38'02" W
Bearing: 124°
Field of View: 74°
1.67 km to the nearest turbine
Elevation: 408 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 19
Number of tips visible: 57



Source: GeoDataScape.

Figure 3.9-6

Viewpoint 5 - Willard

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

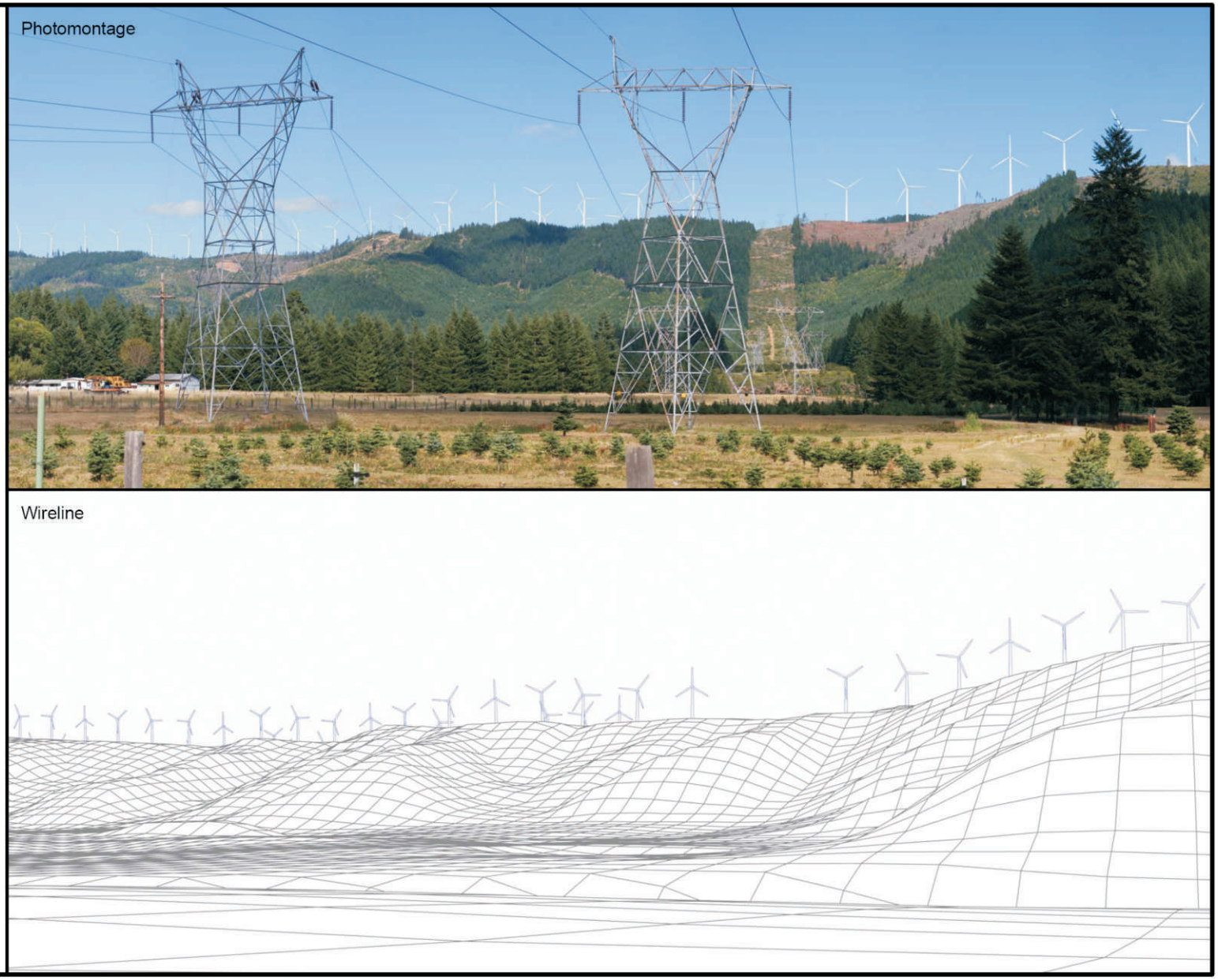
Viewpoint Location

45°44'35" N 121°38'45" W
Bearing: 65°
Field of View: 57°
2.61 km to the nearest turbine
Elevation: 287 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 30
Number of tips visible: 85



Source: GeoDataScape.

Figure 3.9-7

Viewpoint 7 - Mill A

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°41'40" N 121°26'40" W
Bearing: 307 °
Field of View: 21°
14 km to the nearest turbine
Elevation: 31 meters

Turbine Information

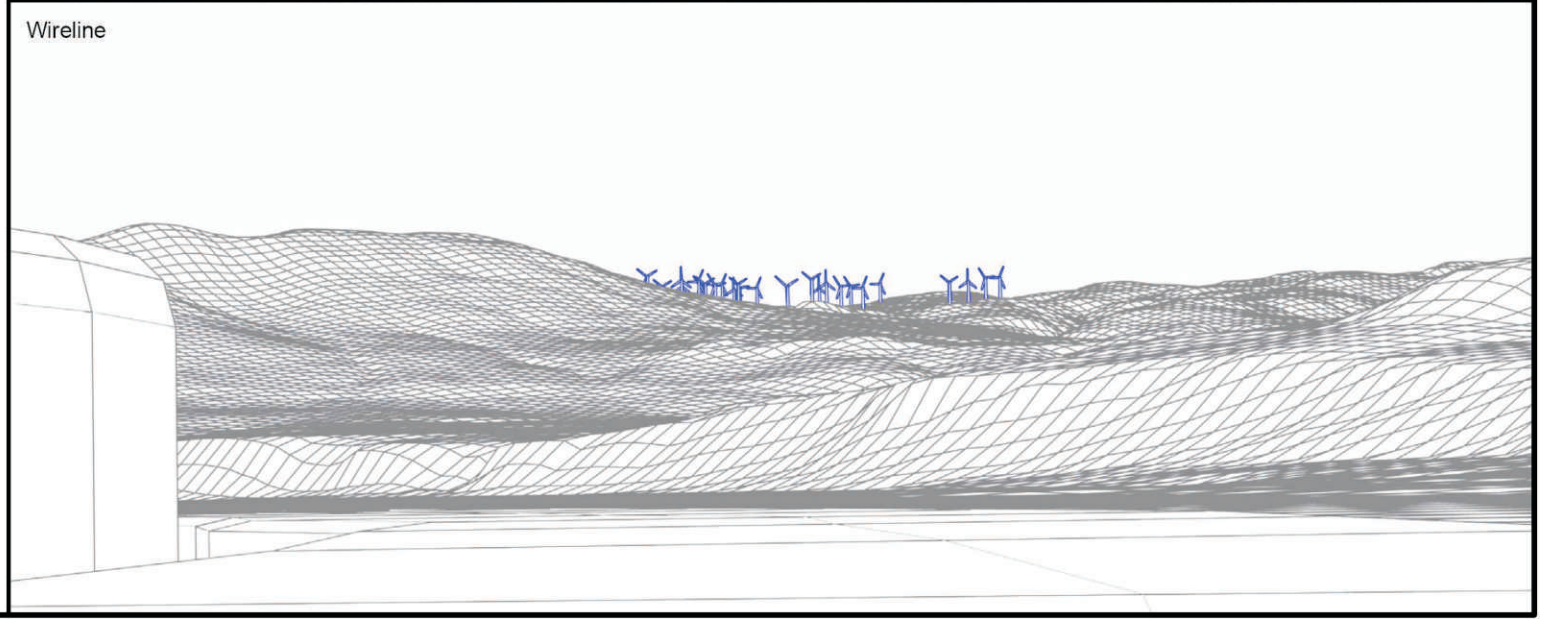
Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 25
Number of tips visible: 70

Photomontage



Wireline



Source: GeoDataScape.

Figure 3.9-8

Viewpoint 11 - I-84 Westbound

Photomontage and Wireline

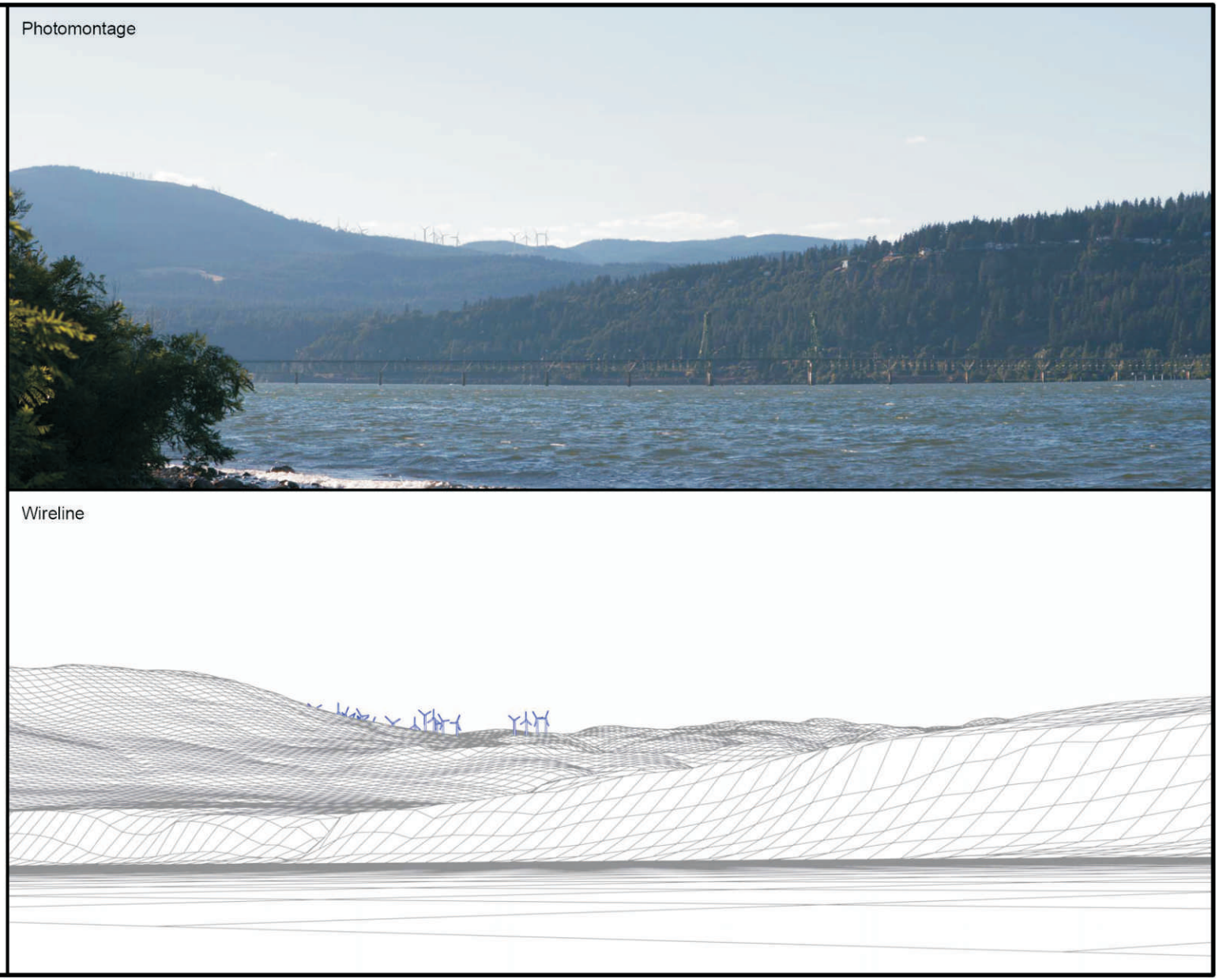
Viewpoint Location

45°42'20" N 121°28'43" W
Bearing: 315°
Field of View: 30°
11 km to the nearest turbine
Elevation: 25 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 15
Number of tips visible: 39



Source: GeoDataScape.

Figure 3.9-9

Viewpoint 12 - Koberg Beach State Park

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

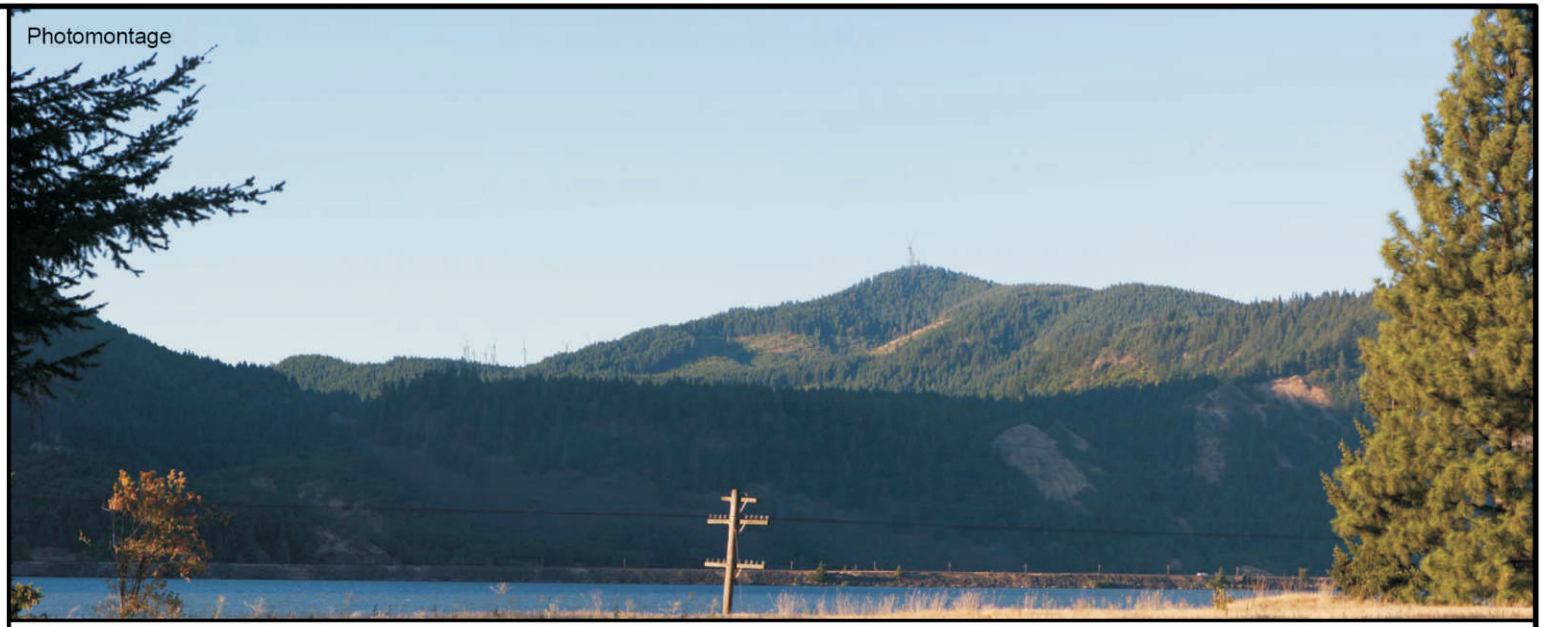
Viewpoint Location

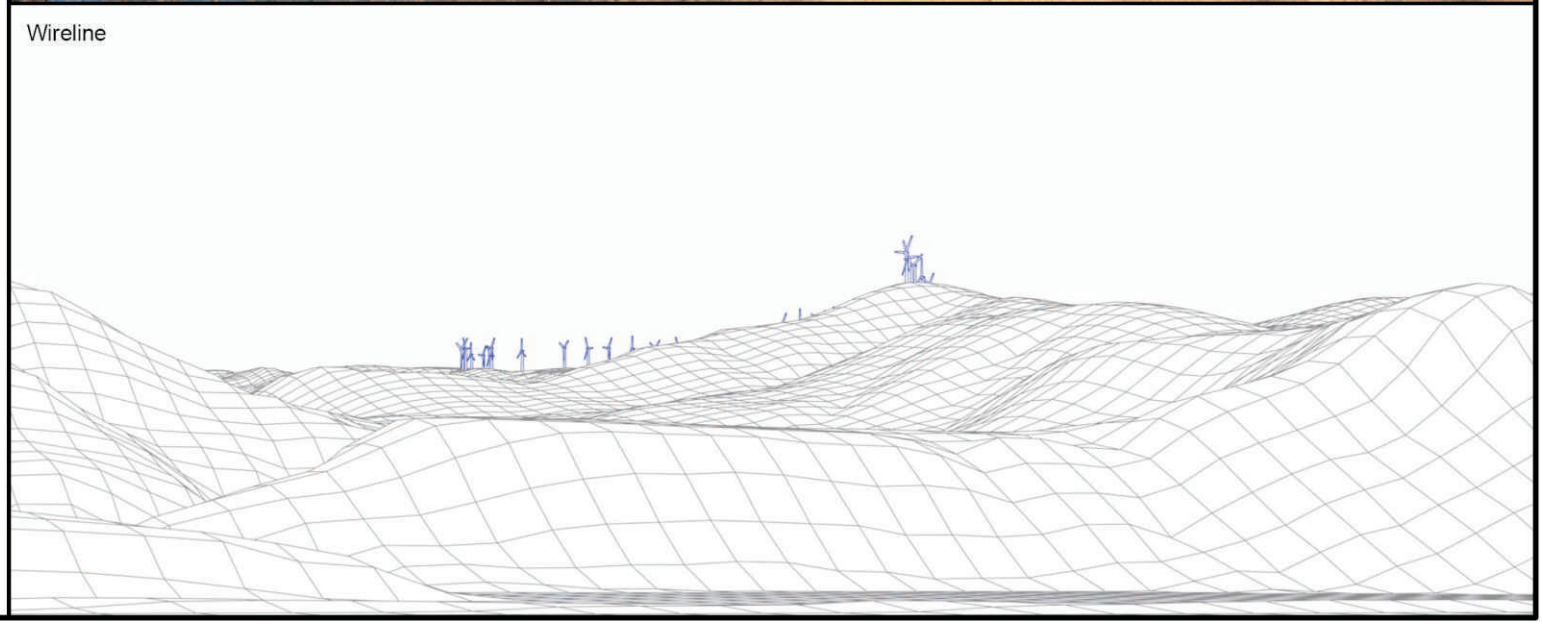
45°41'55" N 121°39'04" W
Bearing: 28 °
Field of View: 33.5°
5.52 km to the nearest turbine
Elevation: 44 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 12
Number of tips visible: 35





Source: GeoDataScape.

Figure 3.9-10

Viewpoint 13 - I-84 Eastbound

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

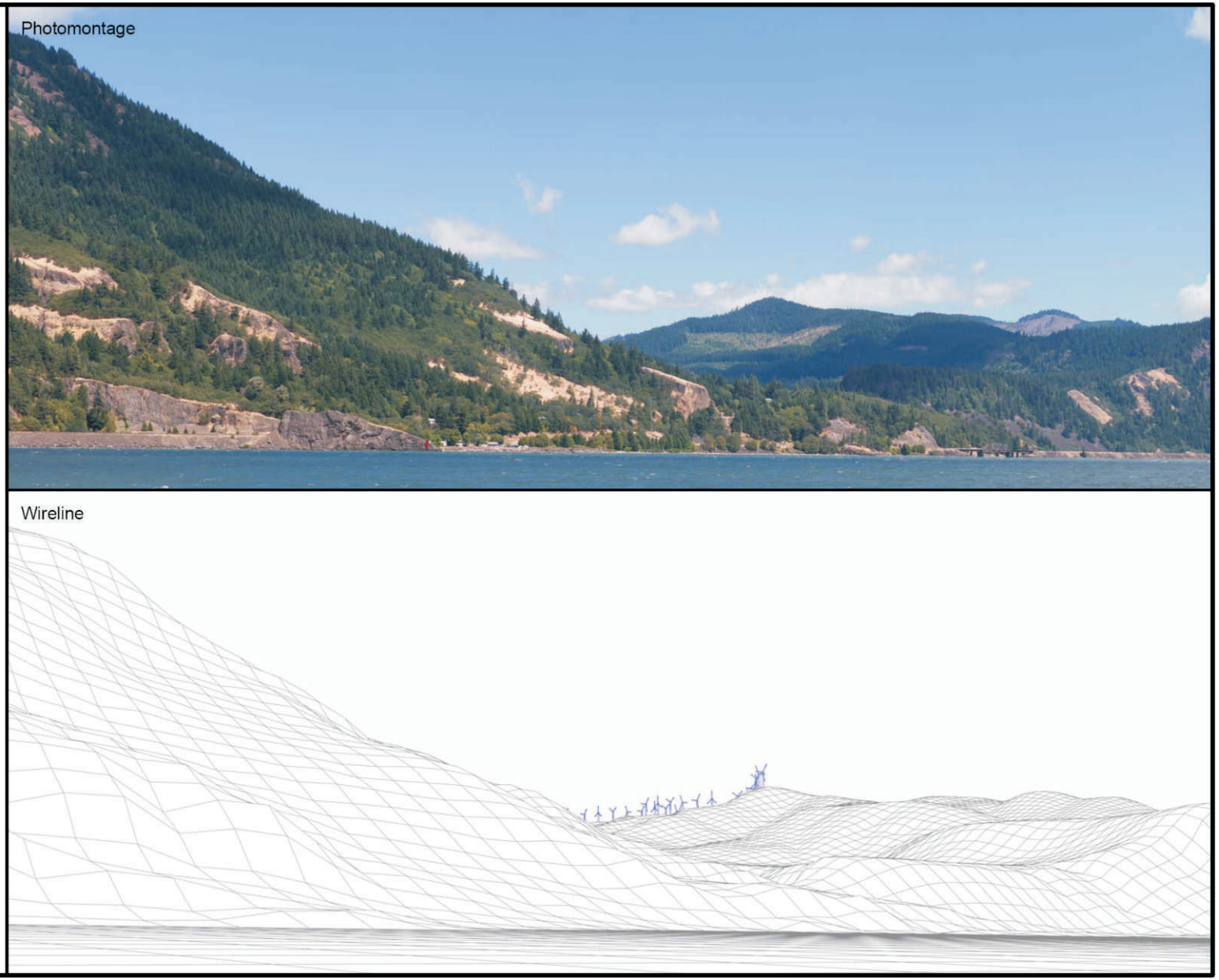
Viewpoint Location

45°41'59" N 121°40'01" W
Bearing: 36°
Field of View: 49°
6.43 km to the nearest turbine
Elevation: 30 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 18
Number of tips visible: 46



Source: GeoDataScape.

Figure 3.9-11

Viewpoint 14 - Viento State Park

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

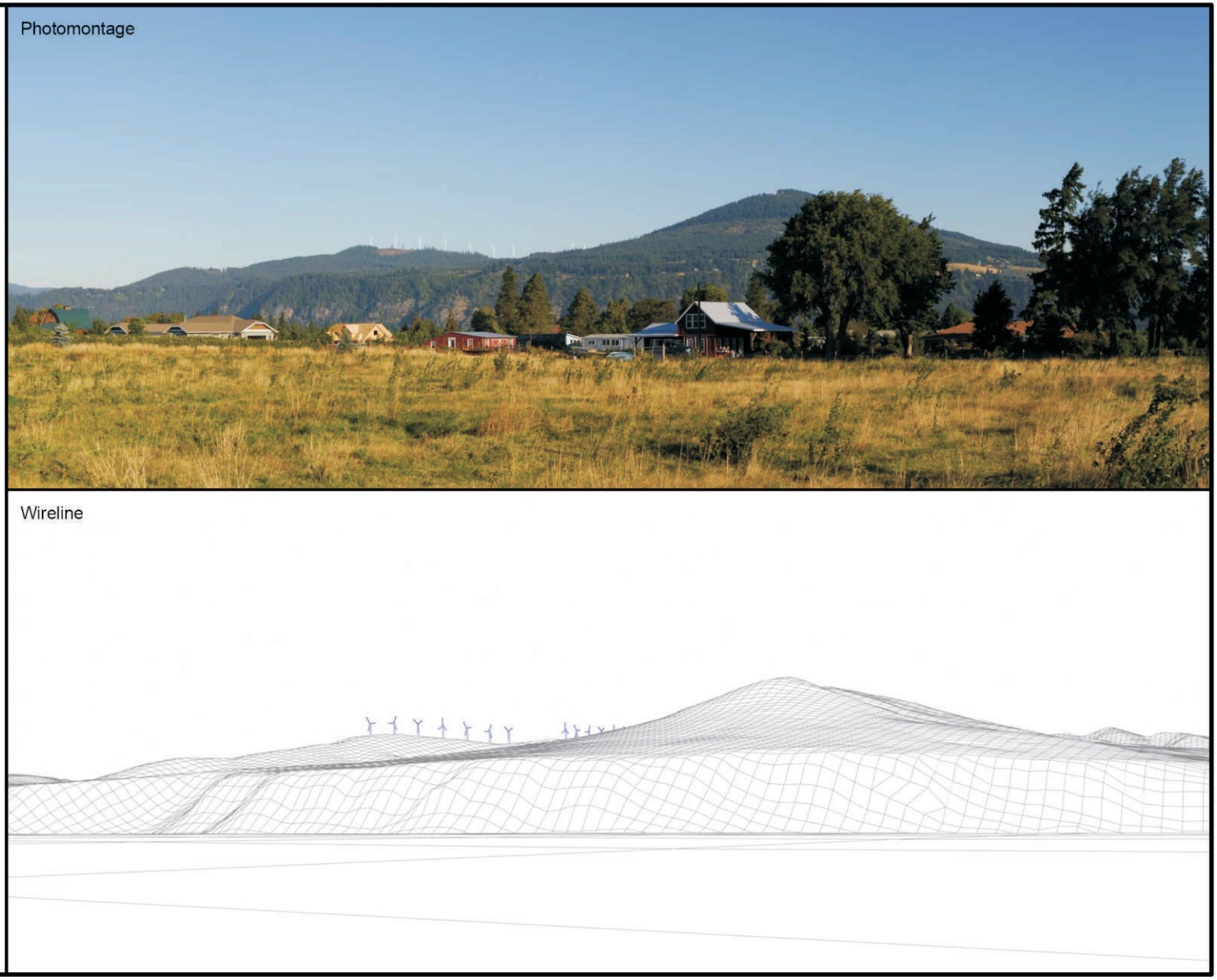
Viewpoint Location

45°41'48" N 121°33'17" W
Bearing: 331°
Field of View: 55°
7.25 km to the nearest turbine
Elevation: 191 meters

Turbine Information

Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 10
Number of tips visible: 29



Source: GeoDataScape.

Figure 3.9-12

Viewpoint 15 - Frankton Road

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°42'13" N 121°31'25" W
Bearing: 332°
Field of View: 59°
8.17 km to the nearest turbine
Elevation: 143 meters

Turbine Information

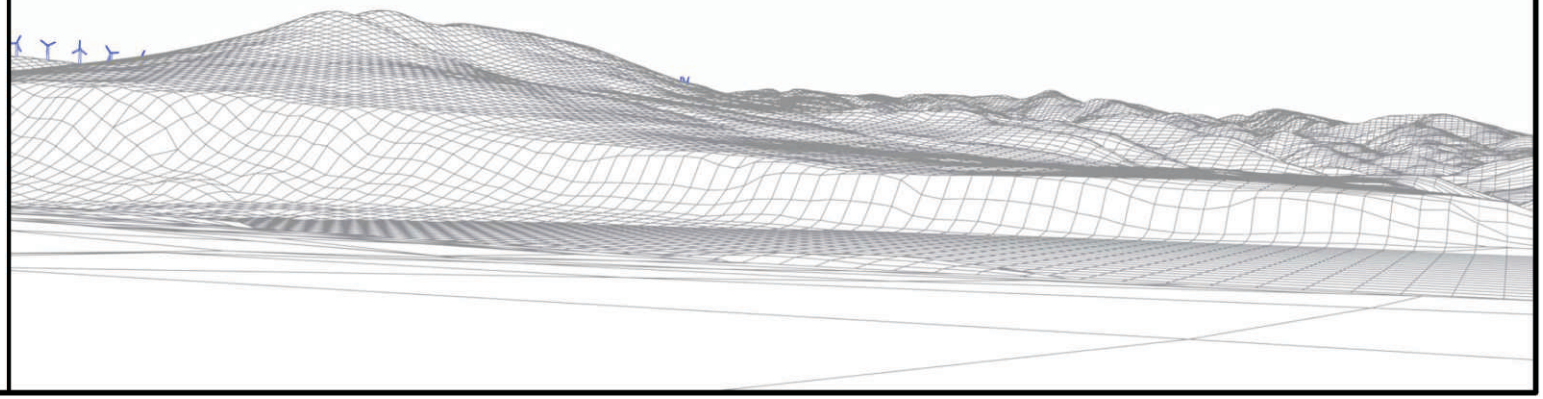
Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 4
Number of tips visible: 11

Photomontage



Wireline



Source: GeoDataScape.

Figure 3.9-13

Viewpoint 17 - Providence Hospital

URS

Whistling Ridge Energy Project
Skamania County, Washington

Photomontage and Wireline

Viewpoint Location

45°42'14" N 121°29'04" W
Bearing: 317°
Field of View: 63°
10.75 km to the nearest turbine
Elevation: 146 meters

Turbine Information

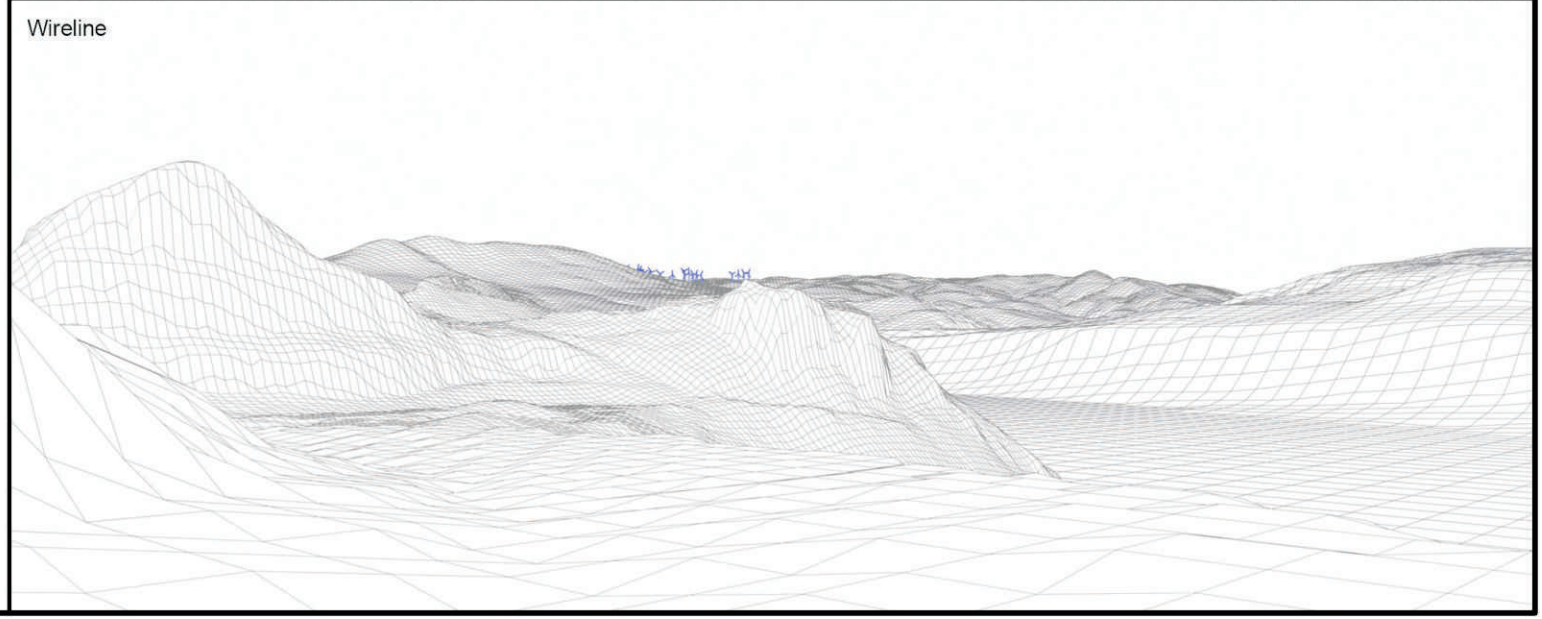
Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 11
Number of tips visible: 39

Photomontage



Wireline



Source: GeoDataScape.

Figure 3.9-14

Viewpoint 19 - Columbia River Highway

Photomontage and Wireline

Viewpoint Location

45°44'15" N 121°36'07" W
Bearing: 345 °
Field of View: 58°
1.02 km to the nearest turbine
Elevation: 482 meters

Turbine Information

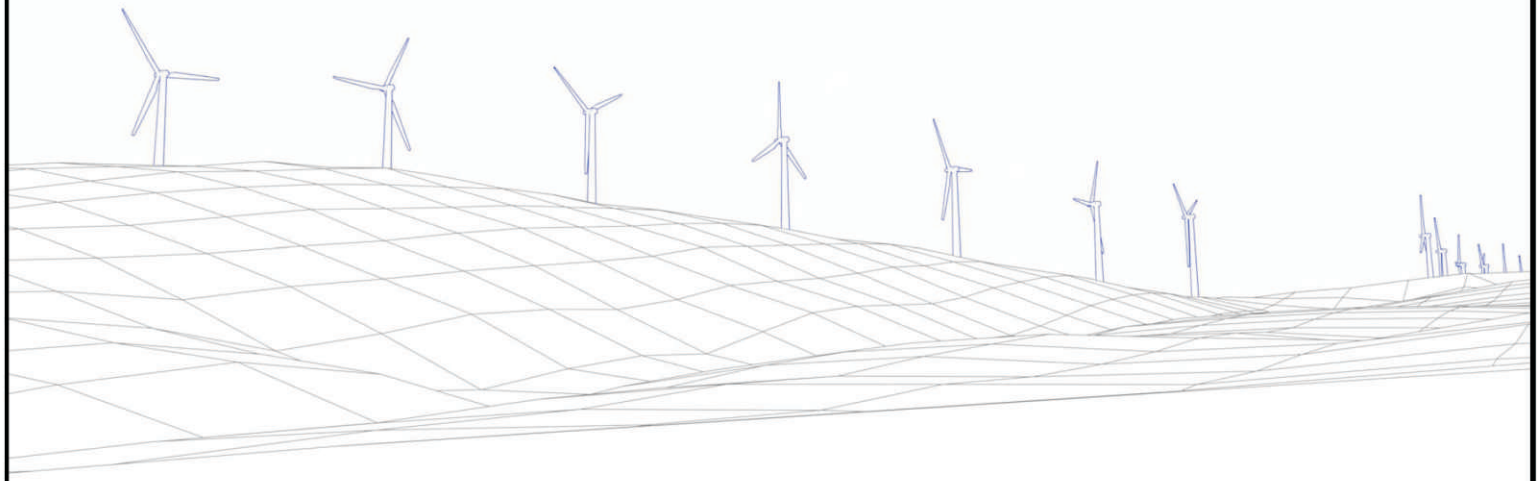
Hub Height: 80 meters
Rotor Diameter: 93 meters

Number of hubs visible: 8
Number of tips visible: 21

Photomontage



Wireline



Source: GeoDataScape.

Figure 3.9-15

Viewpoint 23 - Ausplund Road End

URS

Whistling Ridge Energy Project
Skamania County, Washington

Viewpoint 1: Pucker Huddle (Figure 3.9-3)

From Viewpoint 1, approximately 25 turbines would be visible on the ridge tops at distances of approximately 4 miles to the nearest turbines. At the distance depicted in the photo, the visual clutter of more turbines has more impact than the considerable scale of the larger turbines. The composition would be silhouetted against the sky, increasing their visual impact. However, the distance and the line of sight from the residential areas would minimize the contrast. The presence of the turbines would reduce the scene's degree of intactness by introducing a large number of highly visible engineered vertical elements.

The potential visual impact from Viewpoint 1 would range from low to moderate.

Viewpoint 3: Husum (Figure 3.9-4)

From Viewpoint 3, approximately 27 turbines would be visible on the ridge tips at a distance of approximately 4.75 miles to the nearest turbines. Figure 3.9-4 illustrates the simulated views from SR 141 traveling south into the Project Area. Travelers moving along this highway are generally using the road to access recreation areas or for leisurely drives. Residential viewers would be screened to some degree from the view based on vegetation, landscaping, and the line of sight from the valley floor. Introduction of these vertical structures in the background of this view would decrease the intactness of the landscape, based on the numbers of turbines that would be visible. The composition of the view would be altered with the introduction of these engineered structures and would be apparent on the horizon to the travelers and residence in the area.

Due to the low levels of viewers, duration of the views, and viewer awareness, the visual impact from Viewpoint 3 is considered moderate.

Viewpoint 4: Ausplund Road and Cook-Underwood Road (Figure 3.9-5)

From Viewpoint 4, approximately 14 turbines would be visible looking northwest from the roadway, at a distance of approximately 1.23 miles to the nearest turbines. Figure 3.9-5 illustrates the simulated view from the roadway at the intersections of Ausplund and Cook-Underwood Roads. Because of the position of this viewpoint (direct line of sight) and its distance from the turbines, the turbines apparent scale would be visible and apparent. The presence of the turbines would likely have a moderate effect on the vividness of the existing view and a moderate impact on the overall sense of unity and intactness by the roadway and residential viewers.

The potential visual impact from Viewpoint 4 would be moderate.

Viewpoint 5: Willard (Figure 3.9-6)

From Viewpoint 5, approximately 24 turbines in turbine strings A and B would be visible from screened views from residences in the area of Willard. Figure 3.9-6 shows the simulated view from Viewpoint 5 in the northern portion of the Project looking southeast. These turbines would be located in the ridge tops, with the nearest turbines approximately 1.35 miles away. Because the turbines would be seen against the sky at medium range and screened in many residential views, they would still be visible in the background. This would reduce the visual unity and

intactness minimally when compared to the existing components in the landscape. The wind turbines would be arrayed uniformly along the ridgeline and would create a moderate change in the setting's existing low to moderate visual quality.

The potential visual impact from Viewpoint 5 would be moderate.

Viewpoint 7: Mill A (Figure 3.9-7)

From Viewpoint 7, approximately 35 turbines in strings A and B would be visible in the foreground, middle ground, and background of this view. The nearest turbines would be located approximately 1.62 miles away. Figure 3.9-7 shows the simulated view. The turbines would be seen against the sky. The presence of the long line of turbines may create a slight increase in the vividness of this view. The unity of the view would be decreased further by the long turbine line and the intactness of the view would be moderately compromised compared to the existing view.

The potential visual impact from Viewpoint 7 is considered to be low to moderate.

Viewpoint 11: I-84 Westbound (Figure 3.9-8)

From Viewpoint 11, approximately 19 turbines would be visible in the distance background to roadway travelers looking west into the Project Area from I-84. The nearest turbines would be 8.39 miles away. Figure 3.9-8 shows the simulated view. Although the turbines would be visible to travelers on the far horizon, their presence is not expected to decrease the existing quality of this view, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 11 was rated as moderate to low.

Viewpoint 12: Koberg Park (Figure 3.9-9)

From Viewpoint 12, approximately 17 turbines would be visible in the distant background to recreational users of the park and river. The nearest turbines would be approximately 6.60 miles away. The view looks west into the Project Area. Figure 3.9-9 shows the simulated view. Although the turbines would be visible to the viewers on the far horizon it is not expected to decrease the existing quality of this view to a great degree, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 12 was considered to be moderate.

Viewpoint 13: I-84 Eastbound (Figure 3.9-10)

From Viewpoint 13, approximately eight turbines would be visible in the background to travelers on the roadway looking west into the Project Area from I-84. The nearest turbines would be approximately 3.43 miles away. Figure 3.9-10 shows the simulated view. This view for travelers would be of short duration. Although the turbines would be visible to travelers on the horizon it is not expected to decrease the existing quality of this view because of the number of turbines visible and the partial screening from the middle ground ridgeline. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness for these reasons.

The potential visual impact from Viewpoint 13 was rated as moderate to low.

Viewpoint 14: Viento State Park (Figure 3.9-11)

From Viewpoint 14, approximately 20 turbines in the background would be visible to the recreational users of the area. The nearest turbines would be just under four miles away. Figure 3.9-11 shows the simulated view. Although the water-related recreational activities would have the line of sight more related to the water and river banks, the recreational users moving through this area would be affected by this contrast in the view. The vividness of the scenic quality may be positively or negatively affected, depending on the user perception of turbines in the background. The unity and intactness of the existing view would be moderately compromised and the visible turbines would have a moderate effect on the view's scenic quality compared to existing conditions, due to the distance from the park and activities in the foreground and middle ground.

The potential visual impact for Viewpoint 14 was considered to be moderate.

Viewpoint 15: Frankton Road (Figure 3.9-12)

From Viewpoint 15, approximately 10 turbines can be seen, with the nearest turbines approximately 4.51 miles away. Figure 3.9-12 shows the simulated view. At this distance, the contrast would have a minor effect on the overall visual impact. Consequently, because the prominence of the turbines in the view would be low, the turbines would have a minor effect on the vividness, unity, and intactness from this viewpoint.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 17: Province Hospital Hood River (Figure 3.9-13)

From Viewpoint 17, only two turbines can be seen, and they are diminished by the distance (just over five miles). Figure 3.9-13 shows the simulated view. At this distance, viewers would have to scan the horizon to find the turbines. Consequently, minor effect or negligible effects to the scenic quality is expected.

The potential visual impact from this viewpoint would be low.

Viewpoint 19: Columbia River Highway (Figure 3.9-14)

From Viewpoint 19, approximately nine turbines are visible in the distant background. The nearest turbines would be approximately 6.46 miles away. Figure 3.9-14 shows the simulated view. Although the turbines would be visible in the background the viewer would have to have a focused orientation to see them in the landscape. The amount of turbines and the limited prominence based on the distance is expected to have a minimal effect on the scenic quality from this viewpoint.

The potential visual impact from this viewpoint would be low.

Viewpoint 23: Ausplund Road End (Figure 3.9-15)

From Viewpoint 23, approximately eight turbines can be seen. The nearest turbine would be approximately 0.64 mile away. Figure 3.9-15 shows the simulated view. This area would be

within one mile of the Project and the turbines would be highly visible at the end of this road. However, very minimal use of these roads beyond workers associated with forest management reduces the viewer types. Regardless, the impacts of the turbines on the landscape would affect the scenic quality of the view.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 24: Dog Mountain

Because the Project Area cannot be seen from the Dog Mountain trail (either during the day or at night), no simulated view was prepared. There would be no impact.

Night Lighting

The Project would be required to comply with the Federal Aviation Administration aircraft safety lighting requirements for structures greater than 200 feet tall, which includes turbines and meteorological towers. The exact number of turbines that would require lighting would be specified by the Federal Aviation Administration after final Project plan review; however, current guidance requires that warning lights be mounted on the first and last turbines of each string, and from those end turbines, lights should then be positioned such that the next lit turbine is no more than 1/2 mile, or 2640 feet, from the last lit turbine. The lights would be synchronized to flash together to illuminate the full extent of the Project Area (Patterson 2005). These lights would be visible as small blinking points of red light; they would not light up the sky or the surrounding landscape. Aside from any required aircraft warning lights, the turbines would not be illuminated at night. There would be one meteorological tower located within the Project Area. Its location would be selected during the micro-siting process. Depending on its proximity to turbine towers, it may or may not require aircraft safety lighting.

The Draft EIS for the Nine Canyon Wind Project contains a generic illustration of night lights and can be found online at http://www.efsec.wa.gov/wildhorse/deis/figures/40%20Fig%203.10-9%20and%2010.pdf.

Columbia River Gorge National Scenic Area

During scoping, some commenters expressed concern that Project operation would impact the Scenic Area adversely since turbines would be visible from some Key Viewing Areas inside the Scenic Area. Analysis of KVAs and viewpoints within the Scenic Area were sought and analyzed. The presence of the Project would cause low to moderate visual impact to viewpoints within the Scenic Area,

Congress has determined that the National Scenic Act is not to be used to regulate activities outside of the Scenic Area boundary. The Act states that *"(a) Nothing in this Act shall ... (10) Establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management area."* ~~*no protective perimeters or buffer zones shall be established around the scenic area or each special management area. Activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard*~~

~~*from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas*~~ (16 USC § 544O(a)(10). This federal policy and Congressional mandate discourage projecting National Scenic Act policies, regulations and directives beyond the boundary of the Scenic Area.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days of Project decommissioning. The initial site restoration plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the Project. Visual and aesthetic impact from decommissioning would be similar to those expected during the construction phase.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major visual resource issues presently anticipated. If impacts to visual resources are anticipated to occur as a result of site restoration and project decommissioning, mitigation measures would be proposed as part of the plan.

3.9.3.2 No Action Alternative

Under the No Action Alternative, turbines would not be built. Existing visual conditions would continue unchanged, and would be influenced primarily by ongoing timber harvest until and unless a different applicant proposed to develop the wind energy potential of the area. In the event the failure to construct this Project results in continuation and expansion of fossil fuel energy generation sources, it is foreseeable that air quality, including haze conditions, would continue to be a negative impact to the air quality and scenic resources of the of the Columbia River Gorge National Scenic Area.

3.9.4 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential visual resource impacts during construction and operation of the proposed Project to the extent feasible.

- Ensure that a non-reflective flat neutral gray or light color is the choice of color for the turbines so that visual impacts would be minimized. The primary mitigation measure available for visual impacts is the choice of color for the turbines. Although a brown turbine color would reduce visual contrast in views where the turbines are seen against the landscape, it would also accentuate the visibility of the turbines where they would be seen against the sky. In addition, the brown color would have a greater contrast when snow is on the ground. Because the turbines are most frequently seen against the sky, particularly in close-range views where visual concerns are the greatest, a non-reflective flat neutral gray or light color would be ideal.

- Comply with Federal Aviation Administration requirements for safety lighting. Lights typically used to meet Federal Aviation Administration requirements would to some extent be shielded from ground level view due to a constrained (3–5 degree) vertical beam. The Federal Aviation Administration would independently review the lighting of individual turbines during the micrositing process and consult on mitigation. However, the Project must comply with the safety lighting requirement.

3.9.5 UNAVOIDABLE ADVERSE IMPACTS

The Project would cause some visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area. However, the visual impact analysis showed that the anticipated level of visual impact would not be higher than low to moderate at any of the viewpoints examined.

3.9.6 REFERENCES

Buhyoff, G.J., P.A. Miller, J.W. Roach, D. Zhou, and L.G. Fuller. 1994. An AI Methodology for Landscape Visual Assessments. *AI Applications* 8, no. 1: 1-13.

European Wind Energy Association (EWEA). 2003. Focus On Public Opinion: A Summary of Opinion Surveys on Wind Power. Accessed at: http://www.ewea.org/fileadmin/ewea_documents/documents/publications/WD/WD22vi_public.pdf.

Federal Highway Administration (FHWA). 1988. *Visual Impact Assessment for Highway Projects*.

Patterson, James W. 2005. Development of Obstruction Lighting Standards for Wind Turbine Farms. FAA Technical Note DOT/FAA/AR-TN05/50. November.

US Forest Service (USFS). 1995. *Landscape Aesthetics, A Handbook for Scenery Management*.

3.10 HISTORICAL AND CULTURAL RESOURCES

This section describes existing historical and cultural resources in the Project vicinity and identifies potential impacts to these resources from construction and operation of the proposed Project. Cultural resources include buildings, sites, structures, and objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. Artifacts, records, and material remains associated with these properties, and traditional cultural properties, which can include archaeological, traditional procurement, and religious sites and landscapes, are types of cultural resources.

The primary source of information for this section is the Cultural Resources Inventory Report prepared in support of the Application for Site Certification by URS (2009), as supplemented by fieldwork done by URS in December 2009 (URS 2010). The Cultural Resources Inventory Report was designed to identify, evaluate, and record pre-contact and historic cultural resources.

URS did so in accordance with Chapter 36 CFR §800 of the National Historic Preservation Act (NHPA) which is the regulatory requirement for the BPA Project Area as noted in Section 1.2.2. BPA's Project Area would be limited to the location of its proposed substation at the point of interconnection. The survey also was designed to fulfill the Applicant's SEPA requirements for their portion of the Project, the wind facility itself). The survey objectives include identifying archaeological resources and historic properties that might be considered eligible for the National Register of Historic Places (NRHP) located within the area of potential effects (APE) for the proposed Project for both BPA's interconnection and the Applicant's wind facility.

3.10.1 REGULATORY SETTING

3.10.1.1 Laws and Regulations

Several federal and state laws protect cultural resources, including NEPA and SEPA, which require that impacts of federal and state actions on cultural resources be identified and assessed in environmental documents, as well as the National Historic Preservation Act (NHPA), which establishes a national policy of historical preservation and requires that the effects of Federal actions (such as BPA's interconnection with the Project) on significant cultural resources be determined. Collectively, these regulations and guidelines establish a comprehensive program for the identification, evaluation, and treatment of cultural resources.

To be eligible for the National Register of Historic Places (NRHP), properties must be at least 50 years old (unless they have special significance) and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meet at least one of four criteria:

- ***Criterion A:*** be associated with important historical events or trends;
- ***Criterion B:*** be associated with important people;
- ***Criterion C:*** have important characteristics of style, type, or have artistic value;
- ***Criterion D:*** have yielded or have potential to yield important information.

If a resource is determined eligible for the NRHP, then Section 106 of the NHPA (80 Stat. 915; 16 USC 470) and its implementing regulations (36 CFR 800) require that effects of the proposed federal project to that resource be assessed. If a property eligible for the NRHP would be adversely affected by the proposed federal action, the federal agency must evaluate alternatives or modifications to the proposed action that would avoid, minimize or mitigate adverse effects.

3.10.1.2 Area of Potential Effect

The NHPA requires that the Area of Potential Effect (APE) for the Project Area be determined. As a federal law, the NHPA requires federal agencies to evaluate the impact of all federally-funded or permitted projects on historic properties (buildings, archaeological sites, etc.) through

the Section 106 review process. This process applies only to BPA's portion of the Project (the interconnection). However, the DEIS included an APE for the entire Project Area. Figure 3.10-1 has been updated to show the BPA's APE and the Applicant's APE. For BPA, the APE is the proposed substation site--a 5 acre plot and several steel lattice and wood pole structures located towards the southern end of the Applicant's Project Area. As part of the Section 106 review process, the Washington Department of Archaeology and Historic Preservation (DAHP) concurred with BPA's definition of BPA's proposed APE on August 9, 2010 (see Appendix E).

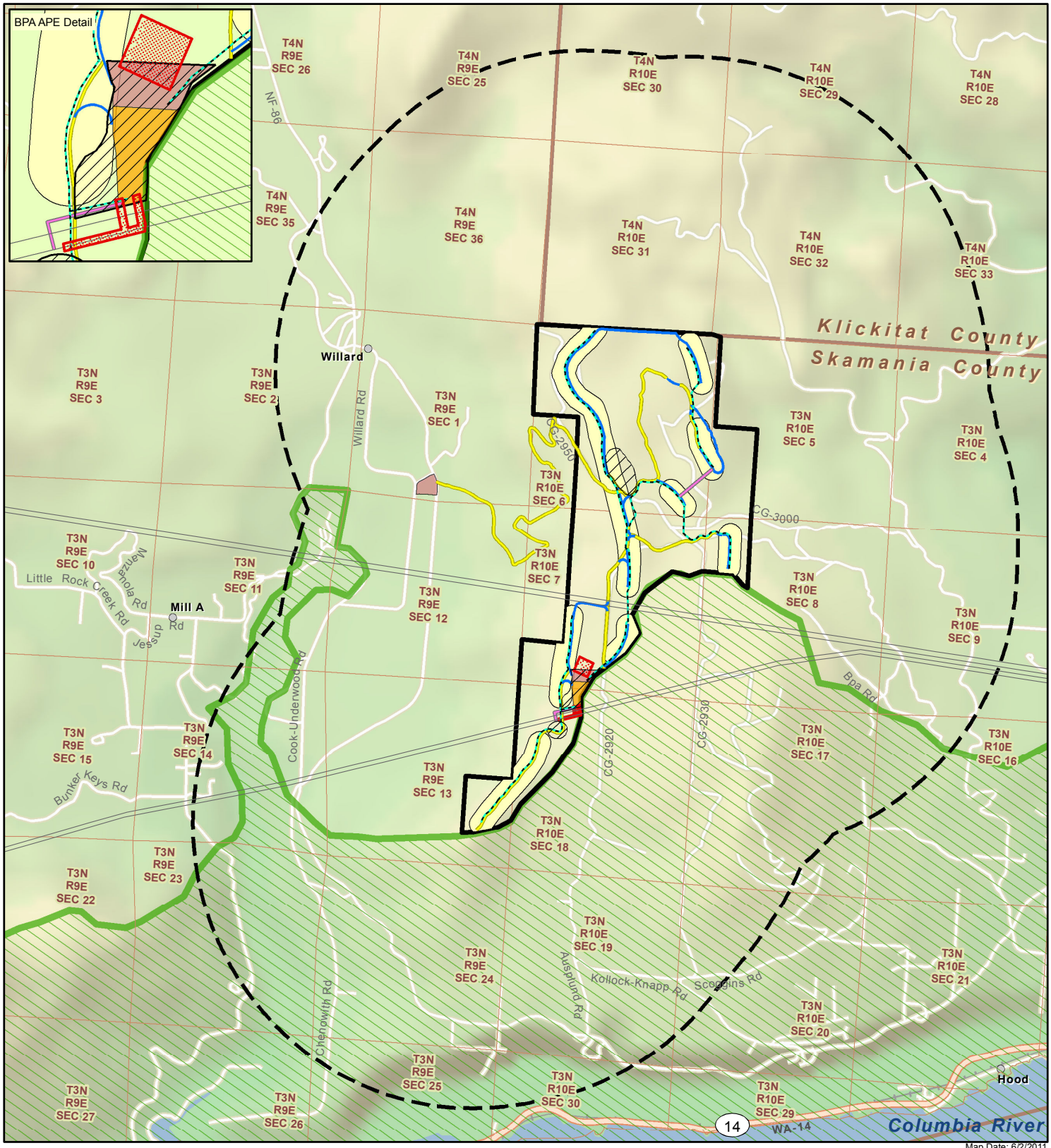
The proposed Project has the potential to affect cultural resources and as such an APE was identified (the Applicant's APE). The APE for direct effects to cultural resources is considered to be the footprint for potential ground-disturbing activities that are anticipated to occur during construction and long-term maintenance of the Project. For the Project, ground disturbance could take place in the turbine string corridors, road corridors inside the Project Area, the West Pit Road outside the Project Area, overhead and underground transmission corridors inside the site Project Area, the Operation and Maintenance facility (two alternative sites), and ~~the substation and~~ lay-down areas. These activities have a total footprint of approximately 379 ~~384~~ acres (Figure 3.10-1) and constitute the APE for the Applicant's direct effects to cultural resources. The Applicant's indirect APE is the area outside of the Project boundary where the Project may have, for instance, a visual impact on significant cultural resources. DAHP concurred with EFSEC's definition of the APE for the Applicant on February 1, 2010 (see Appendix E).

3.10.2 AFFECTED ENVIRONMENT

3.10.2.1 Cultural Context

Pre-Contact Background

The archaeological record of the Columbia Plateau documents the prehistory of a region that is distinguished by local adaptations to a unique set of resources and its inland maritime environment (Chatters and Pokotylo 1998). Archaeological research near the site has focused principally within the Columbia River corridor, and models for the Portland Basin of the Northwest Coast culture area (Pettigrew 1981), the Columbia Plateau culture area (e.g., Galm et al. 1981), and the White Salmon and Klickitat rivers specifically (Masten and Galm 1989) can be applied. An overview of archaeological research within the Columbia River Gorge has been summarized by Beckham et al. (1988). Recently, Griffin and Churchill (2001) synthesized the multiple cultural chronologies that have been posited for the region; the following discussion is based on their synthesis.



Map Date: 6/2/2011

Map Features

- BPA APE
- Applicant's APE (Indirect Effects)
- Approximate Location of 5 Acre Laydown Staging Areas
- 5 Acre Substation Plot
- 5 Acre Operations and Maintenance Facility Alternative Locations
- 650' Turbine Corridor
- Site Boundary
- PLSS Sections
- Columbia River Gorge National Senic Area
- BPA Transmission Lines
- Improved Existing Roads
- New Project Roads
- Overhead Power Line
- Buried Collector Lines - Turbines to Substation

0 1,000 2,000 4,000 Feet

Figure 3.10.1

Area of Potential Effects

Whistling Ridge Energy Project
Skamania County, Washington

The Early period dates from 11,000 to 4,500 years BP, though recent studies at Paisley Caves in Oregon suggest an even earlier date of regional occupation at least by about 14,300 BP (Jenkins 2009). A mobile lifestyle focused on intensive riverine resources with periodic use of uplands is inferred. Subsistence shifted from reliance on large game to an increase in the importance of fish, root, and vegetable resources by the end of the period. Permanent structures are not found in association with the earliest sites, but semi-subterranean house settlements appeared along major rivers at the latter stage, reflecting an increase in sedentism. Sites dating to this period have mostly been found around The Dalles at the eastern end of the Columbia River Gorge (Griffin and Churchill 2001).

The Middle period occurred from approximately 4,500 BP to 250 years BP and is characterized by increased occurrences of semi-subterranean houses and the appearance of food storage facilities, indicative of further sedentism and decreased mobility. Concurrently, there was intensification of use of fish, roots, and vegetable resources during the first half of the period, with hunting of secondary importance. The pattern of winter sedentism was apparently established during this period. There are more archaeological sites, including villages, fishing camps, and hunting camps that date to this period and that are found in the area between the Cascade Mountain Range and the town of Lyle, as well as The Dalles area (Griffin and Churchill 2001).

The Late period, dating from 250 to 100 years BP, is defined by the appearance of the horse on the Columbia River Plateau (circa 1730s), which increased the mobility and resource acquisition patterns of local groups. The period is also marked by the introduction of trade goods and the devastating effects of introduced diseases on the local populations, as well as the arrival of Euro-Americans. There is an increase in the quantity and distribution of sites dating to this period, with most being located along the confluences of major rivers and the Columbia River, though several sites are found on sandy terraces as well as within the islands. A large number of historic villages were noted by Lewis and Clark between Beacon Rock and The Dalles during their 1805–1806 travels (Griffin and Churchill 2001).

Along the lower White Salmon River, Middle and Late period projectile point styles are common. Recorded site types in this area include housepit villages, temporary camps, petroglyph sites, and cemetery sites (Griffin and Churchill 2001).

Ethnographic and Ethnohistoric Background

The proposed Project Area is located near the boundary between two ethnographic culture areas of the Pacific Northwest, the Northwest Coast, and the Columbia Plateau.. Local groups living in the Columbia River Gorge at the time of historic contact are known from the languages they spoke as the Upper Chinookans and the Echeesh-Keens (Sahaptins)[23] (Beckham et al. 1988; Griffin and Churchill 2001). In the general area of the Project, the Columbia River Gorge was

[23] Griffin and Churchill (2001) note that the Yakama Nation prefers the use of "Echeesh-Keen" over the term "Sahaptin."

used by the Eastern Chinookan-speaking Wishram, White Salmon, and Cascades people, as well as the Echeesh-Keen-speaking Yakama and Klickitat (Griffin and Churchill 2001).

The Upper Chinookans occupied the Gorge from the vicinity of the mouths of the Sandy and Washougal rivers east to the Deschutes River. Various Echeesh-Keen speaking groups lived to the east, including the Tenino, Klickitat, Yakama, and Umatilla. The Yakama primarily occupied territory north of the Tenino, while the Klickitat occupied inland regions to the northwest, extending to the Columbia River in the vicinity of the Klickitat River, along with Wishram peoples (Beckham et al. 1988, French and French 1998). Of these groups, the Project Area falls within territory that would have probably been used most intensively by the White Salmon, who comprised several small bands residing primarily in an area extending from about ten miles below The Dalles to the White Salmon River area, especially at the mouth of this river, although they lived away from the river as well (Ruby and Brown 1992).

During the nineteenth century, White Salmon usage most notably overlapped with the Klickitat, the Echeesh-Keen-speaking group primarily occupying the upper drainages of the Klickitat and White Salmon rivers. Several villages were found at the mouth of the White Salmon River, including at least one that was shared with the Klickitat (French and French 1998, Ruby and Brown 1992, Spier and Sapir 1930). White Salmon winter villages were found upriver along the White Salmon near the contemporary communities of Husum and BZ Corner, and along Rattlesnake Creek to the north (Griffin and Churchill 2001). Use of *Namnit* (45SA22), an important ethnohistoric period fishing village at the mouth of the White Salmon River, continues into the present.

Less information appears to be available in the historic record regarding traditional use of the Little White Salmon River west of the White Salmon River. Another important village site was situated at the mouth of the Little White Salmon River: *Skatxlmmax,* or 'eating place,' and *sqtdalpt*, or 'it keeps tearing out', both refer to the village located at modern-day Cook along the Columbia River (French and French 1998). Salmon came to spawn here, and in winter whitefish could be taken from the spawning pools (Nielsen 1959). A trail from Drano Lake traversed the east side of the river into the upper valley. Two main huckleberry fields, including Big Huckleberry Mountain on the south side of the lava beds and Little Huckleberry Mountain towards the headwaters of the Little White Salmon River, were frequented. Bark was peeled from many cedar trees along this trail for use in basket making. The racetrack near Red Mountain was the location of a big annual social event held in conjunction with the berry picking and drying (Nielsen 1959).

The Upper Chinookan and Echeesh-Keen peoples followed a similar seasonal pattern of subsistence activities, except that the former relied more heavily on fish than the latter (Griffin and Churchill 2001). In winter, limited hunting and fishing took place but subsistence was based on stored foods. With the arrival of the spring Chinook salmon, people would gather roots in the nearby hillsides. After the snow packs melted away, movement into the uplands occurred since fishing sites were usually inundated. Dried roots would then be hauled to the winter villages for storage in semi-subterranean cellars. Important spring gathering areas included Camas and Panakanic prairies, Deadhorse Meadow, and the Snowden area. Following the spring root gathering, people returned to the fishing areas along the major rivers to fish for blueback and

Chinook salmon, and women would gather golden currant, gooseberry, dogwood, service berry, and choke cherry from the river and nearby uplands. A type of tobacco was planted and harvested by Chinookans (French and French 1998). In late summer and early fall, huckleberries were picked in the uplands near Mt. Adams, and hunting for deer and elk occurred. Toward late fall, the winter villages would be reoccupied. The White Salmon River was a focal area for tule salmon harvested in the fall that attracted many families to the region (Griffin and Churchill 2001, Norton et al. 1983, Schuster 1998, Winthrop and Meninick 1996). The fishing village at the mouth of the White Salmon River also functioned as a minor trading center (Griffin 2001).

In sum, the ethnographic and ethnohistoric context indicates that the Project Area is situated along a high-elevation ridgeline about two to three miles from two ethnographic riverine village sites, and within approximately one mile of the Little Salmon River valley, which would have formed a natural travel corridor providing access from the Columbia River to upland regions to the north, such as the popular berry picking grounds in the Mount Adams country. No specific reference to the promontories that are in or near the Project Area, now known as Chemawa Hill or Underwood Mountain, were encountered in the reviewed literature, but proximity to known village sites suggests these high places and the adjacent ridgelines composing the Project Area could have been visited occasionally for non-residential, transient uses such as for spiritual activities, burials, or resource acquisition activities related to hunting, cedar peeling, plant gathering, and berry picking.

Historic Background

The first white pioneers to settle the section of the Columbia River between the Cascades and the confluence of the Snake River were reportedly the Joslyn family, who arrived at the White Salmon flats in 1852 and attempted to purchase their lands from the local Klickitats, in addition to filing a Donation Land Claim (McCoy 1987). Increased settlement by whites led to the creation of reservations throughout the region during the 1850s. Fourteen tribes and bands were signatories to the Yakama Treaty of June 9, 1855, when the Yakama ceded around 11 million acres to the US Government, while retaining rights for hunting, fishing, and gathering at traditional locations, and agreed to the establishment of the 1.3 million-acre Yakama Reservation. The White Salmon Reservation was temporarily established at the mouth of the White Salmon River at the Joslyn claim in 1856 for around 800 Native peoples who were not active in the Yakima War of 1855–1856, during which time a coalition of interior tribes led by Kamiakin fought against the US Army and local settlers. At the end of the war two years later, the White Salmon Reservation was closed and residents were removed to the Yakama Reservation. Some avoided relocation and claimed lands their families had traditionally used, including around Northwestern Lake and along the area's minor drainages such as Buck Creek. Although a few took up farming, most continued to practice traditional subsistence activities at traditional places such as the Underwood In Lieu Site (Griffin and Churchill 2001).

The Underwood town site, located about six miles southeast of the Project Area and along the Columbia River, was among the earliest of the pioneer settlements in this portion of the Columbia River Gorge. Amos Underwood was a contemporary of the Joslyns who arrived in the region in 1852 and married Chief Chenowith's daughter, Ellen. In 1861, Amos and Ellen Underwood built a log house at the site of the present town bearing their name, as well as a dock

and pier to accommodate sternwheelers. Amos' brother Edward Underwood also settled here and his house reportedly served as an Indian gathering place, especially in the fall during the salmon runs on the White Salmon River (Thun 1959). The Underwood brothers platted a town site in 1904, in anticipation of growth related to the construction of the Spokane, Portland, & Seattle Railway beginning the following year (McCoy 2003).

The upper drainage of the Little White Salmon River Valley, including the location of the proposed alternate site for the Operations and Maintenance facility along Willard Road, was not homesteaded until the 1880s and 1890s, when the more desirable lower-elevation lands had already been taken (Thun 1959). There were a reported 35 homesteads from Cooks to the present day Oklahoma park at the head of the river (Nielsen 1959). A review of late-nineteenth century General Land Office maps (BLM 2009a) dated 1876 does not depict any settlement or other features of historic interest in or near the Project Area.

The history of the White Salmon and Little White Salmon region has a long association with the logging industry. Initially, the Menominee Lumber Company cut the easily-accessible timber into logs that could be floated down the White Salmon River.. Oxen and horses were used to drag the timber, which traveled across several constructed rollaway dams before reaching the Columbia River, where they were rafted for towing to the Hood River mill (McCoy 1987). Wind River Lumber Company succeeded Menominee, using their dams along the White Salmon as they removed virgin timber from the Buck Creek, Mill Creek and Underwood Mountain areas (McCoy 1987). It was at this time that the upland forests of the Project Area were probably first harvested.

As of 1896, there were seven sawmills operating in Skamania County, the most notable of these being the Oregon Lumber Company's along the Little White Salmon River (Price 1896). After the logging of Underwood Mountain was complete, the Oregon Lumber Company established the Mill A sawmill and headquarters along the west side of the Little White Salmon River, and another sawmill at Chenowith Flat on the east side of the Little White Salmon River at what was known as Mill B (less than one mile to the south of the proposed Maintenance Yard Alternative Location at Willard Road) (Attwell 1975, McCoy 1987). There were flumes on both sides of the river that carried the lumber to the Columbia (Atwell 1975). When the supply of timber became more difficult to access, the company closed the mill in 1907, and moved it to Oregon (McCoy 1987, Nielsen 1959, Thun 1959).

Broughton Lumber Company was established around 1916 by Harold Broughton and D.M. Stevenson, who operated a mill at Willard along the Little White Salmon River. Using water diverted from the Little White Salmon River,, Broughton Lumber Company transported the timber via a flume connecting the mill at Willard to the Columbia River, and then rafted the logs across the river to Oregon for railroad transport. The flume originally consisted of a 4.5-mile long segment from Willard to Drano Lake, and was constructed by the Drano Flume Company around 1913. In 1923, Broughton purchased the Drano Flume Company and expanded their operation by building an additional 4.5 miles of flume from Drano Lake eastward along the Columbia River to a new resaw and planing mill located along the railroad near Underwood (McCoy 1987, Thomas 2007). Following its completion, boards could travel the nine -mile long flume to the planning mill in less than an hour.

From 1923 to about 1940, Broughton Lumber Company constructed and operated a railroad for transport of logs to the primary mill. Two steam engines were used and a maximum of nine miles of track that were laid to haul timber from the woods to the mill at Willard,, but the tracks had no permanent location, as they were moved and re-laid as necessary. The Broughton Lumber Company operation closed in 1986, and portions of the flume from Willard to the Columbia River were dismantled by the company shortly thereafter (Thomas 2007).

The logging activity that cleared extensive areas on Underwood Mountain in the early-twentieth century opened up these lands for orchard use at the same time. Settlement occurred quickly as a result of the "Apple Boom," the period between 1905 and 1920 when vast orchards were planted along the White Salmon Valley, on Underwood Mountain, and elsewhere throughout the region. In 1908, the completion of the railway across the north shore of the Columbia River contributed to this influx of residents. White Salmon emerged as a main trading center by 1910, and fruit packing plants were established along the railway (McCoy 1987 and 2003).

Land patents were filed relatively late, from 1905 to 1910, for the high elevation ridgelines that characterize most of the Project Area (BLM 2009b). The correlation of the land patent dates with the regional orchard boom and railroad completion date in the Project Area is suggestive of prospective claims either for orchards or as investments for lumber resources. It has not been determined how many of the early-twentieth century claimants actually resided on their parcels. A 1929 USGS Hood River topographic quadrangle depicts the presence of one residential structure, an access road, and a trail within the Project Area.

Orchard growers at Underwood initially attempted to irrigate their crops with water pumped from the White Salmon River, but when the pump house was washed away by a flood, they attempted to take water out of Little Buck Creek using a gravity flume until the flume burned. Irrigation was not restored, and some orchard growers and farmers lost their land by foreclosure due to inability to pay taxes. A hard freeze in 1919 killed many apple trees, and several growers switched to winter pear crops (Thun 1959). Commercial orchards generally failed in the White Salmon Valley due to dry land and lack of organized irrigation, severe winters, and a short growing season at higher elevations. Many orchards were simply abandoned and reclaimed by second-growth timber (McCoy 1987 and 2003).

Improvements in transportation along the north shore of the Columbia River occurred after the 1919 opening of the North Bank Highway, especially when the five tunnels west of Underwood were completed in 1937. The Hood River to White Salmon Bridge was opened in 1924 (McCoy 2003), further connecting the economies of the two towns.

3.10.2.2 Cultural Resources Overview

Tribal Consultation and Traditional Cultural Resources

Based on the archival review, no specific traditional cultural properties or sacred sites are documented within the Project Area. Given that this information is culturally sensitive, however, the reviewed records are not likely to contain specific references to traditional or sacred sites that could occur within the Project Area and tribal consultation is required to address their potential

presence (Parker 1993). ~~BPA will conduct the government-to-government tribal consultation for this project as per Section 106 of the NHPA.~~

To incorporate tribal involvement at an early stage in the process, the Applicant initiated contact with the Confederated Tribes and Bands of the Yakama Nation. The Applicant invited the participation of both the Yakama Nation Cultural Resources Department and two local resident tribal members to assist with the identification of potential sensitive, traditional, and/or sacred resources.

Through the Yakama Nation's Cultural Resources Program (CRP), the Applicant requested participation of tribal members for the archaeological field inventory, sponsored a field trip to the Project Area, and solicited ~~has attempted to solicit~~ concerns with regard to potential cultural resources of importance to the tribe. The Applicant contacted the Yakama Nation Cultural Resources Department to review their confidential data sources and to report any potential areas of sensitivity, as appropriate, so that these areas can be avoided and protected early in the planning process. A field investigation by Yakama Nation cultural resources specialists occurred in December 2009. During this investigation, members of the Yakama Nation determined that there is a Traditional Cultural Property (TCP) within the Applicant's APE. Due to the sensitive nature of the TCP, specific information regarding the type of TCP has not been included within this EIS. However, sacred sites such as these are important to the Yakama people of today and of the future. The Yakama Nation expressed opposition to construction of wind turbines within this area and recommended that the proposed Project be redesigned to avoid placing turbines on Chemawa Hill, or if full avoidance was not possible, then buffered zones should be established to protected the relevant features. In addition, the Yakama Nation also recommended avoidance of the Haran Farmstead. ~~The Yakama Nation's findings, currently in preparation, will supplement the information contained in this EIS.~~

Separate from Yakama Nation ~~Cultural Resources Department~~, the Applicant invited the participation of two local residents, also members of the Yakama Nation, who have long-standing ties to the area. Chief Wilbur Slockish of the Klickitat Tribe and Chief Johnny Jackson of the Cascades Tribe met with URS archaeologists prior to the November 2009 field inventory and jointly toured the Project Area. Both individuals stated that based on their knowledge of this area, the Project Area was not specifically used by their ancestors or contemporary Indians. Neither individual identified any traditional cultural properties or other sensitive or sacred sites within the Project Area.

BPA initiated consultation with the DAHP, The Confederated Tribes of the Umatilla Indian Reservation, The Cowlitz Indian Tribe, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission pursuant to 36 CRF 800.4(a)(4). On May 27, 2010, the Yakama Nation provided is cultural resources review and consultation report. On September 10th, 2010, BPA received a letter from the Yakama Nation stating that they did not agree with BPA's interconnection APE and believed that it should include the Applicant's APE as well. A BPA archaeologist spoke with a Yakama Nation archaeologist on March 31st,m 2011 regarding the APE. The Yakama Nation archaeologist noted that the Project application is undergoing an adjudicative review through EFSEC. On May

2, 2011, BPA representatives and Yakama Nation representatives met to discuss the Tribes' request for an expanded APE. It was discussed that BPA has no jurisdiction over siting of wind development facilities, a matter left to Washington EFSEC, and that BPA's APE and Section 106 review was limited to the proposed interconnection.

The Yakama Nation participated in part of the adjudicative process as an intervener. The Yakima Nation formerly withdrew its adjudicative testimony before the adjudicative hearing began. The Applicant is committed to continue working with the Yakama Nation throughout the life of the Project. This includes adjusting the number of proposed towers to be located on Chemawa Hill.

~~The Yakama Nation and EFSEC went to adjudication due to issues regarding the cultural resources, including the the TCP located within the Applicant's APE. An agreement was reached between the Yakama Nation and EFSEC. In addition, in part in response to the Yakama Nation's concerns, the Applicant reduced the number of towers located on Chemawa Hill. The Applicant also agreed to continue consultation with tribally-designated representatives as specific construction and siting occurs on Chemawa Hill and make adjustments where practicable to do so to address culturally sensitive areas.~~

Previously-Recorded Cultural Resources in the Project Vicinity

The DAHP maintains a state-wide database of previously-recorded cultural resource sites, historic register properties, and completed inventories. The locations of the cultural resource sites (e.g., archaeological sites) are managed as restricted access information. The locations of historic register properties (e.g., buildings and structures listed on the state or national register) are non-restricted information.

The DAHP database does not have any record of previous inventories within the Project Area including both the Applicant's and BPA's APEs. Prior inventory coverage in the general vicinity depicts a few small, scattered inventories in upland areas near Underwood Mountain, mostly related to development review projects in the Columbia River Gorge National Scenic Area. A limited linear inventory for a proposed timber sale occurred adjacent to and north of the Applicant's APE and did not identify any resources (Stilson 2005). In general, few inventories have been completed in the vicinity; those that have been completed are limited in scope and do not allow for comparisons or predictions to be made about the types of resources that could be found in the Project Area. Intensive inventory coverage has only occurred along the White Salmon River drainage several miles to the east of the Project Area, where numerous pre-contact and historic period sites have been identified.

One cultural resource was previously-recorded within the Project Area, consisting of the Broughton Lumber Company flume (45GP596). The flume formerly paralleled Willard Road at the western boundary of the alternative location for the Maintenance and Operations facility. The flume was dismantled and removed from this area following the 1986 closure of the mill along the Columbia River. Although sections of the historic flume are still present elsewhere, none remain in the Project Area. This site therefore reflects a former alignment rather than extant physical remains.

Within a one-mile radius of the Project Area are two additional sites: a mortar and peeled cedar found about 0.5 mile west of the Maintenance Yard at Willard, and an early-twentieth century debris scatter associated with an old homesite, found about one mile north of the APE within a similar forested, upland setting. No historic register properties (e.g., buildings and structures) are found within the Project Area or within 1.5 miles of the Project Area based on the DAHP database.

In general, the density of cultural resources is greatest along the White Salmon River to the east, with scattered resources also found along the north shore of the Columbia River. Most archaeological research in the area has focused on riverine sites found along the Columbia River, and, more recently, along the lower White Salmon River. Fewer non-riverine archaeological sites have been documented in the general area, with several archaeological sites, mostly historic period, found in the Underwood Heights vicinity, several miles from the Project Area. It is unclear whether the higher site density documented along the White Salmon River is reflective of more intensive survey coverage, more intensive use of this area, or both, as compared to the Little White Salmon River. However, it appears unlikely that the higher elevation Project Area would have the same density of sites as the riverine areas along the Columbia and White Salmon rivers.

3.10.2.3 Project Area Inventory

A preliminary cultural resources inventory of the Project Area was conducted in 2003, based on the Project design at that time (Ballentyne 2003). Because the proposed Project Area was subsequently revised and expanded, a new survey was completed in 2009 (URS 2010). A wider survey corridor of 650 feet for the turbine strings necessarily overlapped the 2003 inventory's 300-foot wide survey corridor. Much of the Project Area was therefore inventoried on two separate occasions, six years apart. The two survey areas are shown on Figure 3.10-2.

The 2009 URS inventory of the Project Area consisted of a pedestrian survey of the 384-acre APE where direct impacts to cultural resources could occur both within the Applicant's APE and BPA's APE. Prior to the field inventory, oral interviews were conducted with the landowner and local tribal informants, and historic maps and historic and modern aerial photos were reviewed to identify potential resources within the Project Area.

Field Methods

An intensive pedestrian survey of the APE was conducted for this Project in November 2009 for the cumulative 384-acre combined APE. Transects were spaced no greater than 100 feet (30 meters); most were at 65-foot (20-meter) intervals or less. Survey methods depended on the Project component being surveyed and the steepness of the slopes, as well as the presence of any hazards such as burning slash piles. Slopes greater than 30 percent were usually not inventoried. In several areas, survey coverage extended beyond the combined APE, depending on the topography. Ground visibility at the time of the inventory was variable; areas that had been most recently harvested provided excellent visibility, while forested areas were found to have dense accumulations of duff, slash, and dense vegetation that obscured the ground surface. Soil exposures provided by animal burrows, cut banks, roadways, and root casts were inspected closely.

Promontories associated with the proposed turbine strings were examined for potential rock cairns, rings, walls, or other alignments that could indicate sensitivity. Large old-growth stumps were examined for evidence of scarification, and large boulders were examined for evidence of petroglyphs, pictographs, or processing activities. The inventory was especially vigilant in looking for historic features such as residences, camps, roads, railroad alignments, flumes, or other evidence of historic logging and homesteading activities.

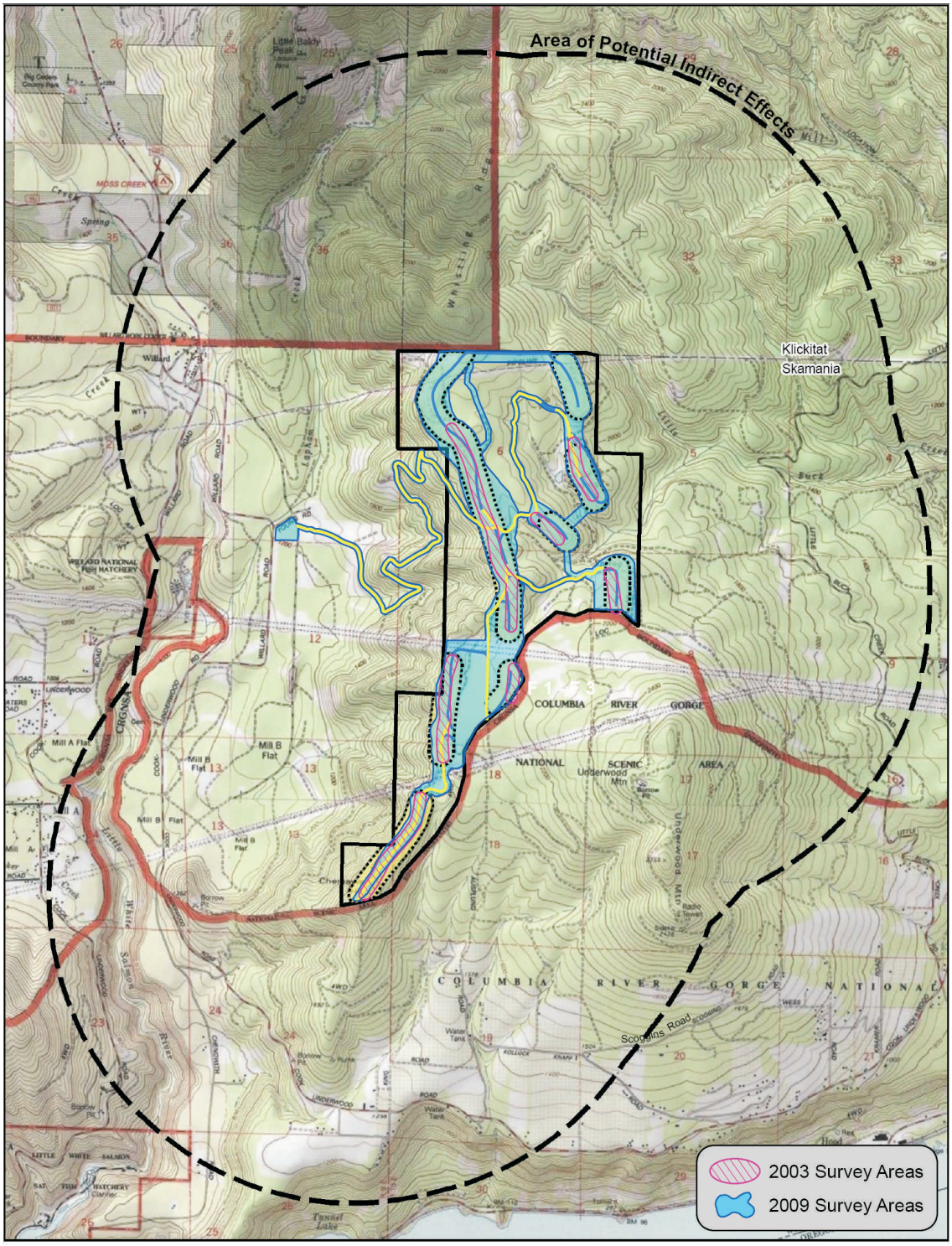
Limited subsurface probing was conducted for this Project at the location of an historic period archaeological resource, referred to as the Haran Farmstead, recorded at the time of the 2009 field inventory. This resource is located within one of the turbine strings, and is characterized by several rock features and a small artifact scatter related to an abandoned early-twentieth century residence and fruit orchard. The subsurface probing investigation employed close-interval systematic, as well as intuitive, sampling methods. Shovel probes were placed at close intervals around each of the recorded rock features to determine whether any associated archaeological deposits could be identified. Wider-spaced, systematic (20 to 30-meter interval) probes were placed within the lower-probability former orchard fields and within expansive areas found between several the rock features, where no surface artifacts were observed, to determine the presence or absence of buried resources.

A total of 52 shovel probes were excavated. The probes measured 30-cm in diameter and were generally excavated at 5 to 30-meter intervals to an average depth of 50 cm. Sediment was passed through alternating screen mesh sizes, both 1/4-inch and 1/8-inch mesh sizes were utilized. All artifacts were replaced within the excavated probe after documentation; none were collected.

Prior to subsurface probing, a metal detector was used to aid in the identification of metal artifacts obscured by the layer of duff that is present across much of the site due to its forested setting. The metal detector was used intensively around each of the recorded rock features. Systematic transects of 10 to 30 meters were walked in lower probability areas such as the former orchard field. Shovel scrapes, or simple removal of snow and duff to expose the ground surface soil, were utilized as an additional method to improve surface visibility. Shovel scrapes were placed at 30-meter intervals within the former orchard lands, where probability is considered low, in order to provide additional validity to the surface reconnaissance.

Beyond the Haran Farmstead, no additional exploratory probing was conducted elsewhere in the Project Area. The majority of the potentially higher sensitivity landforms such as the ridgelines and promontories either had excellent ground surface visibility due to recent timber harvesting activities, and/or had exposed basalt rock with little potential for subsurface soils. Much of the Project Area is characterized by steep topography where exploratory subsurface testing is neither warranted nor practicable. Although Little Buck Creek crosses the Project Area within a proposed Overhead Transmission Line corridor, this area was found to be a small stream crossing surrounded by steep terrain with no areas likely to contain potential cultural resources.

33758687_171.cdr



Area of Potential Effects (Indirect Effects)
Site Boundary
650' Turbine Corridor
Improved Existing Roads
New Project Roads

N

0 0.5 1 Miles

Figure 3.10-2

Cultural Resources Survey Locations

Job No. 33758687

URS

Whistling Ridge Energy Project
Conditional Use Permit Application

Inventory Results

The 2003 draft survey report, which was never finalized or submitted for agency review, preliminarily noted two separate resources, including an historic rock wall feature and a small, disturbed historic artifact scatter of glass, ceramics, and tin cans within a roadway (Ballentyne 2003). As part of the 2009 inventory, one historic period archaeological site, the Haran Farmstead, was identified within one of the turbine string corridors, and incorporates the rock wall feature identified in 2003. The historic artifact scatter previously documented in 2003 was not relocated during the 2009 inventory, and appeared to have been buried or obliterated by later road improvements in this same area (URS 2010).

The Haran Farmstead, documented in 2009, consists of several rock features and a sparse historic artifact scatter associated with a former rural homesite related to James A. Haran, who had a small plum orchard here around the 1920s. A total of nine archaeological features were recorded, including two rock walls[24] (probable property or field clearing boundaries), two structural rock foundations (probable residence and milking parlor), and several rock features of indeterminate function but possibly remnants of appurtenances such as privy, pump house or food storage structures. One small concentration of fewer than 20 historic artifacts, including aqua and colorless glass fragments, galvanized metal water pipes, crockery and porcelain fragments, and tin cans, also was observed. Approximately 100 to 150 artifacts, mostly metal fragments and tin cans, were found scattered across the site during a pedestrian survey supplemented by use of a metal detector.

In December 2009, URS archaeologists conducted exploratory subsurface sampling across the site to define the site boundaries and to determine the presence or absence of associated buried deposits. About 20 artifacts were encountered during the subsurface probing investigation, limited to wire nails, a water pipe, several small colorless glass fragments, and metal can or non-diagnostic metal fragments.

The NRHP eligibility of the Haran Farmstead is addressed in the Cultural Resources Inventory Report. Each of the four criteria of eligibility is applied, and aspects of integrity are addressed. The Haran Farmstead is recommended as ineligible for the NRHP, due primarily to insufficient association and altered key aspects of integrity, which limit its potential to be considered under Criterion A (association with important events), Criterion B (association with important people), and Criterion C (having important characteristics of style). For Criterion D (information potential), the results of the inventory and exploratory subsurface probing indicate there is inadequate data potential to warrant eligibility. ~~URS's recommendation for ineligibility is pending agency review and concurrence.~~

Summary

One historic period cultural resource was identified within the combined APE: the Haran Farmstead archaeological site located with the Applicant's APE, which consists of rock features

[24] The Haran Farmstead as recorded in 2009 incorporates the rock wall observed during the 2003 inventory. The other resource identified during the 2003 inventory, a small concentration of historic artifacts found within an existing access road, was not located in 2009.

and a sparse artifact scatter related to a circa 1920s orchard and residence. Systematic subsurface probes were placed within this site and did not identify significant, buried deposits. The site was recommended as ineligible for the NRHP.

Additional historic farmsteads or other sites within the Project Area are not indicated by the results of archival research, which included review of historic maps and aerial photos. Field inventory confirmed that no aboveground resources, such as buildings, railroads, or flumes, are found in the Project Area.

A preliminary review of the ethnographic and ethnohistoric literature did not document this area as having any specific association for traditional resources, though uplands such as these could have been used at least transiently, for example, for plant resource gathering or spiritual purposes. The Applicant solicited participation of the Confederated Tribes and Bands of the Yakama Nation in order to identify any potentially sensitive resources or traditional cultural properties in the Project Area. Two local tribal members with long-standing ties to the area toured the Project Area and did not identify any cultural resources or concerns. The 2003 and 2009 inventories did not observe any pre-contact Native American site types, such as lithic scatters, petroglyphs, or peeled cedars during the inventory.

Only one water source was observed during the field inventory: the outlet of Little Buck Creek, downstream of the earthen dam that was constructed in 1947 to create the "Cedar Swamp" fire pond (located outside the APE). This small watercourse is surrounded by steep terrain and is not likely to have significant, associated archaeological resources.

Promontories associated with the proposed turbine string, especially Chemawa Hill and others with panoramic views of the surrounding area, were inspected closely for potential rock cairns, rings, walls, or other alignments that could indicate sensitivity. No such features were observed. It appears that even if such resources had been present, the historic and modern logging practices would have obscured this type of resource.

A cultural resource review was also conducted by the Yakama Nation's Cultural Resources Program which identified culturally-sensitive areas, including Chemawa Hill. Chemawa Hill is located within the Applicant's APE, and the Applicant is currently proposing to place turbines at this location. Due to the sensitive nature of the site, specific information regarding the TCP will not be included in this EIS, but the area has been identified by the Yakama Nation as sacred. The Applicant has agreed to reduce the number of turbines located on Chemawa Hill and would continue to collaborate with the Yakama Nation on siting modifications where practicable.

Although the Project Area was logged at least 100 years ago, no features such as camps, historic roads, railroad features, or other evidence clearly related to the historic use of the area was observed. Large old-growth stumps are occasionally encountered, but most are in an advanced state of decay and springboard notches were not observed. No evidence for historic road alignments was observed during the inventory; existing roadways are mechanically-graded, usually rocked and graveled, modern-use alignments that lack historic distinction. As no old-growth forest remains in this area, potential sensitivity for scarified, peeled trees is not indicated.

Much of the current combined APE examined in the Cultural Resources Inventory Report conducted in 2009 was surveyed in 2003. This overlapping of inventory coverage, nearly six years apart, at different times of the year, and with the surrounding forest in different stages of harvest, provides additional support for a general absence of cultural resources to be found in the APE.

3.10.3 IMPACTS

3.10.3.1 Proposed Action

Construction

The proposed Project has the potential to affect one historic period archaeological site, the Haran Farmstead, through ground disturbance during construction of the new Project road and turbine and transformer pads. ~~The degree of impact would depend on the final location of the road and turbines.~~ The Cultural Resources Inventory Report, however, recommended this site as ineligible for the NRHP; and there were no archaeological resources identified within the BPA APE.

Construction also would have the potential to impact other, currently undiscovered cultural or historic resources. Based on the extensive inventories conducted, the likelihood of encountering additional sites is low.

There have been no cultural resources identified within the BPA APE. Within the Applicant's APE, one TCP was identified by the Yakama Nation in relation to Chemawa Hill. The Applicant has agreed to continue to work with the Yakama Nation throughout the proposed Project and will also site fewer turbines on top of Chemawa Hill.

~~Effects on traditional cultural properties or other sensitive or sacred resources that might be of concern cannot be determined until consultation with the tribes is concluded. This consultation is not expected to be completed until after the Draft EIS is issued.~~

Operation

The ongoing maintenance of the access road or emergency procedures such as fire suppression activities have the potential to cause additional impact to the Haran Farmstead or other, currently undiscovered resources.

Project Decommissioning

Project decommissioning could have impacts similar to those during initial construction, including ground disturbance from turbine, transformer and pad removal. As with construction, the degree of impact would depend on the final location of the road and turbines~~, and on the determination of NRHP eligibility for the Haran Farmstead~~.

3.10.3.2 No Action Alternative

Under the No Action Alternative, the Project would not be built and no impacts to historic or cultural resources would take place.

3.10.4 MITIGATION MEASURES

The following mitigation measures are identified to avoid, minimize, and compensate for potential cultural resource impacts during construction and operation of the proposed Project to the extent feasible.

- ~~Implement avoidance and data recovery if the Haran Farmstead (a historic period cultural resource recorded within the APE) is determined to be eligible for nomination to the NRHP. The Haran Farmstead archaeological site, which consists of rock features and a sparse artifact scatter related to a circa 1920s orchard and residence. If the Haran Farmstead is determined to be eligible for nomination to the NRHP, then avoidance and mitigation measures such as data recovery would be considered to achieve a finding of no adverse effect for the project. Though none have been identified to date within the project area, properties considered as significant for reasons other than research potential, such as traditional cultural properties, may require mitigation measures other than data recovery that would be determined in consultation with the Tribe and agencies.~~

- Utilize BMPs to minimize impacts to any additional cultural or historic resources that may be encountered during construction of the proposed Project. These BMPs include preparation and use of an Inadvertent Discovery Plan, which would establish procedures to deal with unanticipated discovery of cultural resources before and during construction. The plan, among other provisions, would require immediate work stoppage and appropriate notification in the event of discovery of previously unknown cultural materials. The plan also would specify protocols for the treatment of human remains that fulfill the requirements of the Native American Graves Protection and Repatriation Act in the event that human remains and/or funerary items are encountered during construction or operation of the Project.

- Design the locations of road, turbine, and transformer to avoid and minimize impacts during construction regular maintenance operations. Although Chemawa Hill was identified as a TCP within the Applicant's APE, the Applicant has worked with the Yakama Nation to site fewer towers on Chemawa Hill and are committed to working with the Yakama Nation during the proposed Project.

3.10.5 UNAVOIDABLE ADVERSE IMPACTS

With the use of appropriate mitigation measures, the proposed Project is not expected to produce any unavoidable impacts to historic or cultural resources.

3.10.6 REFERENCES

Attwell. 1975. *Columbia River Gorge History: Volume* 2. Tahlkie Books, Stevenson, Washington.

Ballantyne, Raena. 2003. PPM Energy Saddleback Wind Project Cultural Resource Assessment. Prepared for PPM Energy by CH2M Hill, Portland, Oregon. November 3.

Beckham, Stephen Dow, Rick Minor, Kathryn Anne Toepel, and Jo Reese. 1988. Prehistory and History of the Columbia River Gorge National Scenic Area, Oregon and Washington. Submitted to USDA Forest Service, Columbia River Gorge National Scenic Area, Hood River, Oregon.

Bureau of Land Management (BLM). 2009a. Survey Plats and Field Note Records. Online database accessed November 2, at: http://www.blm.gov/or/landrecords/survey/ySrvy1.php.

———. 2009b. Land Patent Search. Online database accessed November 2, at: http://www.glorecords.blm.gov/PatentSearch/Default.asp?.

Chatters, James C., and David L. Pokotylo. 1998. Prehistory: Introduction. In *Plateau, Vol. 12, Handbook of North American Indians*, edited by Deward E. Walker. pp. 73-102. Smithsonian Institution, Washington, D.C.

French, David H. and Catherine S. French. 1998. Wasco, Wishram, and Cascades. In *Plateau, Vol. 12, Handbook of North American Indians*, edited by Deward E. Walker. pp. 360-377. Smithsonian Institution, Washington, D.C.

Galm, Jerry R., Glen D. Hartmann, Ruth A. Masten, and Garry O. Stephenson. 1981. Cultural Resource Overview of Bonneville Power Administration's Mid-Columbia River Project, Central Washington. Eastern Washington University, Archaeological and Historical Services, *Reports in Archaeology and History* 100-66.

Griffin, Dennis and Thomas E. Churchill. 2001. Cultural Resource Survey and Traditional Cultural Property Study of the Lower White Salmon River, Klickitat/Skamania Counties, Washington. Archaeological Frontiers Report No. 19. Prepared for Yakama Nation, Toppenish, Washington, and Pacificorp, Portland, Oregon. Eugene, Oregon. October 15.

Jenkins, Dennis. 2009. NGBPP Research at Paisley Caves. Accessed November 3, 2009 at: http://www.uorgeon.edu/~ftrock/paisley_caves_description.php.

Masten, Ruth A. and Jerry R. Galm. 1989. An Overview of Cultural Resources in the Wild and Scenic Areas of the White Salmon and Klickitat Rivers, Klickitat and Skamania Counties, Washington, Vols. 1 and 2. Eastern Washington University *Reports in Archaeology and History* 100-69.

McCoy, Keith. 1987. *The Mt. Adams Country: Forgotten Corner of the Columbia River Gorge.* Pahto Publications, White Salmon, Washington.

———. 2003. *Mid-Columbia North Shore: Odds and Ends.* Trafford Publishing, Victoria, B.C.

Nielsen, Carl. 1959. Little White Salmon. In *Skamania County History, Volume 1*. Reprinted in 2007 by the Columbia River Gorge Interpretive Center Museum, Stevenson, Washington, as printed by the Original History Committee of 1959. p. 96-97.

Norton, Helen H., Robert Boyd and Eugene S. Hunn. 1983. The Klickitat Trail of South-Central Washington: A Reconstruction of Seasonally Used Resource Sites. In *Prehistoric Places in the Southern Northwest Coast*, Robert Greengo, editor. Thomas Burke Memorial Museum Research Report No.4., University of Washington, Seattle.

Parker, P.L., ed. 1993. Traditional Cultural Properties: What You Do and How We Think. CRM Volume 16 Special Issue. National Park Service, Washington, D.C.

Pettigrew, Richard M. 1981. A Prehistoric Culture Sequence in the Portland Basin of the Lower Columbia Valley. University of Oregon *Anthropological Papers* No. 22. University of Oregon, Eugene, Oregon.

Price, J.H. 1896. Bureau of Statistics, Agriculture and Immigration on the Agricultural, Industrial, and Commercial Conditions of the State. State of Washington First Annual Report, Olympia. Accessed: http://books.google.com/books.

Ruby, Robert H. and John A. Brown. 1992. *A Guide to the Indian Tribes of the Pacific Northwest.* Revised edition. University of Oklahoma Press, Norman.

Schuster, Helen. 1998. Yakima and Neighboring Groups. In *Plateau, Vol. 12, Handbook of North American Indians*, edited by Deward E. Walker. pp. 327-351. Smithsonian Institution, Washington, D.C.

Spier, Leslie, and Edward Sapir. 1930. Wishram Ethnography. University of Washington *Publications in Anthropology* 3(3):151-300. Seattle.

Stilson, M. Leland. 2005. Whistling Ridge Timber Sale Cultural Resource Survey. Washington Department of Natural Resources, land and Resources Division. Washington State Department of Archaeology and Historic Preservation, Olympia.

Thomas, Cam. 2007. The Story of the Flume: One common in the Northwest, the Broughton Lumber Company flume was America's last. Twentieth anniversary special edition DVD. Original 60-minute documentary. Cam Thomas Productions.

Thun, Louis. 1959. Early History Report. In *Skamania County History, Volume 1.* Reprinted in 2007 by the Columbia River Gorge Interpretive Center Museum, Stevenson, Washington, as printed by the Original History Committee of 1959. p. 108-110.

URS 2009. URS Corporation. Draft Cultural Resources Inventory Report for the Project. December 4.

URS 2010. URS Corporation. Revised Draft Cultural Resources Inventory Report for the Project. In preparation.

Winthrop, Robert, Johnson Meninick, and Staff. 1996. Inventory and Evaluation of Traditional Cultural Properties Associated with the Condit Hydroelectric Project, FERC Project No. 2342. Draft report to PacifiCorp and the Yakama Nation. Cultural Solutions, Ashland, Oregon.

3.11 TRANSPORTATION

This section discusses the existing network of roadways and rail, river, and air transportation in the Project vicinity, as well as the potential impact of the proposed Project on transportation.

3.11.1 AFFECTED ENVIRONMENT

3.11.1.1 Roadway Transportation

Existing Roadways

In the Columbia River Gorge, the two major roadways extending generally from east to west along the Columbia River are State Route (SR) 14 on the Washington side of the Columbia River and Interstate 84 on the Oregon side of the Columbia River. Other major roadways, such as State Routes 141 and 142 in Washington and State Routes 35 and 197 in Oregon, intersect these two highways generally in the vicinity of cities and communities located in the Gorge.

SR 14 between Interstate 5 in the Vancouver, Washington area and the Project Area is generally very narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has many hills, and curves with tight corners in several places. East of the Project Area on SR 14, there is one low and very narrow tunnel east of the town of Lyle, Washington, and also a very narrow bridge east of The Dalles at approximately milepost (MP) 86. Between Cook-Underwood Road and SR 97 (Goldendale), SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has some tight low-recommended-speed corners and a number of hills. Between SR 97 and the junction with SR 395/I-82, SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders.

Existing access to the Project Area is provided by various county roads that extend northward from SR 14, along with existing private logging roads (see Figures 3.11-1 and 3.11-2). Key roads in the immediate Project vicinity include:

- ***Cook-Underwood Road.*** Cook-Underwood Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. In general, the side slope begins at the fog line. This road is under the jurisdiction of Skamania County and generally is in good condition. There are currently no over-size or over-weight load restrictions in force. The Skamania County Comprehensive Plan lists Cook-Underwood Road as Federal Functional Classification "Major Rural Collector."

- ***Willard Road.*** Willard Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. This road is under the jurisdiction of Skamania County and generally is in good condition. There are currently no over-size or over-weight load restrictions in force. The Skamania County Comprehensive Plan lists Willard Road as Federal Functional Classification "Rural Local Access."

- ***West Pit Road.*** West Pit Road is a private logging road that connects to a network of existing private logging roads located on S.D.S. Co., LLC and Broughton Lumber Company property. West Pit Road varies in width from 20 to 26 feet. It is a dirt road covered in light pit run. This road has portions that generally are in poor condition; however, during summer 2009, various roadway improvements were made and segments of the road were widened for logging purposes.

Existing Traffic Volumes

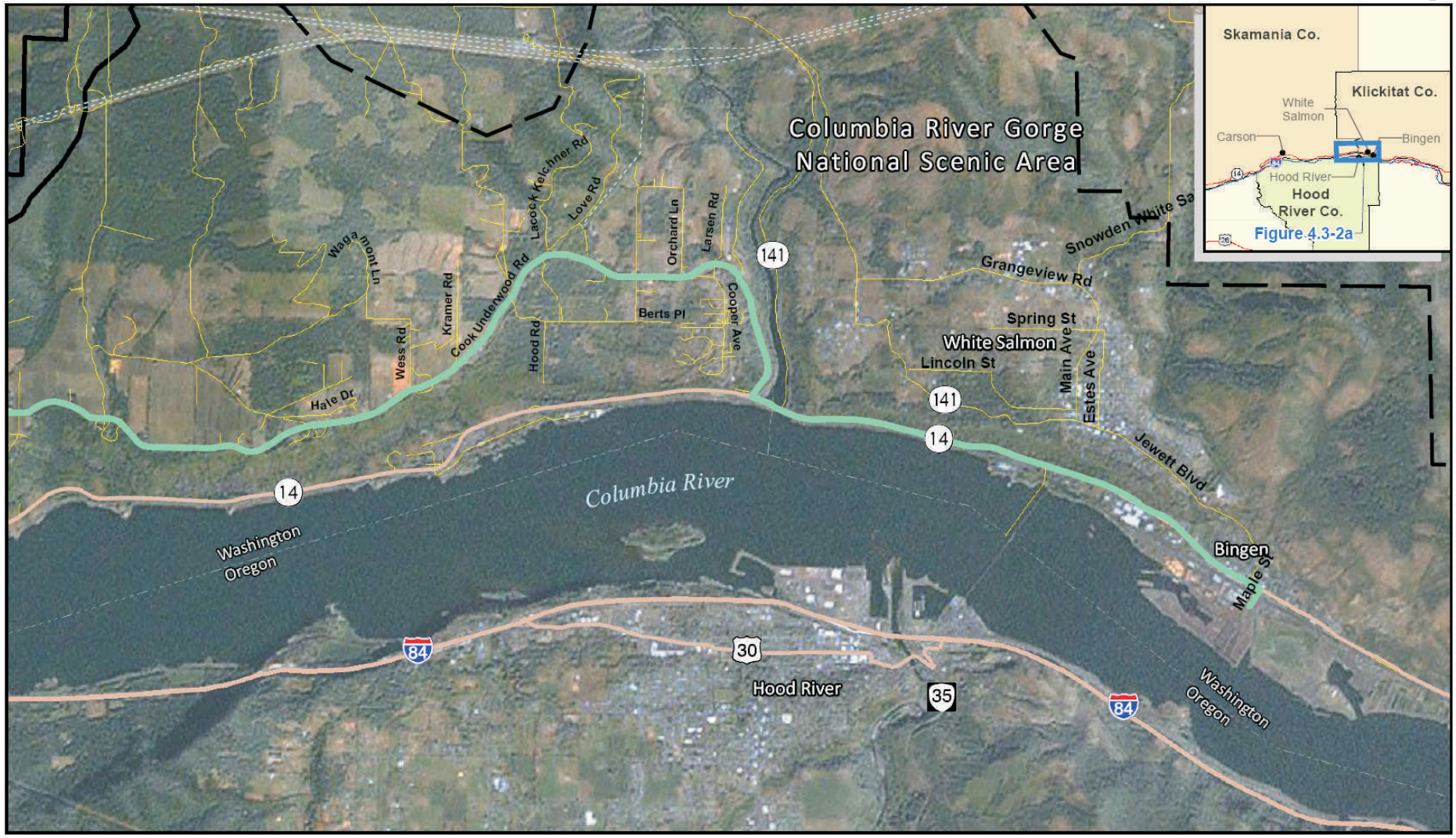
Average annual daily traffic (AADT) values for SR 14 are shown in Table 3.11-1. Peak hour directional volumes were developed based on typical rural highway traffic patterns and proximity of business centers. Typical rural highway traffic patterns conservatively assume AM peak hour volumes to be approximately 7 percent of the total daily volumes, and PM peak hour volumes to be approximately 10 percent of the total daily volumes, with a directional split of 70/30. PM peak hour volumes are traditionally considered to by the highest during a given day. Since no current traffic data is available for Cook-Underwood Road at either the west or east junctions with SR 14, existing traffic volumes are based on typical patterns for small rural towns. Estimated 2009, 2011, and 2012 peak hour traffic volumes at the west and the east junctions of Cook-Underwood Road with SR 14 are presented in Table 3.11-2. Traffic volumes for 2011 and 2012 were based on an expected average weighted growth rate of approximately one percent per year.

Table 3.11-1
Annual Daily Traffic at West and East Junctions of SR 14 and Cook-Underwood Road

Location	Average Annual Daily Traffic (all vehicles)	
	2008	2009 (est)[a]
SR 14 – west junction w Cook-Underwood Road	3,000	3,100
SR 14 east junction w Cook-Underwood Road	3,300	3,400

Source: WSDOT (2008)
[a] A growth rate was developed for the Project vicinity using historic data from annual traffic reports between 1996 and 2008. During several years between 1996 and 2008, there was no recorded historical growth in this area. Using this data, an average weighted growth rate of approximately 1 percent per year was determined.

33758687_124.cdr



Lease Boundary

Columbia River Gorge National Scenic Area

Other Roads with Potential Project Use

Local Roads

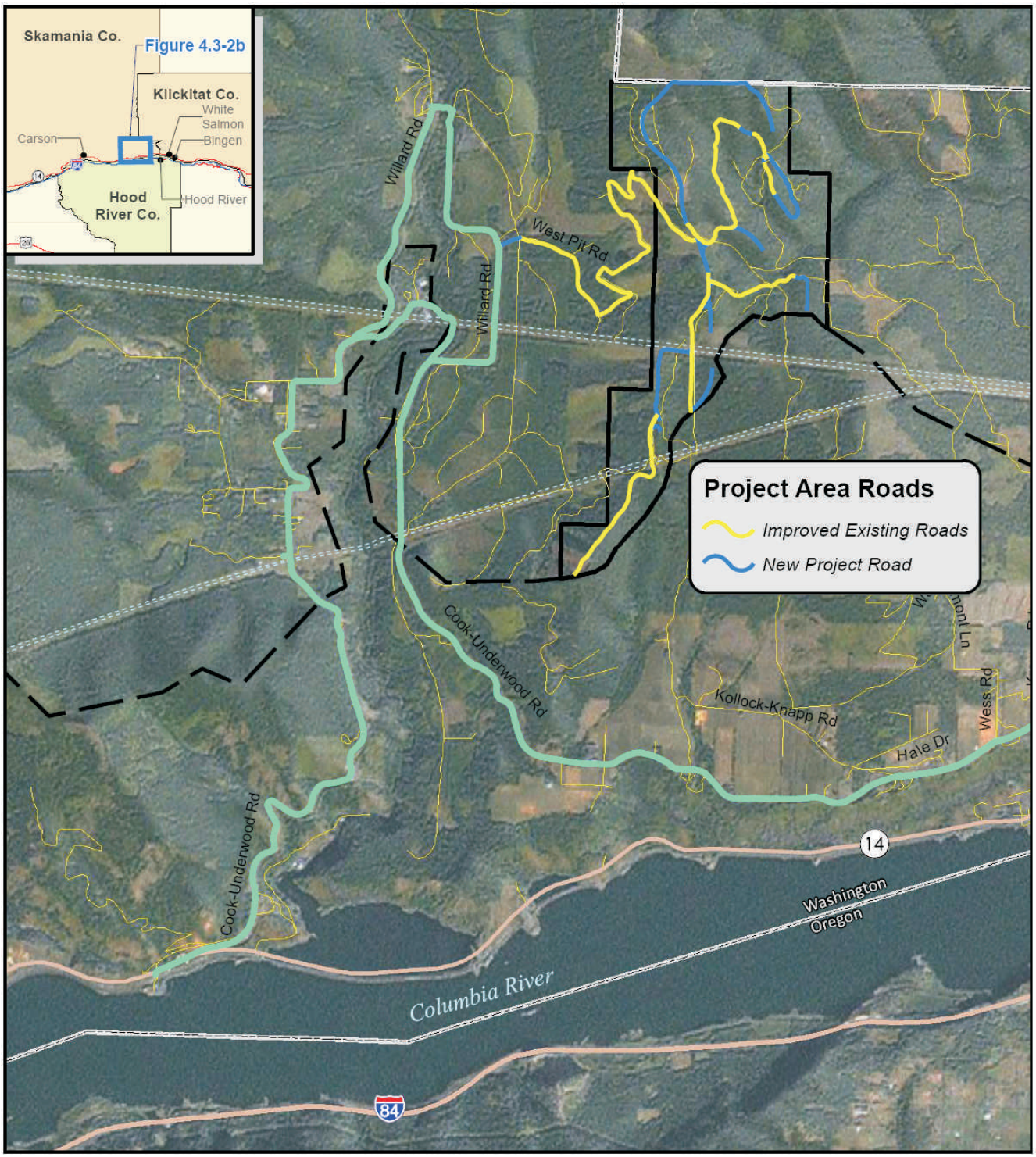
0 0.5 1 Miles

Figure 3.11-1
Project Roadway Access from the East

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_125.cdr



Site Boundary

Columbia River Gorge National Scenic Area

Other Roads with Potential Project Use

Local Roads

N

0 0.5 1 Miles

Figure 3.11-2

Project Roadway Access from the West

Table 3.11-2
Estimated 2009, 2011, and 2012 Peak Hour Traffic Volumes at West and East Junctions of SR 14 and Cook-Underwood Road

	West Junction of Cook-Underwood Road with SR 14		East Junction of Cook-Underwood Road with SR 14	
	2009		2009	
Location	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	160	90	170	100
Westbound SR 14	70	220	70	240
Southbound Cook-Underwood Road	10	10	10	10
	2011		2011	
	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	160	100	180	110
Westbound SR 14	70	230	80	260
Southbound Cook-Underwood Road	10	10	10	10
	2012		2012	
	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	170	100	180	110
Westbound SR 14	70	240	80	260
Southbound Cook-Underwood Road	10	10	10	10

AM Peak Hour is 7:00 AM to 8:00 AM
PM Peak Hour if 4:00 PM to 5:00 PM

Existing Level of Service

Level of service (LOS) is an estimate of operational performance based on delay to motor vehicles. The *Highway Capacity Manual* (TRB 2000), which is generally used when determining LOS, defines LOS using a letter scale from A to F. LOS A is defined as minimal or no delay to vehicles and LOS F is defined as extreme delays to vehicles. LOS C or better is typically considered acceptable for rural intersections and is the LOS threshold of acceptable traffic flow for Skamania County. Table 3.11-3 presents the LOS delay criteria for two-way-stop-control intersections.

Table 3.11-3
Level of Service Criteria for Two-Way-Stop-Control Intersections

Level of Service	Expected Traffic Delay
A	< 10 seconds
B	> 10 - 15 seconds
C	> 15 - 25 seconds
D	> 25 - 35 seconds
E	> 35 - 50 seconds
F	> 50 seconds

Source: TRB (2000)

Existing LOS was estimated for SR 14 and Cook-Underwood Road, using estimated 2009 traffic volumes and the software package Highway Capacity Software Plus, which uses algorithms based on the *Highway Capacity Manual* (TRB 2000). Based on this analysis, the longest delays occur at Cook-Underwood Road during the PM peak hour; however, these delays are relatively short (see Table 3.11-4). Up to approximately 10 seconds of delay is experienced by some vehicles at the west junction of Cook-Underwood Road with SR 14 during the PM peak hour. Slightly more than 10 seconds of delay is experienced by some vehicles at the east junction of Cook-Underwood Road with SR 14 during the PM peak hour. These delays translate to LOS A conditions at the west junction and LOS B at the east junction. Delays during the AM peak hour at Cook-Underwood Road and during both peak hours at SR 14 are all less than 10 seconds, which translates to LOS A.

Table 3.11-4
2009 Level of Service Summary at West and East Junctions of SR 14 and Cook-Underwood Road

Roadway and Turning Movement	Peak Hour	West Junction		East Junction	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A
	PM	7.9	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.4	A
	PM	10.0	A	10.2	B

Delay = Average per vehicle

Existing Traffic Safety

Traffic safety was analyzed along SR 14 between the towns of Stevenson and Bingen for 2006 to 2008. Collision Data Summaries were obtained from WSDOT. SR 14 is functionally classified as a rural collector roadway. SR 14 between Stevenson and Bingen is located within the Southwest Region of the state of Washington. During this three-year period, a total of 158 collisions occurred between the west city limits of Stevenson at MP 43.91, and the east city limits of Bingen at MP 66.88.

Between 2006 and 2008, a total of 17 collisions occurred within the Stevenson city limits, and another 17 occurred within the Bingen city limits. Only one collision occurred at the west junction of Cook-Underwood Road and SR 14 (MP 56.28), and three collisions occurred at the east junction of Cook-Underwood Road and SR 14 (MP 63.32). Four collisions occurred at the intersection of Maple Street and SR 14 within the city of Bingen (MP 66.47). The majority of collisions occurred within Skamania County between MP 44.66 and MP 63.48. Several collisions also occurred within Klickitat County between MP 63.48 and MP 64.71, and within the White Salmon city limits between MP 64.71 and MP 65.50.

The number of collisions that occur along a given roadway is generally expressed in terms of a rate, where collision occurrence is indexed to the number of vehicles traveling on a particular length of the given roadway. The collision rate is based on the number of collisions per million-vehicle-miles (MVM) traveled. Table 3.11-5 shows collision rates for each year as well as multi-year rates for the three year period for SR 14 between Stevenson and Bingen, in addition to collision rates for the city of Bingen.

The multi-year collision rate along SR 14 between Stevenson and Bingen is 1.43 collisions per MVM. The 2007 average collision rate for all Washington state rural collector roadways was 1.65 collisions per MVM and for 2008, 1.63 collisions per MVM. The average collision rate for all Washington rural collector roadways within the Southwest Region during 2007 was 1.72 collisions per MVM, and during 2008, 1.87 collisions per MVM. The multi-year collision rate on SR 14 between Stevenson and Bingen is lower than both the 2007 and 2008 average Washington State and Southwest Region collision rates.

Table 3.11-5
Collision Numbers and Rates for Years 2006 through 2008

Location	Number of Collisions	MP Range	Segment Length (miles)	AADT (veh/day)	Collision Rate (Collisions/MVM)
2006 Data					
Stevenson to Bingen	48	43.91 to 66.88	22.97	4,500	1.27
Bingen City Limits	5	66.50 to 66.88	1.38	7,600	1.31
2007 Data					
Stevenson to Bingen	61	43.91 to 66.88	22.97	4,400	1.65
Bingen City Limits	4	66.50 to 66.88	1.38	6,700	1.19
2008 Data					
Stevenson to Bingen	49	43.91 to 66.88	22.97	4,200	1.39
Bingen City Limits	8	66.50 to 66.88	1.38	6,300	2.52
Multi-Year Data					
Stevenson to Bingen	158	43.91 to 66.88	22.97	4,400	1.43
Bingen City Limits	17	66.50 to 66.88	1.38	6,900	1.63

AADT – average annual daily traffic
MVM million-vehicle-miles

The multi-year collision rate for the city of Bingen is 1.63 collisions per MVM. The multi-year collision rate for the city of Bingen is equal to or close to both the 2007 and 2008 Washington State collision rates and is lower than both the 2007 and 2008 average Southwest Region collision rates. No average collision rate data is available for year 2006.

Transportation Plans and Programmed Transportation Improvements

Skamania County. The Transportation Element of the Comprehensive Plan represents the County's policy plan for the next 20 years and specifically considers the location and condition of the existing traffic circulation system, the projected transportation needs, and plans to address future transportation needs while maintaining established LOS standards. This plan is implemented through the Six-Year Transportation Improvement Program and Annual Construction Program. The most recent Six Year Transportation Improvement Program was approved in April 2009, and lists one improvement to Cook-Underwood Road: a resurfacing project between MP 0 and MP 3. This improvement is listed for years 4–6 of the program, or between 2012 and 2014.

Washington State Department of Transportation Statewide Transportation Improvement Program. This is a list of funded transportation improvement projects. The Transportation Improvement Program for 2009–2012 presents a list of regionally significant projects for the upcoming three years (WSDOT 2009a). A search of the project database for Clark, Skamania and Klickitat Counties showed no projects scheduled for any of the roads in the immediate Project vicinity. The only planned transportation improvement project near the Project Area is resurfacing 1.0 mile of Wind River Road.

WSDOT also is planning to improve SR 14 between Camas and Washougal, east of Vancouver. The project would widen SR 14 from two lanes to four lanes from the end of the West Camas Slough Bridge to Union Street (SR 500). Included in the project would be construction of a new bridge parallel to the existing bridge on the east end of Lady Island, and construction of a split-diamond interchange at Union Street and 2nd Street. ~~The project is planned to go to bid in 2010, and construction is scheduled to be completed in 2012 (WSDOT 2009b).~~

Skamania County and Klickitat County Regional Transportation Plans. These Regional Transportation Plans were developed by the Southwest Washington Regional Transportation Council, in coordination with other jurisdictions and WSDOT (SWRTC 2009a and 2009b). Regional transportation plans are intended to develop regional solutions to transportation needs. Both plans emphasize maintenance and preservation as priorities. Improvements are recommended to address identified deficiencies. Recommended improvements in these plans include several projects to upgrade portions of SR 14. However, funding is not provided through this planning process and these projects are not currently included in the Statewide Transportation Improvement Program.

3.11.1.2 Rail Transportation

The Burlington Northern Santa Fe Railway operates a rail mainline that runs parallel to SR 14 to the south of the Project Area. This line is a major link that ties the important industrial areas of Vancouver, BC; Portland, Oregon; and Seattle/Tacoma, Washington to the north-central states of

the United States and eastern railroads via Chicago. In the Project vicinity, the Applicant currently has two rail spurs from the Burlington Northern Santa Fe mainline to an existing Applicant facility located along the Columbia River in Bingen, Washington. One spur terminates near Maple Street and is approximately 800 feet long. The second spur terminates at a plywood facility in the area and is approximately 2,000 feet long.

3.11.1.3 River Transportation

River transportation in the Project vicinity includes barge and boat shipping transport on the Columbia River, which is located about two miles south of the Project Area and runs predominantly east to west towards the Pacific Ocean. The Columbia River is a major throughway used for transporting commodities such as grain, wheat, and lumber down river from the interior Pacific Northwest to ports such as the Ports of Longview and Vancouver for shipping to various U.S. and international destinations. The Columbia River also is used to ship goods upriver to destinations in the interior Pacific Northwest. Although there are many hydroelectric dams and associated lockage facilities along the Columbia River, the only such facility between the Pacific Ocean and the Project Area is Bonneville Dam, at about river mile 146 on the Columbia River.

Barges moving upriver from the Ports of Longview or Vancouver are transported to the Bonneville Dam using tug boats. The barges and tugs bypass the Bonneville Dam via the lockage facility at the Dam. The Bonneville lockage facility accommodates commercial, government, and recreational vessels. The heaviest lockage traffic on average occurs during the month of August. Vessel traffic is typically heaviest on Thursdays, Fridays, Saturdays, and Sundays. River vessels then continue upriver past the applicant facility in Bingen. At this Applicant facility, there is a dock and crane suitable for unloading heavy materials and other equipment.

3.11.1.4 Air Transportation

Air transportation in the regional area includes the Portland International Airport approximately 60 miles southwest of the proposed Project Area, and several other smaller public and private local airports within a 10-mile radius.

3.11.2 IMPACTS

To determine potential transportation impacts, the Skamania County Public Works Department Manager, the County Engineer, and the Maintenance Superintendent were consulted. Potential impacts to potential Project access routes were considered, and levels of service were estimated for the construction and operation periods. Impacts were considered high if they would result in a decrease in LOS to below the Skamania County standard of LOS C at a given intersection after mitigation. Impacts would be moderate if the Project would result in a modest change to traffic volumes, patterns, or LOS. Impacts would be low if the Project would result in no noticeable change to traffic volumes, patterns, or LOS. Potential impacts to rail, river, and air transportation also were evaluated to determine whether there would be significant increases in uses or interference with their operations.

3.11.2.1 Proposed Action

Construction

Impacts to Project Vicinity Roadways

During Project construction, various types of construction vehicles would access the Project Area. Most Project construction vehicles would be expected to travel to the general Project vicinity via SR 14 since it is the most convenient major highway leading to the area. From SR 14, the construction access route would follow Cook-Underwood Road to Willard Road, and then use a short segment of newly-constructed roadway to access West Pit Road (see Figure 3.11-2). From West Pit Road, construction vehicles would use a network of existing, improved, and new private logging roads at the site to access areas where Project facilities would be built (see Figure 3.11-3).

Project construction would last for approximately one year, and would involve transport of large wind energy components, such as the tower sections, the nacelle and turbines, and blades, to the Project Area during a two to three month period. All wind energy components initially would be delivered from their manufacturing points to one of two ports in Washington state – either the Port of Longview or the Port of Vancouver. From these Ports, the Project components would be transported to the Project Area. Potential methods for transporting these materials to the Project Area include:

- Using specialized trucks that would use existing State, County, City, and private roadways to deliver the components directly to the Project Area;

- By train via the existing Burlington Northern Santa Fe rail lines that run parallel to SR 14 to deliver the components to an existing Applicant facility in Bingen, Washington, and then using specialized trucks to deliver these components to the Project Area; and

- By barge and tug boat up the Columbia River and through the lockage facility at the Bonneville Dam to the Applicant's existing facility in Bingen and then via specialized trucks to the Project Area.

Potential impacts associated with specialized trucks are discussed in this subsection of the analysis; the rail and river transport options are discussed later in this section. The specialized trucks used for transporting wind energy components could have loads as high as 17.5 feet tall measured from the ground to the highest point of the load, as wide as 14.5 feet, and/or as long as 150 feet. While most of these trucks would not exceed the WSDOT legal load limit, some trucks could have a gross vehicle weight in excess of 105,500 pounds. Trucks with loads in excess of the legal load limit could degrade the condition of the existing roadways along the proposed haul route, and may require additional axles in order to distribute the weight of the load. Permits would be required for all oversized and overweight vehicles.

Most specialized trucks delivering components directly from either of the Ports to the Project Area would be expected to use SR 14 to the west junction of Cook-Underwood Road with SR 14 at MP 56.28 (see Figure 3.11-2). These trucks would encounter restrictions on SR 14 that are summarized in Table 3.11-6, and could require additional traffic control measures. However, SR

14 would not require improvements to accommodate the trucks the transport of wind energy components.

Due to the road constraints discussed in Section 3.11.1.1 and identified in Table 3.11-6, the use of specialized trucks on SR 14 may not be physically possible for some extremely large or wide loads. An alternate route would be for trucks to use I-84 through Oregon to the Boardman junction, then along SR 730 to the junction of I-82 with SR 395, across the Columbia River back into Washington State and then to SR 14. Trucks traveling on SR 14 in this direction, between the junction of I-82/SR 395 and Cook-Underwood Road, would be constrained by one very narrow tunnel with a height restriction of 13 feet 3 inches measured vertically from the edge of the roadway. There also are several additional Columbia River crossings west of the I-82/SR 395 crossing, but each has weight restrictions that would prohibit the transport of wind energy components. These crossings include the Bridge of the Gods, the Hood River Bridge, SR 197, and SR 97.

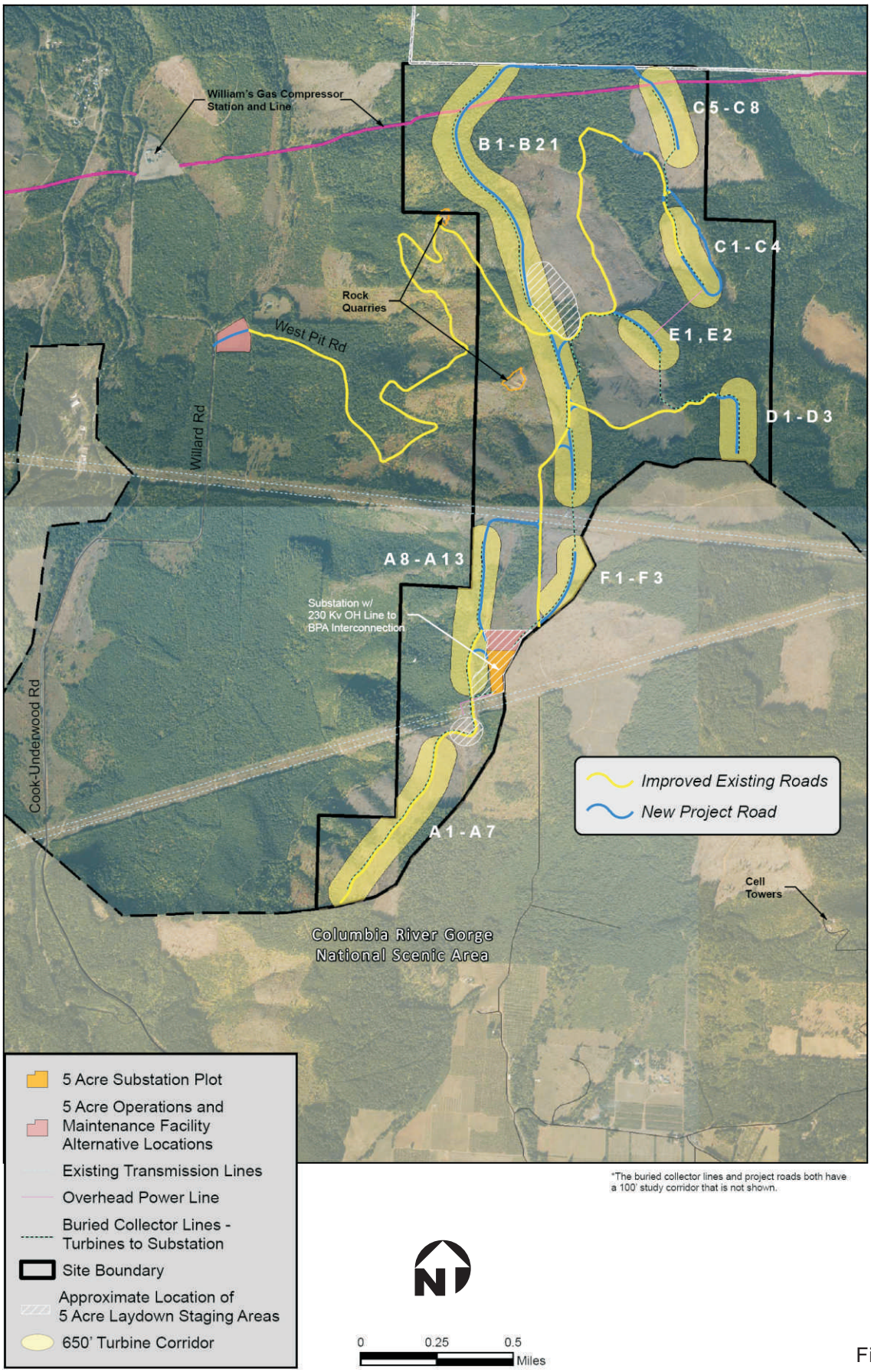
Table 3.11-6
Road and Bridge Restrictions for Oversize Motor Vehicles on SR 14
(all restrictions apply in both directions)

Milepost	Height[a]	Width	Length
18.89 to 34.68 (west of Project)	Loads over 10' wide require 1 front and 1 rear pilot cars		
19 to 56 (west of Project)		Loads over 14' wide require 2 front and 1 rear pilot cars	
19 to 83.53 (west and east of Project)			Loads over 125' – trailer/load length prohibited
56.28 to 63.25 (west of Project)	All over-height (14') loads must contact WSDOT Goldendale Office Detour via Cook-Underwood Road must be approved by Skamania County	No loads over 12' wide allowed Loads between 8.5 and 10' wide require 2 front and 1 rear pilot cars	
65 to 65 Hood River Bridge Crossing (east of Project)		No over-width loads allowed	
76.77 to 76.91 (east of Project)	All over-height (14') loads must contact WSDOT Goldendale Office	Loads over 10' wide require 2 front and 1 rear pilot cars	

[a] Heights are measured from the ground to the highest point on the load.

For wind energy components transported either by rail or barge as discussed below, these components would be delivered from either of the Ports to the existing Applicant facility in Bingen, Washington, and then loaded onto specialized trucks at this facility. The trucks would then transport the components to the Project Area. The route for these trucks would include approximately 0.25 mile of Maple Street in Bingen, Washington. Maple Street was recently constructed and is in good condition. Maple Street has two 12-foot lanes, a wide concrete sidewalk on the east side, and a paved shoulder on the west side. There are currently no oversize or overweight restrictions for this road.

33758687_123.cdr



Source: GeoDataScape.

Figure 3.11-3

Project Site Roadway Network

URS

Whistling Ridge Energy Project
Skamania County, Washington

Specialized trucks leaving the Applicant's facility would then follow SR 14 to the east junction of SR 14 and Cook-Underwood Road at MP 63.32. This portion of SR 14 has a restriction on loads over 125 feet in length. Special provisions and/or permitting may be required to transport the turbine blades (the longest components) to the junction of SR 14 and Cook-Underwood Road at MP 63.32 from the junction of SR 197 (MP 83.50).

Improvements to County and private roads between SR 14 and the Project Area would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components. These improvements would include widening and rebuilding sections of the existing roadway network, as well as placing asphalt on some roads that would be used for hauling equipment and Project components to the Project Area. All existing county roadways requiring improvements prior to hauling would be designed and constructed in accordance with the WSDOT *Design Manual* (WSDOT 2007) and *A Policy on Geometric Design of Highways and Street*s (AASHTO 2004).

Cook-Underwood Road contains a bridge that crosses the Little White Salmon River near its northernmost point at approximate MP 5.5. Specialized trucks would be required to meet Skamania County provisions for oversized and overweight loads. Cook-Underwood Road would require no improvements to accommodate the transport of wind energy components. However, specialized trucks transporting wind energy blades, the longest single wind energy component, eastbound on SR 14 onto Cook-Underwood Road at MP 56.28 or westbound onto Cook-Underwood Road at MP 63.32 would require a 135-foot inside turning radius, and a 20-foot allowance for "tip swing."

In addition, temporary widening of the intersection of Cook-Underwood Road and Willard Road would be required to accommodate the required truck turning radii for westbound trucks transporting wind energy blades to the Project Area. Widening could include removal of some trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. The exact amount of right of way or easement that might be required from adjacent property owners would depend on the turbines chosen, and would be determined during final design. Following construction, the area would be re-vegetated. No other improvements would be required along Willard Road to accommodate the transport of wind energy components

A new direct connection across property owned by the Applicant would be required between Willard Road and West Pit Road for transport of larger Project components to the Project Area. The intersection of Willard Road and West Pit Road would be designed to accommodate the required truck turning radii. In addition, West Pit Road would require additional permanent widening to accommodate transport of wind energy components to the Project Area. West Pit Road would be improved to provide a minimum drivable section width of 25 feet (width of finished road), with an additional 5 feet of shoulder on either side, with allowance for side slope and drainage. The one existing culvert, which was upgraded during the summer of 2009, may need some additional lengthening if the roadway is widened over the culvert. Widening could include removal of trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface.

Roadway Construction in the Project Area

To provide access to all of the proposed wind tower locations, approximately 7.9 miles of existing roads would be improved and about 2.4 miles of new private access roads would be constructed at the Project Area (see Figure 3.11-3). All roadway improvements and new construction at the proposed Project Area would be designed and constructed in accordance with the standards for the applicable road classifications as set forth in the Skamania County Private Road Guidelines and Development Assistance Manual, as adopted by the County Resolution in 2008.

New gravel roadways would extend toward and run along the turbine strings. Roads extending towards the turbine strings would be designed for a minimum drivable section width of 25 feet with allowance for side slope and drainage. Roads running along or between the turbine strings would be designed for a minimum drivable section width of 25 feet with an additional 5-foot section on both sides to accommodate drainage and clearance for the Project crane that would be on site to assemble the tower sections, the nacelles, and blades. All newly constructed roads would be constructed with an all-weather driving surface.

During construction, parking would be located at the construction staging area and along the proposed Project Area access roads. Parking along turbine string roads would be primarily for those employees working on foundations, electrical infrastructure, and turbines. Vehicles would park in areas that would be already temporarily or permanently disturbed from other construction activities. No additional ground disturbance would occur solely for construction parking requirements.

Impacts to Traffic Volumes and LOS

During Project construction, there would be an increase in traffic activity in and around the Project Area due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14. Traffic delays could occur on Project Area roads due to the maneuvering of large vehicles carrying heavy and/or long loads. In addition, it is expected that approximately 265 personnel would be on site at the same time while multiple construction disciplines conduct work concurrently. Between 65 and 75 percent of the construction labor force would most likely be hired from the cities of Portland and Vancouver; of these, most are expected to commute daily to and from the Project Area. The remaining 25 to 35 percent of the work force would most likely be residents of Skamania, Klickitat, and Hood River counties.

Traffic volumes during construction were estimated for the west and east junctions of Cook-Underwood Road with SR 14. The estimated traffic volumes assume that all construction vehicles related to Project construction would travel through either the east or the west junction Cook-Underwood Road with SR 14; if other routes were used, the actual impacts to these junctions would be less.

Table 3.11-7 compares estimated traffic volumes without the proposed Project to estimated traffic volumes with the proposed Project during the peak construction period. As shown in this table, it is expected that at the peak of construction (a period of three to five months) during the AM peak hour, approximately 210 construction vehicles would travel through either junction of SR 14 and Cook-Underwood Road. During the PM peak hour, approximately 10 construction

vehicles would be expected to travel through this same junction. Also during this construction peak, an increase of up to 275 vehicles total would be southbound on Cook-Underwood Road from the Project Area during the PM peak hour.

Table 3.11-7
Estimated 2011 Traffic Volumes
During Peak Construction Period

Location	West Junction of Cook-Underwood Road with SR 14				East Junction of Cook-Underwood Road with SR 14			
	2011 Without Project		2011 With Project		2011 Without Project		2011 With Project	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	160	100	370	105	180	110	390	115
Westbound SR 14	70	230	160	240	80	260	170	270
Southbound Cook-Underwood Road	10	10	20	285	10	10	20	285

AM Peak Hour is 7:00 AM to 8:00 AM
PM Peak Hour if 4:00 PM to 5:00 PM

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road using estimated 2011 traffic volumes, including non-project traffic and traffic related to construction. The analysis assumed that 65 to 75 percent of construction traffic trips would travel to and from west of the Project Area on SR 14, and 25 to 35 percent of construction traffic trips would travel to and from east of the Project Area on SR 14. Many of these trips would occur outside of the peak periods, depending on their origin location and start time. Analyses results are presented in Table 3.11-8.

Table 3.11-8
Level of Service During Construction

Location	Peak Hour	Estimated 2009 LOS		Estimated 2011 LOS			
				Without Project		With Project	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
West Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	8.4	A
	PM	7.9	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.4	A	14.7	B
	PM	10.0	A	10.1	B	14.1	B
East Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	8.4	A
	PM	8.0	A	8.0	A	8.1	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.5	A	15.1	B
	PM	10.2	B	10.3	B	14.7	B

Delay = Average per vehicle

Based on this analysis, estimated 2011 traffic volumes, including construction vehicles, would have minimal impact on the LOS at either junction of SR 14, which would maintain LOS A. For vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14, delays would increase up to approximately six seconds per vehicle over estimated 2011 conditions. The southbound approach on Cook-Underwood Road at the west junction with SR 14 would experience degradation in LOS from A to B during the AM hour over estimated 2011 operations. The southbound approach on Cook-Underwood Road at the east junction with SR 14 would experience degradation in LOS from A to B during the AM peak hour over estimated 2011 operations. LOS B operations would be maintained at both the west and east junctions of Cook-Underwood Road with SR 14 during the PM peak hour with no change in LOS over year 2011.

Traffic Hazards

Traffic hazards associated with construction projects generally relate to accidents. Construction of the Project would require that many construction vehicles, including trucks with oversized and overweight loads, share the existing roadway network with the general public. As a result, some accidents could occur that would be directly attributable to construction traffic. This increase is expected to be temporary and minimal. Prior to Project construction, coordination would be required between the owner, contractor, the Cities of Bingen and White Salmon, Skamania County, and WSDOT to ensure the highest level of safety possible for both the traveling public and the construction vehicles. This coordination would be particularly important during the summer months when the cities of Bingen and White Salmon experience an increase in traffic volume from recreational activities in the surrounding area.

SR 14 in the vicinity of the proposed Project Area is a two-lane undivided rural highway with limited access. Access points in the proposed Project vicinity do not include roadway channelization for turning movements. PM peak traffic volumes at both the east and west intersections of SR 14 with Cook-Underwood Road would increase from an estimated 10 vehicles without the Project to an estimated 285 vehicles with the Project (see Table 3.11-7). While traffic delay would increase by approximately four seconds (see Table 3.11-8), LOS at both intersections in the PM peak would remain at LOS B. Construction worker traffic (workers travelling to and from the job site) is anticipated to have minor effects on traffic safety. Potential moderate impacts to travel safety could occur due to the turning movements of oversized and overweight trucks onto and off of Cook-Underwood Road during the peak construction period.

Impacts to Railroad Transportation

Some wind energy components also may be transported from either the Port of Longview or Port of Vancouver by rail to the existing Applicant facility in Bingen, Washington. Wind energy components on rail cars can be up to 14.5 feet in width, up to approximately 15 feet in height, and as long as 150 feet. The wind energy components likely would be transported on standard or heavy-duty 89-foot long flat rail cars. These components would be off-loaded at the Applicant's facility to a staging location to be determined and loaded onto specialized trucks for transport to the Project Area.

Although the Burlington Northern Santa Fe rail line between Vancouver, Washington and the Applicant's facility could accommodate most wind energy components, this rail line may not be

able to accommodate loads with widths in excess of 14 feet. This may preclude transport by rail of the wide bottom sections of the wind turbine towers; however, the nacelles, turbines, blades, and upper sections of the wind turbine towers still could be transported by rail. Because rail transport would only be used for components that could safely be transported by rail and would be accomplished within existing railroad schedules, impacts to rail transportation are expected to be minimal to low.

Impacts to River Transportation

Potential impacts to river transportation would occur only if wind energy components were transported by barge from either the Port of Longview or Port of Vancouver to the Applicant's facility in Bingen, Washington. The wind energy components would be transported from the Ports upriver to the Bonneville Dam using by barges and tugboats. The barges and tugboats would bypass the Bonneville Dam via the lockage facility, and continue upriver to the existing Applicant's facility in Bingen, Washington. The wind energy components would be off-loaded at the Applicant's facility to a staging location to be determined and loaded onto specialized trucks for transport to the proposed Project Area.

There would be no oversized or overweight restrictions using barges at either of the Ports, on the Columbia River, or at the lockage facility at the Bonneville Dam. Coordination with the Bonneville Dam Project Office would be required to determine optimal times for lockage use. Because there would be no interference with river operations and shipping of Project materials would be accomplished within existing lockage schedules, construction impacts to river transportation are expected to be minimal to low.

Impacts to Air Transportation

Temporary construction equipment such as cranes and derricks that would be used for the construction of the proposed towers could pose a hazard to aviation safety during the construction period, depending on their height. A "Determination of No Hazard to Air Navigation" likely would need to be obtained for certain taller wind energy components, such as the wind turbines, that would be constructed at the Project Area. It is not expected that local or regional airports would be used for transporting construction equipment or material, and no air transportation impacts would be anticipated.

Operation

Project operation would generate small volumes of additional traffic associated with workers commuting to the Project and occasional service delivery trips. Project operation workers would generate approximately 30 daily trips, with service delivery trips ranging from zero to usually no more than four daily trips. Although the Project would operate 24 hours a day, seven days a week, using an automated system, the operations crew would typically work eight-hour days Monday through Friday. The distribution of operational traffic trips is expected to be the same as for construction trips.

Impacts to Project Vicinity Roadways

Vehicles trips generated during Project operation would consist primarily of employees commuting to and from the site in their personal vehicles. The number of additional trips, and

the types of vehicles used, are not expected to exceed State or County roadway legal load limits. These vehicles would not contribute to roadway degradation.

Impacts to Traffic Volumes and LOS

Peak-hour traffic volumes were estimated for operations at both the west and east junctions of SR 14 and Cook-Underwood Road. These estimates include 2012 baseline traffic volumes and the project-generated traffic volumes. Like the analysis of traffic volumes during construction, the estimated traffic volumes assume that all vehicles during Project operation would travel through either the east or the west junction Cook-Underwood Road with SR 14; if other routes were used, the actual impacts to these junctions would be less. Table 3.11-9 compares estimated traffic volumes without the proposed Project to estimated traffic volumes with the proposed Project during full operation of the Project.

Table 3.11-9
Estimated 2012 Traffic Volumes During Operation at Junctions of Cook-Underwood Road and SR 14

	West Junction of Cook-Underwood Road with SR 14				East Junction of Cook-Underwood Road with SR 14			
	2012 Without Project		2012 With Project		2012 Without Project		2012 With Project	
Location	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Eastbound SR 14	170	100	180	100	180	110	190	110
Westbound SR 14	70	240	75	240	80	260	85	260
Southbound Cook-Underwood Road	10	10	10	25	10	10	10	25

AM Peak Hour is 7:00 AM to 8:00 AM
PM Peak Hour if 4:00 PM to 5:00 PM

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road, based on the estimated 2012 traffic volumes. The results indicate that operations would have a minimal impact on the LOS for either the west or the east junctions of Cook-Underwood Road with SR 14. Delays would increase slightly—less than one second per vehicle—for vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14 over estimated 2012 operations. LOS A and B operations would be maintained during the AM and PM peak hours at both the west and east junctions of Cook-Underwood Road with SR 14 with no change in LOS over year 2012. Analyses results are presented in Table 3.11-10.

Table 3.11-10
Level of Service During Operation

Location	Peak Hour	Estimated 2009 LOS		Estimated 2012 LOS			
				Without Project		With Project	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
West Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	7.6	A
	PM	7.9	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.4	A	9.7	A
	PM	10.0	A	10.2	B	10.4	B
East Junction of Cook-Underwood Road							
SR 14 Eastbound Left Turn	AM	7.6	A	7.6	A	7.6	A
	PM	8.0	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.4	A	9.5	A	9.8	A
	PM	10.2	B	10.3	B	10.6	B

Delay = Average per vehicle

During operations, employees would park at the Operations and Maintenance facility parking lot. There would be approximately 10 vehicles each day, including employee and delivery vehicles. A maximum of approximately 20 vehicles are expected to be parked in the Operations and Maintenance facility parking lot at any one time. A visitor kiosk is also planned at the Operations and Maintenance facility that would provide tourists with a safe place to view and learn about wind turbines. The parking lot would be sized to accommodate these uses.

Traffic Hazards

Because of the low volumes and infrequent trips, Project operation is not expected to increase traffic hazards or accident occurrences.

Impacts to Railroad and River Transportation

Once construction is complete and the Project is operational, it is expected that there would not be any use of railroad or river transportation for the proposed Project. Because there thus would be no interference with railroad or river operations, there would be no expected impacts to railroad and river transportation during Project operation.

Impacts to Air Transportation

The proposed wind turbines would not be expected to conflict with arriving or departing aircraft from either the public or private airports within the Project vicinity. All towers would meet Federal Aviation Administration regulations regarding lighting. A "Determination of No Hazard to Air Navigation" would be obtained for the proposed Project. The Federal Aviation Administration would need to be notified of any alterations to the wind turbine towers that could affect air space.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major transportation issues presently anticipated, including impacts to traffic volumes and LOS standards. If impacts to transportation are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.11.2.2 No Action Alternative

Under the No Action Alternative, the Project would not be constructed and therefore no additional auto or truck trips would be added due to the Project. No impacts upon any type of transportation (road, rail, air, or river) would occur.

3.11.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential Project impacts to transportation.

- Prepare and implement a Transportation Management Plan to direct and obligate the contractor to implement procedures to minimize traffic impacts in consultation with both WSDOT and Skamania County. The plan should be submitted to EFSEC for approval and include requirements for coordination of project-related construction traffic and WSDOT planned construction projects, along with requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic.

- Comply with State and County permitting requirements for over-size and over-weight vehicles.

- Notify land owners in the Project vicinity prior to construction of transportation routes that would be used for construction equipment and labor.

- Place approved State and/or County advanced warning construction signs prior to and during construction.

- Use certified flaggers when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents.

- Avoid restricting traffic flow for more than 20 minutes during the construction phase.

- Use pilot cars both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways. For all loads over 10 feet wide traveling on SR 14 from east of the proposed Project Area between MP 76.77 and MP 76.91, use three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500 feet of separation. The lead pilot car would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible for stopping all oncoming traffic.

- Design and build all access road improvements or new construction according to WSDOT and Washington State access management standards.

- Conduct pre- and post-haul construction visual assessments of roadway surface conditions to identify weak or deteriorated areas along the haul route that may require repair as a result of project-related traffic. Following the end of construction, repair all pavement sections affected by project-related traffic as needed to pre-construction conditions or better.

- Perform all snow removal from Project access roads in a safe manner that does not degrade roadway conditions.

3.11.4 UNAVOIDABLE ADVERSE IMPACTS

No major unavoidable adverse impacts to traffic and transportation have been identified. Construction of the Project is anticipated to have very minor impacts to LOS standards, and to have a potential very minor impact on traffic safety. Operation of the Project is anticipated to have little to no impact to transportation.

3.11.5 REFERENCES

American Association of State Highway and Transportation Officials (AASHTO). 2004. *A Policy on Geometric Design of Highways and Street*s.

Transportation Research Board (TRB). 2000. *Highway Capacity Manual*.

Southwest Washington Regional Transportation Council (SWRTC). 2009a. *Skamania County Regional Transportation Plan*. May. Accessed October 2009 at: http://www.rtc.wa.gov/reports/mtp/Rtp2009Skamania.pdf.

———. 2009b. *Klickitat County Regional Transportation Plan*. May. Accessed October 2009 at: http://www.rtc.wa.gov/reports/mtp/Rtp2009Klickitat.pdf.

Washington State Department of Transportation (WSDOT). 2007. *Design Manual*. Publication M 22-01.

———. 2008. *2008 Annual Traffic Report*.

———. 2009a. Statewide Transportation Improvement Plan (on-line project database). Accessed October 2009 at: http://eefmapps.wsdot.wa.gov/fmi/xsl/STIP/search_agency.xsl?-db=STIP&-lay=websearch&-view.

———. 2009b. SR 14 Project Camas-Washougal Widening and Interchange Web Page. Accessed October 2009 at: http://www.wsdot.wa.gov/projects/sr14/camaswashougal/.

3.12 PUBLIC SERVICES AND UTILITIES

This section describes impacts to public services and utilities. The Project Area is served by a variety of public services and utilities. Public services discussed include fire protection, law enforcement, emergency medical services and schools. Utilities discussed include telephone, electric, sewer, water and solid waste disposal.

3.12.1 AFFECTED ENVIRONMENT

3.12.1.1 Public Services

Fire Protection

As discussed in Section 3.6.1.2, Public Health and Safety, fire protection services are provided by two city fire departments (North Bonneville and Stevenson) and seven Skamania County fire districts provide fire protection to Skamania County residents. DNR also provides fire suppression services to forested areas in Skamania County, and would be the first responder to a fire emergency at the Project Area (J. Weeks, personal communication).

Law Enforcement

As discussed in Section 3.6.1.3, Public Health and Safety, the Skamania County Sheriff's Office would provide law enforcement services to the Project. Sheriff's Office headquarters are located in Stevenson, approximately 15 miles southwest of the Project Area. The response time from Sheriff's Office headquarters to the Project Area is approximately 20 minutes.

Additionally, the Washington State Patrol patrols SR 14, which is south of the site. Construction and equipment delivery vehicles would travel on SR 14. Roads extending north of SR 14 are county roads, and are patrolled by the Sheriff's Office.

Emergency Medical Services

As discussed in Section 3.6.1.4, Public Health and Safety, two ambulance companies would respond to an emergency in the Project Area: Skamania County Emergency Medical Service and Skyline Ambulance. Skamania County Emergency Medical Services is the functioning entity of Skamania County Hospital District No. 1, which provides ambulance service to the residents of Skamania County. Skyline Ambulance is based at Skyline Hospital in White Salmon, and is equipped with three ambulance vehicles.

The two hospitals closest to the Project are Skyline Hospital in White Salmon (7 miles southeast of the Project) and Providence Hood River Memorial Hospital in the City of Hood River (8 miles southeast of the Project).

Schools

The public school closest to the Project Area is the Mill A School, which is approximately 2 miles southwest of the site. The next closest public schools are in the community of Carson, approximately 10 miles west of the site. School buses may drive through neighborhoods near the Project Area, including Willard and Mill A, which are located approximately 2.25 and 1.5 miles respectively from the site.

Mill A School District No. 31 provides public educational services to the population in the district (ESD 2008). Mill A School currently enrolls 81 students in grades K through 8 in the southeastern corner of Skamania County adjacent to the Project Area. High school students living within the boundaries of the Mill A School District attend Stevenson High School in the Stevenson-Carson School District No. 303, which borders Mill A School District No. 31 on the west. Table 3.12-4 shows that over the last few years, enrollment in these five districts has not changed more than five percentage points, on average.

Table 3.12-1
Enrollment Trends
in the Whistling Ridge Energy Project Vicinity

	Mill A School District	Mount Pleasant School District	Skamania School District	Stevenson-Carson School District	Washougal School District
Fall 2004	79	65	64	1,049	2,870
Fall 2005	76	63	72	1,069	3,015
Fall 2006	66	56	70	1,058	3,057
Fall 2007	69	56	68	1,020	3,054
Annual Average Rate of Growth, 2004-2007	-4.4%	-4.8%	2.0%	-0.9%	2.1%

Source: Washington State OSPI (2008).

There are no higher education facilities near the Project Area. The higher education facilities closest to the site are located in Vancouver, Washington.

3.12.1.2 Utilities

The site area is served by the following utilities:

- Telephone: Embarq;
- Electric: Skamania County Public Utility District (PUD);
- Sewer: Individual septic systems;

- Water: Individual wells;
- Solid Waste Pickup: Skamania County.

Embarq provides telephone service to the area surrounding the site (D. Cox, personal communication). The Skamania County Public Utility District (PUD) is a customer-owned utility that provides electricity service to Skamania County. The PUD's primary source of power is obtained from BPA, which markets power generated by the federal hydroelectric facilities along the Columbia River. The PUD's backup power source is the Condit Dam. The PUD has expressed interest in using the Project as a source of backup power when the Condit Dam is removed.

The homes and businesses in Mill A and Willard do not have sewer service or water service, and are served by individual wells and septic systems.

Skamania County provides solid waste pick-up service to residences and businesses in the County, including those near the Project Area (Skamania County PUD office staff, personal communication). The majority of solid waste from Skamania County is delivered to the Roosevelt Regional Landfill in Klickitat County (WSSWIC 2009). The landfill began operations in 1990, and as of 2000 had in excess of 140 million tons of remaining permitted capacity. The landfill site contains more than 2,000 acres in which additional capacity could likely be permitted (Klickitat County 2000).

3.12.2 IMPACTS

3.12.2.1 Proposed Action

The potential impacts of the proposed Project on public services and utilities include those from construction and operation.

Construction

The use of construction workers from outside the immediate area could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments.

The impact of Project construction on local schools would be at most minor and temporary, as few out-of-area construction workers are likely to be accompanied by families for this temporary construction project.

Construction-related impacts to local utilities providing telephone, electric or solid waste pickup are also expected to be minor and temporary. Most workers would not be in the area for long enough to obtain these services; those who stayed in temporary housing in the area would not remain for more than a few months.

The presence of construction vehicles on area roads would not impact the response times for emergency providers. Construction trucks would represent additional volume on area roads, but transportation LOS would remain at LOS A or B (delays of less than 15 seconds), and thus

would not cause substantial delays to emergency response vehicles. Construction activities themselves would take place entirely within land managed for commercial forestry by the Applicant, and would not impact local emergency providers.

Fire Protection

The Project Area is generally forest land. The only structures proposed on the forest lands are the towers, associated transformers and substation, and the Operations and Maintenance facility. Project construction could temporarily increase the risk of fire at the Project Area and in the broader Project Area. As the landowner, the Applicant has the ability to respond to fires on their forest land with dozers and water trucks.

Fire response on forest lands is provided by DNR. They have resources in the area and respond to all wildland fires. DNR would likely respond to a structure fire in the woods, as would Underwood Fire District and Mill A Volunteers. Mill A Volunteers is not a recognized fire district with a tax base but a volunteer fire company; the group has joint responder agreements with Underwood and DNR.

Underwood Fire District is the nearest local fire district and has submitted a comment (scoping comment #108) to EFSEC regarding their ability to respond to fires and provide services. The Underwood fire chief commented:

> *"The area designated for the energy project is outside our district; DNR is the official service provider for these areas. The Project may have a generally positive impact on the ability of our department and DNR to offer fire protection services to the area because new roads, extensions, and improved existing roads will provide better access for all first responders. If necessary, Fire District 3 can provide service coverage to the Project area without any reduction in service capacity to our constituency. We do not have a contract to provide service to the area. The project does not present any challenges or requirements for which we are not already prepared to respond."*

There are two potential locations for the Operations and Maintenance facility site, one on-site next to the substation and the alternative site along West Pit Road near the intersection with Willard Road. The alternative site would have a shorter emergency response time than the on-site option.

Law Enforcement

Construction activities associated with the Project would increase traffic volume on roadways surrounding the Project Area, as a result of both commuting construction workers and the transportation of materials. This increased volume would likely occur in mid-summer to fall when vacationers use the roadways. It is possible that the number of accidents and calls for service along major roadways (e.g., SR 14 and I-84) would increase for approximately six months, after which most of the on-site work would be done.

The demand for traffic enforcement activities would peak when construction employment peaks at approximately 265 employees for approximately one month. Out-of-area workers are not

expected to move their families into the Project Area because each construction phase requiring workers with specialized skills would be completed within three and one-half months or less. They would likely either commute (from the Portland-Vancouver area) or stay in temporary housing for the period of time needed to complete their tasks. As described in Section 4.4 Socioeconomics of the Application for Site Certification, this analysis assumes that as many as 40 non-local workers could be employed at the Project Area during the peak construction month (this includes potential out-of-state workers) and would likely stay in temporary housing.

There likely would be additional calls for response during the construction phase, primarily because of increased traffic and accident potential. However, because the construction period is short (approximately one year), the increased service calls are not anticipated to be sufficient in number to require additional law enforcement staff resources in the Project Area. See Section 3.11, Transportation, for further discussion of traffic safety hazards.

Emergency Medical Services

During Project construction, the local demand for emergency medical services could increase slightly due to construction accidents that could occur at the Project Area or Project vicinity. Project construction workers would be exposed to hazards caused by equipment failure, natural disaster, or human mistake that would require the services of local emergency response units to provide initial treatment and transportation to a local medical facility and the services of emergency rooms in the receiving facility. The specific level of demand for emergency medical service response is unknown.

With adequate safety measures in place, and considering the size of the construction workforce (which would temporarily reach a peak of 265 workers for one month) it is expected that Project construction would generate few serious injury accidents requiring emergency medical services response. The two local hospitals (Skyline Hospital in White Salmon and Providence Hood River Memorial Hospital in Hood River) have capacity for additional patients and there are ambulances available to service the Project Area.

It is expected that an average of 31 and a peak of 40 construction workers would temporarily migrate to the local labor market from either outside the immediate tri-county area of Skamania, Klickitat and Hood River region or from out of state. However, because the duration of their stay in the Project Area would be short (approximately four months), it is unlikely that these temporary workers would create a noticeable increase in demand for emergency medical services during Project construction.

Schools

An average of 21 (40 at peak) specialized non-local construction workers from out of the area would work on the Project. However, the anticipated maximum duration of employment for each craft is three to three and one-half months, and few workers are anticipated to move their families to the area. Further, much of the construction would take place during the summer months when school is not in session. Consequently, construction is expected to cause little to no additional enrollment. The Mill A and White Salmon School Districts have the capacity to handle any influx. The White Salmon Valley School District commented during scoping:

> *"Economically this project has the potential to benefit the community and the school district by adding revenues without creating additional demands for services or impacts on the school system."*

Construction traffic is not expected to lower transportation LOS below LOS A or B (delay less than 15 seconds), and consequently there would be little or no impact on school busses in the area.

Utilities

Water Supply. During the approximately one-year construction period, approximately 1.7 million gallons of water would be consumed for road compaction, dust control, wetting concrete, and other construction purposes. The construction contractor would supply water used during construction. Water would be delivered to the Project Area via water trucks and obtained from a local source with a valid water right. This impact would be negligible considering the temporary nature of the impact and the availability of adequate water supplies.

Wastewater. No impacts to community wastewater disposal systems are anticipated because the Project would not be connected to a sewer system during construction. Sanitary wastes would be collected in portable toilets during construction. Disposal of sanitary wastes would be managed through a contract with a portable toilet vendor. The contractor would incorporate applicable state capacity requirements based on the construction worker population in the Project Area at any given time. Collected wastes would be managed and disposed of by the contracted vendor.

Solid Waste. During construction, the primary wastes generated would be solid construction debris such as scrap metal, cable, wire, wood pallets, plastic packaging materials and cardboard. The total volume of construction wastes is expected to be less than ten tons. This waste would be accumulated on site in drop boxes until hauled away to a licensed transfer station or landfill by either the construction contractor or the Skamania County Solid Waste Division.

The majority of solid waste from Skamania County is delivered to the Roosevelt Regional Landfill in Klickitat County (WSSWIC 2009). The landfill began operations in 1990, and as of 2000 had in excess of 140 million tons of remaining permitted capacity. The landfill site contains more than 2,000 acres, in which additional capacity could likely be permitted (Klickitat County 2000).

Operation

Project operation would create a potential positive impact on public services and utilities. The Project's assessed value could be as much as $87.5 million, and this would generate approximately $731,500 per year in property tax revenue and $50,000 in sales tax revenue. Assuming that an annual tax revenue of $731,500 would be distributed in the same manner as current property tax distributions, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road fund ($115,035), and the Current Expense fund ($111,086). The sales tax revenue would be split between Washington State (approximately $46,000) and Washington Counties, primarily Skamania and Klickitat Counties ($4,000). Section 3.13.2 Impacts provides additional

information on revenue. Although impacts are expected to be minimal, a portion of these funds could nevertheless be used to upgrade existing public services and utilities in Klickitat County.

The Project would have eight to nine on-site employees during operation. Given this small number, and considering the use of on-site services and emergency response plans, the Project is expected to have minimal adverse impact on local public services and utilities.

Fire Protection

Fire protection would continue to be provided by the Applicant, DNR, Underwood Fire District and Mill A Volunteers. Potential for fire during operations would be lower than during the construction period, and the remaining fire risk could be mitigated through appropriate operational practices. DNR has stated that resources for fire protection and suppression services are adequate to serve the Project during construction and operation (J. Weeks, personal communication).

Wildfires in the Project Area are relatively rare, and DNR continually monitors fire conditions.

Turbine fires are possible; however, with the types of modern wind turbines proposed for the Project, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central supervisory control and data acquisition system, which would notify operators of the alarm by cell phone or pager.

Law Enforcement

The Sheriff's Office resources are generally adequate to serve the Project during construction and operation, given that on-site security is provided by a separate party (D. Cox, personal communication). The Applicant would likely contract locally for private security.

Emergency Services

The Project would not result in a decrease in response times for area service providers during operation. The Project's eight to nine permanent employees would not represent a substantial increase in traffic volumes on area roads that would impact emergency response, nor would Project facilities result in additional traffic controls.

Schools

The addition of eight to nine employees, even if all were from outside the local area and had families, would represent a minimal impact to local schools, especially since they would likely live in more than one school district.

Utilities

Upon completion, the Project and either of the proposed sites for the Operations and Maintenance Facility would be served by the following utility systems:

- ***Telephone.*** Embarq and Sprint. Both providers have adequate capacity to serve the site.

- ***Electric service.*** Skamania County PUD/BPA connection. Electricity would be used at the Operations and Maintenance building. The PUD has adequate capacity to serve the site. The impact would be the same at either alternative location for the facility; however, the alternative site at West Pit Road would be closer to existing PUD lines. No new BPA infrastructure would be needed for the electrical transmission interconnection system beyond the proposed interconnection and substation.

- ***Drinking water.*** Estimated water use during operation would be less than 5,000 gallons per day, primarily for showers, kitchen, and bathroom for Operations and Maintenance staff. Since the staff would work eight-hour shifts Monday through Friday, total water use is likely to be equivalent or less than a single-family home. Water would be supplied by an on-site well. A well using less than 5,000 gallons of water a day would be exempt from permit requirements in RCW 90.44.040. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells.

- ***Wastewater.*** Sewer service would be provided through an on-site septic system. The Operations and Maintenance facility would use less than 5,000 gallons per day of water, and since sewer flows are determined by indoor water use, total sewer flow is also likely to be equivalent or less than a single-family home. There is adequate space on either the Project Area or the alternative Operations and Maintenance site for construction of a septic field of sufficient size to serve this demand. The septic system would be built by a septic tank installer licensed by Skamania County, in accordance with all requirements of the Washington Department of Health and the Skamania County Community Development Department Environmental Health Division.

- ***Non-hazardous waste.*** Solid waste pickup would be provided by Skamania County through Allied Waste, which has one of three garbage collection franchises for the County. The Roosevelt Regional Land Fill has adequate space for any routine non-hazardous waste from the Project.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. The plan would address site restoration that would occur at the conclusion of the Project's operating life (estimated to be 30 years), and restoration in the event the Project is

suspended or terminated during construction or before it has completed its useful operating life. The plan would include or parallel a decommissioning plan for the Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated, including potential impacts on public services and utilities. If impacts to public services or utilities are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.12.2.2 No Action Alternative

Under the No Action Alternative the proposed Project would not be built. There would be no impacts to public services and utilities.

3.12.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential Project impacts to public services and utilities during construction or operation of the proposed Project.

- Mitigate potential impacts to public services and utilities by using tax revenues generated by the Project.

- Provide all local police, fire, and emergency medical agencies with emergency response information for the Project, including employee contact information, procedures for rescue operations to the nacelles, and location of rescue basket. The Applicant would provide applicable emergency response information to local agencies prior to Project construction and would review and update employee contact information annually and provide any changes to the appropriate agencies.

- Utilize fire precautions for staying abreast of fire conditions in the Project Area by contacting DNR. A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. Both the wind turbine generators and the substation would be equipped with lightning protection systems. As seen in Table 3.6-5, Public Health and Safety, sources for potential fire and explosion along with measures to mitigate the risk of either occurring, are outlined.

- Maintain the use of a full-time security plan during Project construction to reduce the potential need for increased police services to the Project Area. These law enforcement mitigation measures are outlined in Section 3.6.3, Public Health and Safety.

- Prepare emergency plans to protect the public health, safety, and environment on and off the Project Area in the case of a major natural disaster or industrial accident relating to or affecting the Project. The construction specifications would require that the contractors prepare and implement a Construction Health and Safety Program that included an

emergency plan. The Construction Health and Safety Program would include the following provisions:

- Construction Injury and Illness Prevention Plan;
- Construction Written Safety Program;
- Construction Personnel Protective Devices;
- Construction On-Site Fire Suppression Prevention; and
- Construction Off-Site Fire Suppression Support.

- Install the well supplying the Operations and Maintenance facility, at either of the two sites under consideration, by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells.

- Coordinate and comply with the Skamania County Community Development Department Environmental Health Division, and would comply with all County and State septic tank and subsurface disposal field design, installation, and maintenance requirements

3.12.4 UNAVOIDABLE ADVERSE IMPACTS

The Project would have no unavoidable adverse impacts to public services and utilities. The small amount of additional services and utilities that would be needed would be offset by the increased tax revenue.

3.12.5 REFERENCES

Carlson, John. Skamania County Emergency Management. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

Cox, Dave. Undersheriff, Skamania County Sheriff's Office. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 17, 2008.

Educational Service District 112 (ESD). 2008. School Districts, Skamania County. Accessed December 15 and 17, 2008 at http://www.esd112.org/schooldistricts/skamania_county.html.

Fullerton, Gail A. and Ole Helgerson. 2008. Underwood Community Wildfire Protection Plan. Accessed December 12, 2008 at: http://www.skamaniacounty.org/Wildfire/UnderwoodCWPP/Underwood%20CWPP%20Draft.pdf.

Hovey, Russ. Department of Natural Resources. Phone conversation with Katie Carroz, Carroz Consulting LLC. January 13, 2009.

Klickitat County. 2000. 2000 Klickitat County Comprehensive Solid Waste Management Plan Update. Section 10.2.2. Accessed October 2009 at: http://www.klickitatcounty.org/SolidWaste/FilesHtml/SWMP/10-0.pdf.

Municipal Research and Services Center of Washington (MRSC). 2008. MRSC Website. Accessed December 17, 2008 at http://www.mrsc.org/Subjects/PubSafe/Fire.

Skamania County Public Utility District Office Staff. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

Skinner, Tracy. Washington Survey and Ratings Bureau. Email communications with Katie Carroz, Carroz Consulting LLC, December 12 through December 23, 2008.

Skyline Hospital. 2008. Skyline Hospital Website. Accessed December 19, 2008 at http://www.skylinehospital.com/index.html.

Washington Association of Sheriffs and Police Chiefs (WASPC). 2008. Criminal Justice Information: Crime in Washington. Accessed December 19, 2008 at http://www.waspc.org/index.php?c=Criminal%20Justice%20Information%20Support.

Washington State Office of the Superintendent of Public Instruction (OSPI). 2008. Data and Reports. Accessed December 15, 2008 at http://www.k12.wa.us/dataadmin/default.aspx.

Washington State Patrol. District 5 Public Information Contact, Phone conversation with Katie Carroz, Carroz Consulting LLC. January 26, 2009.

Washington State Solid Waste Information Clearinghouse (WSSWIC). 2009. Solid Waste Facilities for County. Accessed October 2009 at: https://fortress.wa.gov/ecy/swicpublic/UIProfiles/Profile.aspx?profileID=30#haulers.

Weeks, Joe. Southeast (Ellensburg) Region of the Washington State Department of Natural Resources Fire Service. Phone conversation and email with Katie Carroz, Carroz Consulting LLC. February 5, 2009

3.13 SOCIOECONOMICS

This section describes the potential impact of the proposed Project on local socioeconomic resources. For the purpose of this analysis, the region is defined as the tri-county area that includes Skamania and Klickitat Counties in Washington State and Hood River County in Oregon State. The Project Area is defined as the area within approximately three miles of the Project Area.

3.13.1 AFFECTED ENVIRONMENT

3.13.1.1 Demographics

Region

Table 3.13-1 shows the April 1, 2009 population for Skamania and Klickitat Counties, and the July 1, 2008 population for Hood River, Oregon. A greater percentage of all three counties live outside of incorporated areas. The incorporated cities closest to the Project Area are White Salmon, Washington, with 2,200 residents, and Hood River, Oregon, with 6,865 residents. The metropolitan area closest to the Project Area is the Portland-Vancouver-Beaverton metropolitan area, with a population of 2.2 million people. Table 3.13-1 also shows the population distribution for the region and the surrounding communities.

Minority residents represent 23 percent of the White Salmon population and 31 percent of the Hood River population. The minority population is primarily Hispanic/Latino. The tri-county area including Skamania, Klickitat, and Hood River Counties is predominantly white, non-Hispanic. Hood River County has the highest minority percentage (31 percent) of population, followed by Klickitat County (16 percent) and Skamania County (11 percent). The State of Washington population includes 24 percent minority residents. Oregon's population includes 20 percent minority.

In 2000, 17 percent of the population of White Salmon and Hood River were living below the poverty[25] level. This same measure was 13 percent for Skamania County, 17 percent for Klickitat County, and 14 percent for Hood River County the same year. These percentages are higher than statewide averages for Washington and Oregon.

Skamania County's population is expected to grow from 10,800 in 2009 to 11,720 in 2015, an annual average growth rate of 1.4 percent. Klickitat County's population is expected to grow from 20,200 in 2009 to 23,049 in 2015, an annual average growth rate of 2.2 percent. The growth rates for both Skamania County and Washington State are expected to slow by 0.3–0.4 percentage points during 2015 to 2025. The population growth rate for Klickitat County is expected to slow from 2.2 to 1.1 percent for 2015 to 2025. Skamania County is expected to have 12,915 residents by 2025 and Klickitat County is expected to have 25,831 residents by 2025. Hood River County is expected to grow 1.3 percent annually on average, during 2009–2015 and 2015–2025.

[25]The Census Bureau uses a set of income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but are updated annually for inflation. The poverty threshold in 2000 for a family of four with two related children under age 18 was $17,463 (US Census 2009).

Table 3.13-1
Population Distribution in the Project Vicinity

Jurisdiction	Population, April 1, 2000	Population, 2009
Skamania County	9,872	10,800
Unincorporated	8,079	8,465
Incorporated	1,793	2,335
North Bonneville	593	880
Stevenson	1,200	1,455
Klickitat County	19,161	20,200
Unincorporated	12,536	13,550
Incorporated	6,625	6,650
Bingen	672	685
Goldendale	3,760	3,745
White Salmon	2,193	2,200
Hood River County (Oregon)	20,411	21,725
Unincorporated	13,465	13,745
Incorporated	6,946	7,980
Cascade Locks	1,115	1,055
Hood River	5,831	6,925
Washington State	5,894,143	6,668,200
Unincorporated	2,374,593	2,552,500
Incorporated	3,519,550	4,115,700
Oregon State	3,421,399	3,823,465
Unincorporated	1,141,038	1,158,198
Incorporated	2,280,361	2,665,267

Notes: 2000 estimates are April 1 estimates; 2009 estimates are April 1 for Washington State and counties, and July 1 for Oregon state and Hood River County.
Sources: WOFM (2009), PSUPRC (2009).

Project Area

In 2008 the three census block groups within 3 miles of the Project Area had 3,347 residents. Approximately 12 percent were minority. Twelve ~~Nine~~ percent lived below the poverty level in 2008 ~~2000~~; higher ~~fewer~~ than for the region generally.

Minority and Low-Income Populations

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.

As stated above, the 2009 Census indicated that Skamania County had a minority population that consisted primarily of Hispanic/Latino persons which accounted for only 6 percent of the total

population in that county. Additionally, of the total population make-up for Skamania County, 12 percent were living below the poverty level as indicated by the 2008 Census.

3.13.1.2 Housing

Region

In 2008 there were 5,409 housing units in Skamania County, 9,985 housing units in Klickitat County and 3,050 housing units in Hood River County. Occupancy rates in 2008 were 83 percent in Skamania County, 89 percent in Klickitat County and 90 percent in Hood River County, representing 909 vacant units in Skamania County, 1,078 vacant units in Klickitat County and 892 vacant units in Hood River County. In 2000, median gross rents were 13 percent lower in Skamania County and 25 percent lower in Klickitat County than for Washington as a whole. Median gross rent in Hood River County was 13 percent lower than in Oregon as a whole in 2000.

Project Area

The existing residences closest to the Project Area are approximately 0.48 mile and 0.8 mile from the proposed turbine locations. A new homesite location has been applied for, which would be located approximately 2,000 feet (0.38 mile) from the site's south property line. It is unknown if the applicant for this permit has secured all approvals or has proceeded with construction plans. One of two alternative Operations and Maintenance facility sites is located approximately 0.9 mile west of the Project Area on West Pit Road. The nearest residence to this potential site is approximately 0.25 mile away. The other alternative Operations and Maintenance facility site is located in the Project Area adjacent to and north of the substation, farther from residential areas.

The unincorporated community of Willard is located approximately 2.25 miles northwest of the Project Area. The unincorporated community of Mill A also is located near the Project Area, approximately 1.5 miles west of the site. The homes near the Project Area are in a rural setting, primarily single family and between 30 and 50 years old.

Temporary Housing

Over 1,000 hotel rooms and 39 recreational vehicle (RV) or tent campsites exist within 25 miles of the Project Area (Table 3.13-2). Assuming an average occupancy rates of 70 percent, a minimum of 325 hotels rooms or RV/tent campsites are available at any one time.

Table 3.13-2
Temporary Lodging Units

Type of Lodging	Units within 25 Miles of Project Area
Hotel or Motel	1,043
RV Camping	21
Tent Camping	16
Cabin or RV	2
Total Units	1,082
Units Available Assuming 70% Occupancy	325

Source: Woodall (2008), TravelWashington (2008).

3.13.1.3 Employment

Region

In Skamania County, there were approximately 3,254 jobs in 2007 (BEA 2009), representing a gain of 138 jobs over 2006 levels. The principal sources of employment in Skamania County were local government, accommodation and food services, federal government, and manufacturing (Golubcow 2006a and 2006b). "Place of work earnings" (wages, salaries and proprietors' earnings) accounted for only one-quarter of total personal income in the county, with income from property (dividends, interest and rent) and transfer payments (mainly Social Security) making up the balance. The annual unemployment rate in Skamania County was 6.6 percent in 2007 and 8.4 percent in 2008, higher than for Washington State (4.5 percent in 2007 and 5.5 percent in 2008).

In Klickitat County, there were approximately 9,839 jobs in 2007 (BEA 2009). Of these jobs, SDS and Broughton Lumber Company employ a work force of up to 325 employees during their busiest production times, which is equivalent to three percent of total jobs in Klickitat County.[26] The principal sources of employment were local government, retail trade, and professional and technical services. Place of work earnings accounted for about 46 percent of total personal income in the county, with income from property and transfer payments making up the balance. The unemployment rate in 2007 was 6.7 percent, and in 2008 was 8.2 percent. These unemployment rates were higher than for Washington State as a whole.

There were 15,787 jobs in Hood River County in 2007 (BEA 2009), representing the highest employment of the three counties in the region. Place of work earnings accounted for 59 percent of total personal income in the county, with income from property and transfer payments making up the balance. The principal sources of employment were manufacturing, health care and social assistance, local government, and retail trade. The unemployment rate in Hood River County was 4.6 percent in 2007. In comparison, the annual unemployment rate for Oregon as a whole was 5.1 percent in 2000 and 5.2 percent in 2007.

[26] Located in Bingen, SDS jobs are reported as part of Klickitat County statistics even though logging operations occur in both Skamania and Klickitat Counties.

Table 3.13-3 shows unemployment rates in the region for 2000, 2007 and 2008. Hood River County has the lowest unemployment rate of the three counties in the region. The most recent available annual unemployment rate in Hood River County (2007) is roughly two percentage points lower than the same measures for Klickitat and Skamania Counties and 0.6 percentage point lower than for Oregon as a whole.

Table 3.13-3
Unemployment Trends

	Unemployed					
	2000 Annual		2007 Annual		Annual 2008 (Washington areas) and December 2008 (Oregon Areas[a]	
Geographic Area	No.	Percent	No.	Percent	No.	Percent
Skamania County	290	6.0	340	6.6	450	8.4
Klickitat County	700	7.5	650	6.7	820	8.2
Hood River County	757	6.6	592	4.6	712	5.7
Washington State	151,340	5.0	154,720	4.5	192,000	5.5
Oregon State	93,196	5.1	100,517	5.2	158,369	8.0

Sources: WESD (2008), OED (2009).
[a] The most recent annual statistics for Washington are for 2008 and are shown in this column. The most recent annual statistics for Oregon are for 2007. This column shows (for the Oregon areas) the most recent unemployment rate available for both Oregon and Hood River County, which is the December 2008 monthly unemployment rate.

The annual rates, however, do not show the impact of the economic recession, which began to be felt at the end of 2008. These effects can be partially seen by comparing monthly unemployment rates between 2008 and 2009 (through August, the latest month available) which are shown in Table 3.13-4. Table 3.13-4 shows that in August 2009, Skamania County's unemployment rate was 3.1 percentage points higher than for the same month in 2008. The comparable figures are 2.9 percentage points for Klickitat County and 3.3 percent for Hood River County.

Project Area

The Project Area is used for long-term timber production. Although the number of jobs in the project area is unknown, approximately 400 homes or businesses exist within three miles of the Project Area, and approximately one-third of these homes or businesses are located in Willard.

~~*Minority and Low-Income Populations*~~

~~Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.~~

~~As stated above, the 2000 Census indicated that Skamania County had a minority population that consisted primarily of Hispanic/Latino persons which accounted for only 11 percent of the total~~

~~population in that county. Additionally, of the total population make-up for Skamania County, 13 percent were living below the poverty level as indicated by the 2000 Census.~~

Table 3.13-4
Monthly Unemployment Rates, 2008 and 2009

Month	Skamania County		Klickitat County		Hood River County	
	2008	2009	2008	2009	2008	2009
January	8.9	14.5	9.2	12.7	5.5	8.5
February	9.5	14.2	8.9	12.3	5.2	8.9
March	8.5	15.1	7.0	12.9	5.0	9.6
April	7.8	14.2	7.3	12.1	4.6	9.6
May	7.1	11.9	7.2	9.9	5.1	10.6
June	7.8	12.0	6.5	10.3	5.6	9.2
July	7.4	11.7	7.2	8.2	5.4	7.9
August	8.3	11.4	6.2	9.1	6.2	9.5
September	6.2	N/A	5.4	N/A	4.7	N/A
October	7.0	N/A	5.9	N/A	4.2	N/A
November	9.0	N/A	7.3	N/A	5.4	N/A
December	11.7	N/A	9.6	N/A	6.3	N/A

Source: BLS (2009).

3.13.1.4 Public Finance and Fiscal Conditions

Due to the location of the proposed Project within Skamania County and Washington State, these two jurisdictions would be the primary beneficiaries of tax revenues related to Project construction and operation. Washington State and Skamania County collect several types of taxes:

- ***Payroll taxes.*** Washington State collects payroll taxes for workers' industrial insurance, unemployment compensation, and other purposes. While Counties do not directly benefit from payroll taxes, these revenues have a direct beneficial impact to Skamania County residents.

- ***Business and occupation taxes.*** Business and occupation taxes, which are paid on the gross receipts of business activities, are the second-largest revenue source for Washington State. Skamania County does not levy a business tax, so although it does not benefit directly from Business and occupation taxes paid by businesses within Skamania County, the state as a whole would benefit.

- ***Retail sales and use tax.*** In Washington State, the first 0.5 percent of retail sales tax goes to the local county.

- ***Property tax.*** Skamania County collects property taxes for taxing districts within the County. The Project Area is within Taxing District 109, for which the total assessment rate is $8.026839/$1,000 assessed value. This revenue is split between the County, Washington State, and the local taxing district.

In 2008, Skamania County started with a beginning fund balance of $25.6 million, and accrued revenues of $13.7 million that year. The largest revenue fund categories were intergovernmental revenues (43 percent), general property taxes (21 percent) and charges and fees for services (10 percent). Expenditures in 2008 were $19.4 million. The largest expenditure categories were law and justice services (26 percent), general government (20 percent), transportation (19 percent) and natural resource (10 percent) (Table 3.13-5).

Dollars in each of the revenue and expenditure categories are distributed among the General Fund, Special Revenue Fund, Debt Service Fund, Capital Project Fund and Enterprise Fund. Approximately 54 percent of all revenue dollars are in the General Fund, and 39 percent of the revenue dollars are in the Special Revenue Fund. Most of the expenditure dollars were in the General Fund (57 percent) and the Special Revenue Fund (37 percent).

The Project Area is within Taxing District 109, for which the total millage rate[27] is $8.026839/$1,000 assessed value. The millage rate is broken down in Table 3.13-6.

Table 3.13-5
Skamania County Revenues and Expenditures, 2008

Category	Amount
General Property Taxes	2,814,374
Sales & Use Taxes	362,938
Other Local Taxes	614,543
Licenses & Permits	182,553
Charges & Fees for Services	1,331,765
Interest & Investment Earnings	1,228,335
Fines & Forfeits	478,440
Rents, Insurance Premium, Internal Contributions, Miscellaneous	840,764
Intergovernmental Revenues	5,855,309
Total Revenues	13,709,021
Beginning Fund Balance	25,623,475
Law & Justice Services	5,081,012
Fire & Emergency Services	764,603
Health & Human Services	1,649,067
Transportation	3,612,827
Natural Resources	1,858,521
General Government	3,933,882
Utilities	744,672
Capital	1,744,959
Debt Service-Interest	25,000
Total Expenditures	19,414,543

Source: WSA (2009).

[27] The millage rate is the amount per $1,000 of property assessed value that is used to calculate taxes on property.

Table 3.13-6
Breakdown of Taxing District No. 109 Millage Rate

Category	Amount
Current Expense	1.218965
Mental Health	0.012500
Developmental	0.012500
Veteran's Relief	0.011250
County Road	1.262288
Hospital and EMS District	0.643625
State Treasurer (State School Fund)	2.033112
Cemetery District	0.074757
Library District	0.338660
Excess Levy: School District 405 (Klickitat County), Maintenance and Operations	1.640058
Excess Levy: School District 405 (Klickitat County), Capital Projects	0.163270
Excess Levy: School District 405 (Klickitat County), Bond	0.281641
Public Utility District	0.334213
Total	8.026839

Source: L. Moore (personal communication).

3.13.2 IMPACTS

3.13.2.1 Proposed Action

Impacts of the proposed Project are divided between construction and operation.

Construction

Business and Economic Impacts

Design and construction of the proposed Project is expected to begin in 2011. Operation is expected to commence by 2012. During the estimated one-year construction period (excluding engineering, design, specifications, and survey), approximately 330 full-time and part-time workers would be employed at some point during construction. Some of these jobs would not last the entire construction period. The on-site construction work force would peak at approximately 265 workers over the construction period and average 143 workers over the 12 months (Table 3.13-7).

An estimated 65 to 75 percent of the construction labor force would likely be hired from outside the tri-county area, and 25 to 35 percent would be residents of the tri-county area including Skamania, Klickitat, and Hood River counties (A. Barkley, personal communication).[28] (This estimate is based on the relative size of the labor force in the tri-county area compared to larger labor forces in metropolitan areas that are farther away.) This would translate to 66 to 93 (peak)

[28]This information, along with estimated average and peak workforce size and number of full-time and part-time jobs related directly to project construction, are project-specific estimates provided by the Applicant.

and 36 to 50 (average) workers from the tri-county area and 172 to 199 (peak) and 93 to 107 (average) workers from outside the tri-county area, primarily the Portland-Vancouver metropolitan area. At peak, the construction workforce would represent 32 to 45 percent of the estimate size of the construction workforce in Skamania County in 2007 (BEA 2009).

Table 3.13-7
Estimated Quarterly Construction Personnel

Month Before Commercial Operation	Estimated Number of Construction Personnel On Site
14	15
13	15
12	90
11	90
10	190
9	190
8	265
7	215
6	165
5	190
4	100
3	100
2	100
1	25
0	25
Cleanup	25
Average (months 1 – 12)	143
Peak (months 1 – 12)	265

Source: A. Barkley (personal communication)

The total cost of construction is $150 million. Total payroll costs, including fringe benefits and other labor overhead costs, are projected to be approximately $18 million, of which approximately $4.5 million (25 percent) is expected to be earned in the tri-county area (A. Barkley, personal communication), based on the assumption by the Applicant that approximately one-quarter of the construction workforce would already live in the tri-county area.

Non-labor costs are estimated to be $132 million. Construction materials, services and equipment leasing associated with construction are projected to total approximately $13.2 million (10 percent of total non-labor costs) (A. Barkley, personal communication). The Applicant estimates that most of this spending would take place in the tri-county area.

Spending by suppliers, local Project workers and households would benefit the retail trade and services sector, as well as other sectors of the local economy. To estimate the value of these indirect and induced impacts, assumptions specific to Project construction were provided by the proposed Project owner (A. Barkley, personal communication), and were used as inputs to the IMPLAN regional input/output model. These assumptions are as follows and were also mentioned above:

- Local non-labor construction expenditures would be approximately $13.2 million;
- Labor income earned by local residents would be approximately $4.5 million;
- Approximately one-quarter of the workforce (36 workers, taken as a percentage of the average workforce size of 143 workers) would be current residents of the local area.

Based on these assumptions and using IMPLAN modeling software, indirect and induced value added from construction is estimated to be approximately $3.9 million.[29] Project construction would result in 71 indirect and induced jobs (Table 3.13-8). Total direct, indirect and induced value added would be an estimated $8.5 million. Total employment (direct, indirect and induced) would be an estimated 107 full-time and part-time jobs. These effects would continue throughout the construction period.

Table 3.13-8
Employment Impacts of Construction

Sector	Number of Direct Jobs	Number of Indirect Jobs	Number of Induced Jobs	Total Number of Jobs
Agriculture, Forestry, Fish & Hunting	0	1	0	2
Mining	0	0	0	0
Utilities	0	0	0	0
Construction	35	1	0	36
Manufacturing	0	35	11	46
Wholesale Trade	0	0	0	0
Transportation & Warehousing	0	0	6	6
Retail trade	0	1	2	3
Information	0	5	5	10
Finance & insurance	0	1	2	3
Real estate & rental	0	1	0	1
Total[a]	35	45	26	107

Source: IMPLAN (2008).
North American Industry Classification System categories that are 0 are not shown.
[a] Totals may not add due to rounding.

Economic effects would occur beyond the tri-county area in the form of jobs, income and spending. These effects would occur due to spending (attributable to Project construction) that would occur outside the tri-county area. Although these effects were not quantified as part of this analysis, 65 percent to 75 percent of the construction workforce would live in areas outside the tri-county area; therefore, spending would likely increase in the areas where these employees reside. Also, non-labor construction procurements that occur in areas outside the tri-county area (estimated to be approximately $119 million) would result in economic benefits. Areas that benefit could include the metropolitan area closest to the proposed Project (Portland-Vancouver) as well as other areas in the Northwest and the nation as a whole.

[29] Value added is the difference between the proposed project's total output and the cost of the proposed project's inputs. For the construction industry in the tri-county area, value added is comprised primarily of employee compensation (IMPLAN 2008). Value added is a measure of the contribution to output in the tri-county area made by project construction.

Population and Housing Impacts

Up to an estimated 15 percent of the construction workforce would be specialized craftsmen originating outside of Washington and Oregon (A. Barkley, personal communication). These workers would likely have relatively short assignments, and few would be expected to bring their families to the area. The remaining 85 percent of non-local workers would likely come from the Portland-Vancouver area. Assuming as a worst-case scenario that one-third of the workers from the Portland-Vancouver metropolitan area would stay in temporary lodging near the Project Area Monday through Friday, and the specialized, temporary staff also would require lodging, the population that would require housing in the tri-county area is expected to range from 75 workers to 85 workers during peak construction. These construction workers would be expected to seek temporary accommodation in the general vicinity of the Project Area, and to use motels, trailers, campers, and other forms of transient housing. Given that 325 of the approximately 1,082 hotel rooms or RV campsites within 25 miles of the Project Area would be available at any one time, the out-of-area workers would not cause a substantial impact to the availability of transient accommodation in the Project vicinity. The construction phase of the proposed Project is not expected to affect median housing values, median gross rents, or new housing construction.

Fiscal Impacts

Overall fiscal impacts of Project construction are expected to be positive, based primarily on increased employment and spending in the local economy.

Sales Tax Revenue. The total cost of construction is estimated to be approximately $150 million. Non-local procurements would include wind power generation equipment purchased from various domestic and foreign suppliers. Depending on legislation currently under consideration in the state legislature, state sales and use tax may be levied only on procurements that are not directly related to electricity generation. Should the state sales tax exemption for wind power be extended, capital equipment such as turbines, transformers, transmission cables, and substation equipment would not be taxable.

Local procurements are estimated to be 10 percent of total procurements ($13.2 million) (A. Barkley, personal communication). An estimated 90 percent of local procurements would be directly related to electricity generation, and would not be subject to sales tax should the state sales tax exemption for wind power be extended. Taxable sales due to Project construction is therefore estimated to be approximately $1.32 million, resulting in $92,400 in sales and use tax revenue using the sales tax rate (7.0 percent) for the Project Area, which is located in unincorporated Skamania County.

Most of the sales tax revenue due to Project construction would accrue to Skamania County because the Project Area is located in Skamania County. However, if taxable construction supplies are purchased in another Washington State county (Klickitat County, for example), and not shipped to the Project Area, the county in which the purchase occurred would receive the county portion of the sales tax revenue on that purchase. Of the total estimated $92,400 in sales tax revenue, Washington State would receive $85,800 and Skamania County (or the counties where materials or supplies are purchased and not shipped to the site) would receive $6,600.

If a portion of taxable construction materials or supplies are purchased in Hood River County, the owner must pay use tax to Washington State, in which case the tax would go to Washington State (6.5 percent) and Skamania County (0.5 percent). Sales tax revenue would not accrue to Hood River County. Klickitat County could receive a portion of the sales tax revenue, but as stated above, the majority of the county portion is expected to go to Skamania County.

In addition to the $92,400, the proposed Project would result in modest increases in sales tax revenues due to local purchases by construction workers.

Property Values and Property Tax Revenue. Construction activities are not likely to adversely affect property values in residential and commercial areas near the Project Area because the construction period would be relatively short. Construction of the proposed Project would not affect property tax revenues.

County Expenditures. Construction of the proposed Project would require that many construction vehicles, including trucks with over-size and over-weight loads, share the existing roadway network with the general public. Skamania County could experience a small increase in traffic-related costs due to the need for permitting and control measures related to these vehicles, particularly for the over-size loads. Some accidents could occur that would be directly attributable to construction traffic, but any increase is expected to be minimal.

The County could experience minor to negligible increases in the cost of public services such as fire suppression, law enforcement, governmental services, parks and recreation, and hospital costs during construction due to the additional traffic and the temporary population. These are not expected to be significant in the context of the County as a whole.

Operation

Business and Economic Impacts

Operation of the proposed Project would result in a positive economic impact to Skamania County, the tri-county area, and the State of Washington due to increased tax revenues, employment, and local expenditures.

Project operation would require eight to nine full-time or part-time Operations and Maintenance employees. Approximately 75 percent of employees (7 employees) would originate from the tri-county area (A. Barkley, personal communication). An additional temporary workforce with appropriate skills would be utilized during major maintenance or other non-routine operational work. Efforts would be made to hire local individuals to staff the proposed Project as much as practicable.

The estimated gross payroll, including fringe benefits and other payroll overhead for the operational workforce would be $1.5 million, or an average annual labor cost of $167,000 to $188,000 per employee. Subtracting approximately 25 percent to estimate benefits and overhead, the implicit wage would be within 10 percentage points of the 2007 standard industrial wage for construction workers in Skamania County (IMPLAN 2009).

In addition to the direct employees, Project operation would result in indirect and induced employment, for an estimated total of 11 ~~12~~ permanent jobs resulting from the proposed Project (Table 3.13-9).

Table 3.13-9
Employment Impacts of Operation

Sector	Number of Jobs			
	Direct	Indirect	Induced	Total
Ag, Forestry, Fish & Hunting	0	0	0	0
Mining	0	0	0	0
Utilities	7	0	0	7
Construction	0	0	0	0
Manufacturing	0	0	2	2
Wholesale Trade	0	0	0	0
Transportation & Warehousing	0	0	1	1
Retail trade	0	0	0	0
Information	0	0	1	1
Finance & insurance	0	0	0	0
Real estate & rental	0	0	0	0
Total[a]	7	1	4	11

Source: IMPLAN (2009).
North American Industry Classification System categories that are 0 are not shown.
[a] Totals may not add due to rounding

Using IMPLAN regional economic modeling software for the power generation and supply industry in Skamania, Klickitat, and Hood River Counties, a wind power facility employing nine full-time workers would have a gross annual operating cost valued at approximately $3.75 million. This would include direct purchases from suppliers (including fuels, maintenance supplies and services, retail goods and professional services).

An alternative methodology for calculating job impacts is used by the Renewable Energy Policy Project, which estimates that every megawatt of installed wind capacity creates about 4.8 job-years of employment, including both direct and indirect jobs (REPP 2009). Using this methodology, the proposed Project, which would produce approximately 75 MW of electricity, would result in 360 job-years or 12 jobs per year for the 30 year life of the proposed Project.

As stated in Chapter 1, the purpose of the Project is to help meet the future need for energy resources while at the same time enabling SDS to further diversify its business through a technically and economically feasible project. When SDS started in 1946, there were 26 employees in its original crew. This number grew to a high of 450 employees during the 1970s when logging and lumber production were at a peak. Production has since slowed tremendously, as the supply of timber from national forests has sharply declined due to environmental legislation. For this reason, many of the mills in Skamania County have closed down. SDS was able to survive the crises and changes of the last 30 years and no longer relies on timber from

national forests. SDS has scaled back operations, yet today SDS is one of the largest employers in Klickitat County, employing 325 people during busiest production times.

SDS has remained viable during changes in the market through expanding and diversifying its enterprises to include marine in 1984 and power produced in its steam-operated power plant, which creates energy from wood waste, a renewable, organic resource. The the Project is intended to provide another means of diversifying the holdings of SDS to ensure a continuation of a resource-based work force in Skamania County, and to create new construction and operation jobs at a time when jobs in Washington State are being lost. As shown in Table 3.13-9, the proposed Project would create twelve new full-time jobs in Skamania County,

Population and Housing Effects

Of the nine permanent employees for the proposed Project, seven are assumed to originate from the tri-county area, and two would be assumed to migrate to the area from other locations. Assuming an average household size of 2.6 persons, the population in the area could increase by approximately five people, and two households. At the most recent average housing vacancy rate available for Skamania County (16.8 percent), more than 900 housing units would be available in Skamania County alone. Thus operation of the proposed Project would not impact housing availability or cost.

The proposed Project would not displace any minority or low-income populations. The proposed Project would be constructed on private land currently used for forest production, and no residents would be displaced.

Fiscal Impacts

Property Values. Local communities near proposed wind turbine locations have expressed concern that constructing wind turbines would detract from views, which would in turn decrease their property values. A number of studies have been performed to determine the impact of wind power projects on property values. These include the following:

- The Lawrence Berkeley National Laboratory prepared *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis* in December 2009 (Hoen et al. 2009). Researchers collected data on almost 7,500 sales of single-family homes within 10 miles of 24 existing wind facilities in nine different US states. None of the models uncovered conclusive evidence of the existence of any widespread property value effects that might be present in communities surrounding wind energy facilities. Neither the view of the wind facilities nor the distance of homes to those facilities was found to have any consistent, measurable, and significant effect on the selling prices of those homes (Hoen et al. 2009).

- In 2006, ECONorthwest prepared *Economic Impacts of the Kittitas Valley Wind Project* (the Kittitas Study) for the Economic Development Group of Kittitas County, Washington. This report involved a survey of tax assessors in counties (other than Kittitas County) with wind projects to determine the potential effects of wind facilities on property values. The Kittitas Study also conducted a review of the available academic literature for additional information on property value effects. The finding was that

views of wind turbines would not negatively impact property values (ECONorthwest 2006).

- The Renewable Energy Policy Project prepared *The Effect of Wind Development on Local Properties* (REPP 2003). For this study, the project compiled a database that included every wind development that came on-line after 1998 with 10 MW installed capacity or greater. For all projects for which sufficient data was available, REPP conducted a statistical analysis to determine how property values changed over time in the viewshed and in the comparable community. The statistical analysis provided no evidence that wind development has harmed property values within the viewshed (REPP 2003).

- Responses to comments published as part of the 2009 Desert Claim Wind Power Project Final Supplemental Environmental Impact Statement state *"the Final EIS referenced a 2003 report published by Kittitas County that summarized the existing literature on the effect of wind power projects on property values."* The response states that the study, which was prepared by Huckell/Weinman Associates, concluded that wind power facilities have not diminished the value of surrounding properties (EFSEC 2009).

- A literature review to assess the question of whether wind turbines in rural communities have the potential to affect residential property values was completed as part of the Lower Snake River Wind Energy Project Draft EIS (Ecology & Environment 2009). The Draft EIS reported that in 2008 Hoen and Wiser found (1) no statistical evidence that homes near wind facilities are stigmatized by those facilities, (2) no statistical evidence that homes with a view of wind turbines have different values than homes without such views, and (3) no statistical evidence that homes within 0.25, 0.5 and 1 mile of the turbines sell for different values than those located further away. In 2006, while assessing the impacts of a 20 turbine, 30 MW wind facility's visibility on residential property values in Madison County, New York, Hoen found no statistically significant relationship between either proximity to or visibility of the wind facility and the sale price of homes (Ecology & Environment 2009, Hoen 2006).

In summary, the results of these studies and literature reviews are that no statistical evidence exists that wind development has a harmful effect on property values within the viewshed. Therefore, property value impacts are not expected as a result of the proposed Project.

Sales Tax Revenues. Sales, use and other indirect business taxes to state and local governments attributable to Project operation are estimated at approximately $50,000 per year. This estimate is the sum of the estimated sales and use tax revenue from (1) the procurement of supplies and materials for the purpose of Project operations, and (2) new employee spending in the area. The sales tax revenue would be split between Washington State (approximately $46,000) and Washington counties, primarily Skamania and Klickitat counties ($4,000).

The portion of non-labor annual operating cost that is not directly related to electricity production (10 percent of $2.3 million, or approximately $230,000) would be taxable (A.

Barkley, personal communication). Applying the Skamania County sales and use tax rate (7.0 percent) to this amount results in an estimated $15,800 in tax revenue.

New employee spending is estimating by taking the total labor income (direct, indirect and induced) from the IMPLAN operations model (approximately $977,000 per year) and assuming that 70 percent of this amount is disposable income and 70 percent of disposable income is spent in local Washington counties. Based on these assumptions, related sales and use tax revenue would be approximately $34,000.

With the proposed Project, the Project Area would continue to be managed as commercial forest, excluding the area containing the turbine strings and roads. The Project Area covers 1,152 acres. Table 1-1 shows that the maximum area developed for the wind turbine foundations, connecting roadways and transmission lines would be 384 acres (approximately 33 percent of the 1,152-acre site). As specific locations are determined for turbines and other Project components, the 384-acre area would be reduced. The areas that would experience permanent impacts and temporary construction impacts of the proposed Project total approximately 108 acres (approximately nine percent of the 1,152-acre site). The 56-acre area that would be removed from timber production for the life of the proposed Project is approximately five percent of the total Project Area. The opportunity cost of taking this land out of timber production would include tax revenues for Skamania County and Washington State, and would be countered by the sales tax revenues resulting from wind energy sales.

Property Tax Revenue. The proposed Project would have an estimated value of $87.5 million, which would represent an increase of 6.5 percent in assessed value in the County. Using the average 2008 property tax rate for Skamania County of $8.36/$1,000 assessed value (WDOR 2009), the increase in property tax revenue to the County would be $731,500. This would represent an annual revenue increase of 2.9 ~~7.66~~ percent compared to the $2.8 ~~9.66~~ million in property tax collected in calendar year 2008 ~~2007~~. Although Washington State limits property tax increases to one percent of the previous year's levy, new construction does not apply, and would be added on after the one percent is added, using the previous year's property tax rate (V. Torres, personal communication). The increase in property tax revenue would begin one year after construction is complete, and continue for the life of the proposed Project. However, to the extent the wind turbines depreciate over time, the assessed value of the turbines and therefore the property tax revenue also would decrease.

Additional property tax revenue would be distributed to a variety of County departments. Assuming that annual tax revenues of $731,500 would be distributed in the same manner as current property tax distributions, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road fund ($115,035), and the Current Expense fund ($111,086). A portion of the State School Fund would be returned to Skamania County for Skamania County schools.

Property tax revenues would be higher to the extent that increased wages and economic activity in the County resulted in higher valued properties.

A different methodology was used by the National Wind Coordinating Committee, which estimates an increase of $10 to $14 in property taxes for each $1,000 investment (NWCC 2009).

Using this approach, the $17.7 million dollars spent locally (labor and non-labor cost) would result in approximately $177,000 to $250,000 in additional property taxes. This estimate is lower than the forecast given above; however, the NWCC estimate is based on industry averages, while the first estimate is based on project-specific data.

County Services. The addition of five residents would cause a negligible increase in demand for and cost of public services. These would also be outweighed by the substantial economic benefits of the proposed Project to the County.

Minority and Low-Income Populations. Environmental justice addresses whether the Proposed Action would disproportionately impact disadvantaged populations such as low-income and minority residents. The population in the study area (Skamania and Klickitat Counties, Washington; and Hood River County, Oregon) is predominantly white (non-Hispanic/Latino) and a review of data from the 2000 Census did not identify any specific geographic concentrations of minority groups. The Proposed Action would not be expected to disproportionately affect any low-income populations, based on per capita income information at the Census Tract level. Therefore, there would be no disproportionately high or adverse effects to minority or low income groups.

Project Decommissioning

In compliance with WAC 463-72, Site Restoration and Preservation, the Applicant would provide EFSEC with an initial site restoration plan at least ninety days prior to the beginning of site preparation. A detailed site restoration plan is required within ninety days of Project decommissioning. The initial site restoration plan would address site restoration that would occur at the conclusion of the proposed Project's operating life (estimated to be 30 years), and restoration in the event the proposed Project is suspended or terminated during construction or before it has completed its useful operating life. The initial site restoration plan would include or parallel a decommissioning plan for the proposed Project.

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve all major socioeconomic issues presently anticipated, including potential impacts to population, housing and employment. If socioeconomic impacts are anticipated to occur as a result of site restoration and Project decommissioning, mitigation measures would be proposed as part of the plan.

3.13.2.2 No Action Alternative

Under the No Action Alternative, the proposed Project would not be built. Socioeconomic conditions in the area would continue in their present condition.

3.13.3 MITIGATION MEASURES

The following mitigation measures are identified to avoid, reduce, or compensate for potential Project impacts to any socioeconomic factors during construction or operation of the proposed Project.

- Impact to the local economy and social structure of the proposed Project is expected to be beneficial, in the form of additional jobs, increased sales, and increased tax revenues. Temporary increases in population during construction are likely to be minor in view of the availability of housing, transient accommodations, and other public services in the region.

- Ensure that the applicant uses the local labor pool to the greatest extent possible; construction contractors would be required to advertise positions locally and to employ local workers to the greatest extent possible.

3.13.4 UNAVOIDABLE ADVERSE IMPACTS

The proposed Project would result in beneficial impacts, primarily from employment during construction and operation. Minimal adverse impacts are expected.

3.13.5 REFERENCES

Barkley, Allen. Project Owner Representative. Email communication with Katie Carroz, Carroz Consulting LLC. December 8, 2008 and December 14, 2009.

Bureau of Economic Analysis (BEA). 2009. Regional Economic Information System Table CA05 Personal income and detailed earnings by industry; Table CA25 Total employment by industry; Table CA1-3 Personal income, population, per capita personal income; Tables SA51-52 and SA1-3, Disposable personal income and personal income. Accessed December 3, 2009 at: http://www.bea.gov/regional/reis/default.cfm#step3. Accessed December 22, 2009 at: http://www.bea.gov/regional/spi/.

Bureau of Labor Statistics (BLS). 2009. Unemployment rates by county, not seasonally adjusted. Accessed 2009 at: http://data.bls.gov/map/servlet/map.servlet.MapToolServlet?state=41&datatype=unemployment&year=2006&period=M13&survey=la&map=county&seasonal=u.

Ecology & Environment, Inc. 2009. Socioeconomic Report for the Lower Snake River Wind Energy Project, prepared for Renewable Energy Systems Americas Inc. July 23.

ECONorthwest. 2006. *Economic Impacts of the Kittitas Valley Wind Project*. http://www.econw.com/consulting/subtopics?topic=energy&subtopic=renewable_energy.

Energy Facility Site Evaluation Council (EFSEC). 2009. Desert Claim Wind Power Project Final Supplemental Environmental Impact Statement Comments and Responses, Chapter 4. November 6. http://www.efsec.wa.gov/Desert%20Claim/FSEIS/4.0%20Comments.pdf.

Golubcow, Molly. 2006a. "Tourism That Blows." *Atlantic City Weekly.* August 9.

———. 2006b. "Manitoba's First Wind Farm a Tourism Hotspot." July 24. Accessed at: www.mb.gov.ca.

Hoen, B., R. Wiser, P. Cappers, M. Thayer, and G. Sethi. 2009. *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis.* December. http://eetd.lbl.gov/ea/ems/re-pubs.html.

Hoen, Ben. 2006. *Impacts of Windmill Visibility on Property Values in Madison County, New York.* April 30.

IMPLAN. 2008. Regional economic impact model specific to the three-county area. Modeled by Carroz Consulting LLC.

———. 2009. Regional economic impact model specific to the three-county area. Modeled by Carroz Consulting LLC.

Moore, Leslie. Skamania County Assessor's Office. Personal communication with Katie Carroz, Carroz Consulting LLC. February 5, 2009.

National Wind Coordinating Committee (NWCC). 2009. Wind Energy Series, January 1997. Accessed January 25, 2009 at: http://www.nationalwind.org/publications/wes/wes05.htm.

Oregon Employment Department (OED). 2009. Oregon Labor Market Information Service (OLMIS). Unemployment Rates. Accessed January 25, 2009 at: http://www.qualityinfo.org/olmisj/AllRates.

Portland State University Population Research Center (PSUPRC). 2009. Preliminary 2009 Population Estimates as of July 1, 2008 and 2008 Oregon Population Report (2000 estimates). Accessed December 2, 2009 at: http://www.pdx.edu/prc/.

Renewable Energy Policy Project (REPP). 2003. The Effect of Wind Development on Local Property Values. May. Accessed December 28, 2008 at: http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf.

———. 2009. Website: Wind Energy and the Economy. Accessed February 3, 2009 at http://www.awea.org/faq/wwt_economy.html.

Torres, Valerie. Property Tax Specialist, Washington State Department of Revenue. Personal communication with Katie Carroz, Carroz Consulting LLC. December 10, 2009.

TravelWashington. 2008. Travel Resource for Washington State. Accessed December 12, 2008 at: http://www.travel-in-wa.com/.

US Census. 2009. Poverty Thresholds 2000. Accessed December 2, 2009 at: http://www.census.gov/hhes/www/poverty/threshld/thresh00.html.

Washington Employment Security Department (WESD). 2008. Labor Market and Economic Analysis. Resident Labor Force and Employment in Washington State and Labor Market Areas. Accessed January 25, 2009 at: http://www.workforceexplorer.com/cgi/dataanalysis/?PAGEID=94&SUBID=149.

Washington State Auditor (WSA). 2009. Washington State Auditor, Local Government Financial Reporting System. Accessed February 3, 2009 and December 8, 2009 at: http://www.sao.wa.gov/applications/lgfrs/.

Washington State Department of Revenue (WDOR). 2009. Tax incentives for renewable energy. Accessed January 25, 2009 at: http://gis.dor.wa.gov/docs/pubs/incentives/renewableenergy.pdf.

Washington State Office of Financial Management (WOFM). 2009. Washington State Office of Financial Management. Official April 1, 2008 Population Estimates. April 1, 2009 Population of Cities, Towns, and Counties Used for the Allocation of Selected State Revenues. Accessed December 2, 2009 at: http://www.ofm.wa.gov/pop/april1/default.asp.

Woodall. 2008. Woodall's Camping Directory Website. Accessed December 12, 2008 at http://www.woodalls.com/.

3.14 CUMULATIVE IMPACT ANALYSIS

"Cumulative impacts" are the impacts on the environment which result from the incremental impact of an action, such as this Proposed Action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 C.F.R. 1508.7).

This section describes existing development in the vicinity of the proposed Project, as well as current and reasonably foreseeable future development planned for the area, and analyzes and describes potential cumulative impacts. The past, present, and reasonably foreseeable future actions provide the context to assess the cumulative impacts of these actions in combination with the Proposed Action.

3.14.1 EXISTING DEVELOPMENT

The nature and extent of existing development in the vicinity of the proposed Project (i.e., generally within approximately 20 miles of the Project Area) is largely described earlier in this chapter in the sections for each environmental resource. This section first summarizes existing cumulative development that has occurred in the vicinity of the proposed Project. This section then discusses existing wind projects that are considered in the analysis of potential cumulative visual impacts to travelers and others along the I-84 corridor.

3.14.1.1 Surrounding Land Uses

The general Project vicinity is characterized by agriculture, commercial forestry, rural residential development, and a small number of commercial enterprises.

The proposed Project Area is located approximately two miles north of the Columbia River and directly north of the Columbia River Gorge National Scenic Area. The National Scenic Area extends along the Columbia River for about 85 miles and includes 292,500 acres in parts of three Oregon and three Washington counties. Although both the Project Area and the proposed access road are located completely outside the Scenic Area, the proposed Project Area does extend south to the northern boundary of the Scenic Area. The Gifford Pinchot National Forest is located north of the Project Area.

On the Washington side of the Columbia River, land use is predominantly commercial forestry and residential in numerous small, unincorporated communities. There are approximately 400 residences and businesses within three miles of the Project Area (Figure 3.8-1). There is some limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards, located within the Columbia River Gorge National Scenic Area. On the Oregon side of the Columbia River, land use within the Scenic Area is predominantly commercial timber production and residential. South of the Scenic Area, land uses include commercial forestry, agriculture, and some residential. The primary Oregon orchard crops are pears, apples, and cherries.

3.14.1.2 Existing Wind Projects

Portions of the Project would be visible to drivers along I-84, which is located on the Oregon side of the Columbia River. For the purpose of assessing cumulative impacts to visual resources, views of other wind projects from I-84 were considered even if they are located farther than 20 miles from the Project Area. I-84 extends for a distance of approximately 130 ~~127~~ miles from Cascade Locks, Oregon (southwest of the Project Area on the Oregon side of the Columbia River) to the intersection with I-82, which leads north to the Tri-Cities. The draft EIS identified ten existing wind projects along this segment, all located within a distance of approximately 70 miles east of the Project Area (to approximately Arlington, Oregon).[30] Following publication of the draft EIS, eight additional wind projects were identified within a distance of approximately 70 miles east of the Whistling Ridge Energy Project Area. These projects have been added to the analysis in the FEIS. These 18 projects could potentially be viewed by drivers along I-84 within a driving time of approximately one to one-and one-half hours and were included in the analysis of cumulative impacts to Visual Resources described further in Section 3.14.3.10. ~~These ten projects could potentially be viewed by drivers along I-84 within a driving time of approximately one to 1.5 hours.~~

From Arlington, I-84 continues on in an easterly and the southeasterly direction, terminating at Pendleton, Oregon. There are no existing wind energy projects in this area. Farther east, there are wind energy generation projects southeast of the Tri-Cities, and west and southwest of Walla Walla (in both Washington and Oregon), more than 80 additional miles east-northeast. These were considered too remote for this analysis.

All of the 18 ~~ten~~ existing wind energy projects considered in the cumulative visual resource impact analysis are located east of the Columbia River Gorge National Scenic Area as shown in

[30] See map at http://www.nwcouncil.org/maps/power/Default.asp.

Figure 3.14-1. Nine ~~Four~~ are located north of the Columbia River in Washington, and nine ~~six~~ are located south of the river in Oregon. In contrast to the steep terrain and forested vegetation of the Project Area, the 18 ~~ten~~ operating wind projects located to the east are on lands with rolling hills, open vistas, and little or no vegetation. The projects that were considered include:

- Windy Point (Tuolumne), 137 MW wind project west of Maryhill, Washington;
- Windy Flats – Dooley, 113 MW wind project west of Maryhill, Washington;
- Linden Ranch, 50 MW wind project near Goldendale, Washington;
- Goodnoe Hills, 94 MW wind project north of the Columbia River between Goldendale and Roosevelt, Washington;
- White Creek, 205 MW wind project near Roosevelt, Washington;
- Harvest Wind, 99 MW wind project near Roosevelt, Washington;
- Juniper Canyon I, 150 MW wind project in Klickitat County, Washington;
- Big Horn, 199 MW wind project in Klickitat County, Washington;
- Big Horn II, 50 MW wind project in Klickitat County, Washington;
- Patu, 10 MW wind project near Wasco, Oregon;
- Biglow Canyon (I, II, III and Phase II), 600 ~~125~~ MW wind project in Sherman County, Oregon;
- Klondike (I, II, III ~~IIIA~~), 499 MW wind project in Sherman County, Oregon;
- Hay Canyon, 101 MW wind project in Sherman County, Oregon;
- ~~Goodnoe Hills, 94 MW wind project north of the Columbia River between Goldendale and Roosevelt, Washington;~~
- ~~Big Horn, 199 MW wind project in Klickitat County, Washington;~~
- Star Point, 99 MW wind project in Sherman County, Oregon;
- ~~White Creek, 205 MW wind project near Roosevelt, Washington;~~
- Wheat Field, 97 MW wind project near Arlington, Oregon;
- Rattlesnake Road, 103 MW wind project near Arlington, Oregon;
- ~~Wheat Field, 97 MW wind project near Arlington, Oregon;~~

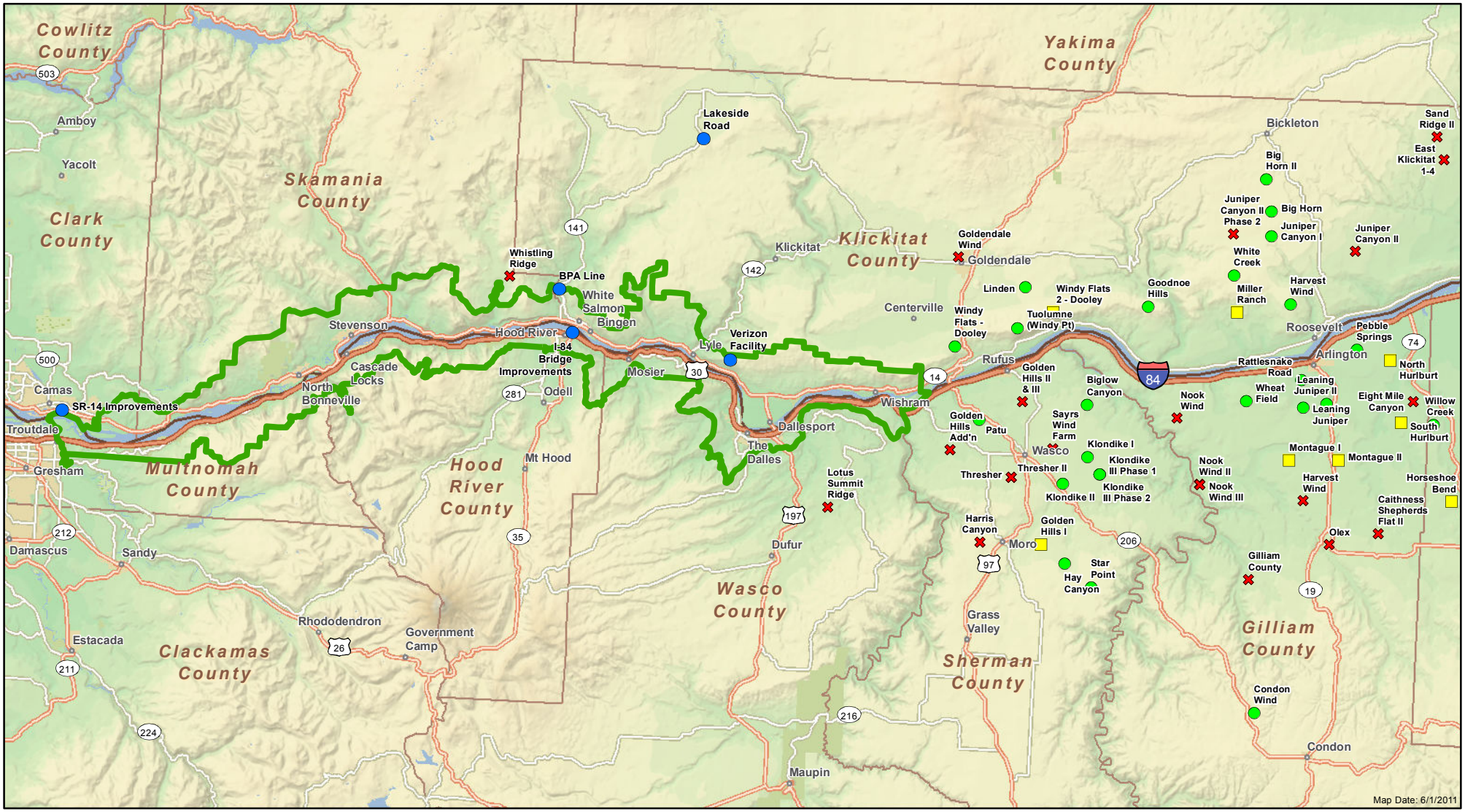
- Leaning Juniper I, 150 MW wind project near Arlington, Oregon;
- Leaning Juniper II, 200 MW wind project near Arlington, Oregon;

3.14.2 REASONABLY FORESEEABLE FUTURE DEVELOPMENT

Reasonably foreseeable future development generally includes those actions currently underway, formally proposed or planned, or highly likely to occur based on available information. Reasonably foreseeable future development projects located within approximately 20 miles of the Project Area were identified to determine if they could potentially have cumulative impacts on the environment, including water quality, soil erosion, vegetation, terrestrial wildlife species, and bird and bat species. The 20 mile radius was considered a reasonable geographic area within which to consider potential cumulative impacts, particularly construction-related impacts such as surface disturbance, vegetation removal, emissions, runoff, noise, and traffic. To assess potential cumulative visual impacts to drivers along the I-84 corridor, reasonably foreseeable future wind projects located within approximately 70 miles of the Whistling Ridge Project Area were also added to the analysis.

Various sources, including searches in the fall of 2009 of the web sites of the surrounding Skamania, Klickitat and Hood River Counties, Columbia River Gorge Commission, WSDOT, Oregon Department of Transportation, EFSEC, the Oregon Department of Energy, and the Ports of Skamania County, Klickitat County, The Dalles, and Cascade Locks, were made to obtain information about any current and potential future development in the Project vicinity. Reasonably foreseeable development that may occur in the vicinity of the Proposed Action could include both other wind projects and roadway projects. (See Figure 3.14-1 for the general locations of this potential development.)

Both non-wind and wind reasonably foreseeable future projects were initially considered for inclusion in the cumulative impact analysis. Non-wind projects involved transportation improvements, communications facilities, and power line improvements. Of these projects, only the Oregon Department of Transportation bridge replacement projects, now in progress along I-84, were considered close enough to the Project Area to be included in the cumulative impact analysis. The other transportation, communication, and power line improvement projects were considered to be too far from the Whistling Ridge Project Area to result in cumulative impacts and were therefore eliminated from further analysis. Reasonably foreseeable wind projects are shown in Figure 3.14-1. Of these wind projects, all except the Middle Mountain project were judged not likely visible from I-84. Nonetheless, the cumulative visual resource impact analysis does consider reasonably foreseeable wind projects with approximately the same geographic area as existing wind projects considered in that analysis. In addition, the cumulative impact analysis has been updated to reflect the discontinuation of the Middle Mountain project. The Middle Mountain project, originally proposed by Hood River County as a small community scale wind project of around 10 MW, would have been located on the south side of the Columbia River, approximately seventeen miles south of the Whistling Ridge Energy Project. However, on May 17, 2010, the Hood River County Commission decided to discontinue efforts to develop the Middle Mountain wind project and this project therefore has been removed from the cumulative impact analysis.



Map Features

- Existing Wind Generation
- Wind Project Under Construction
- Proposed Wind Generation
- Other Proposed Projects
- Columbia River Gorge National Scenic Area Boundary

N

0 5 10 20 Miles

Figure 3.14-1

Existing and Proposed Development

Whistling Ridge Energy Project
Skamania County, Washington

~~In addition to the potential for cumulative visual impacts, two proposed projects in the project vicinity were identified as having a potential for other cumulative impacts with the Project.~~

~~***Middle Mountain Wind Project.*** Hood River County is proposing this 9-MW project, which would be located approximately 10 miles south of Hood River31. Six wind turbines are proposed in a single line on Middle Mountain. The project would be located approximately 15 miles south of the Project. The County has completed visual simulations, and a project informational meeting is scheduled for January 12, 2010. The County plans to continue its feasibility analysis in the coming months. Studies of impacts to biological resources have not been conducted.~~

A description of the Oregon Department of Transportation bridge replacement projects along I-84 are presented below:

I-84 Bridge Replacements. Oregon Department of Transportation is repairing or replacing 21 bridges on I-84 through the Columbia River Gorge with new bridges. Several of these projects are located near Hood River and these improvements are grouped as follows:

- *I-84 Cascade Locks to Hood River.* The bridges in this bundle span the junction of the Hood and Columbia rivers. Construction began in July 2008 and was completed in fall 2010[32].

- *I-84 Exit 64 (Hood River).* This bundle includes replacing the overpass bridge on Interstate 84 at exit 64 in Hood River and improving the interchange and Button Bridge Road beneath the overpass. Design work started in fall 2008 and would be completed by fall 2009. Construction is scheduled from early 2010 to late 2011[33].

- *I-84 Hood River to The Dalles.* These five bridges are located at the east end of the Columbia River Gorge. Construction on the Mosier Creek bridge replacement began in August 2008 and would be completed in fall 2010[34]. Design work on the remaining bridges is complete and construction is scheduled from spring 2009 until early 2012. Repairs to the I-84 bridges at Hostetler Way in The Dalles and over Rock Creek in Mosier were completed in summer 2007.

---

[31] See: http://www.co.hood-river.or.us/vertical/Sites/%7B4BB5BFDA-3709-449E-9B16-B62A0A0DD6E4%7D/uploads/%7B909769CE-99F0-47B5-9CAF-77015BF9D737%7D.PDF, and http://www.co.hood-river.or.us/index.asp?Type=B_BASIC&SEC={2AE779FB-D681-4AA8-8835-B50BBAA8252D}.

[32] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/CascadeLocksto2ndStreetHoodRiver.pdf.

[33] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/B224_PIP_90109_ODOT.pdf.

[34] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/CascadeLocksto2ndStreetHoodRiver.pdf.

3.14.3 CUMULATIVE IMPACTS

The following subsections describe the cumulative effects that the Proposed Action, in combination with the past, present, and reasonably foreseeable future actions identified above, would have on the various environmental resources discussed in this EIS. Cumulative impacts from the combination of these actions could occur for each of the environmental resources. However, the contribution of the Proposed Action to these cumulative impacts would vary, with the greatest contribution occurring in cumulative impacts on visual resources as constructing and operating the Project would add a view of an additional wind power project to travelers in the Gorge. In addition to the existing projects east of the Project Area, long-distance travelers in either direction along I-84 could see some elements of the Project, for approximately 12.5 miles traveling west and 6.5 miles traveling east. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road. As discussed in more depth below in Section 3.14.3.10, the visual impact of the Project along I-84 would be variable, with the number of turbine strings visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the Project Area (Figure 3.9-1). This would constitute a small cumulative impact when considered in combination with views of other wind projects located from 35 to 70 miles to the east.

Low levels of adverse cumulative impacts have been identified for energy and natural resources from the use of steel, concrete and vehicle fuel for construction, and for transportation (traffic safety and increased risk of accidents during construction periods of the Project and the I-84 bridge replacement projects, if they should overlap). Simultaneous construction projects may create a beneficial cumulative socioeconomic impact to local communities. Finally, by introducing up to 75 MW of clean renewable energy into the regional electrical grid, the Project would positively contribute to efforts to combat the cumulative impacts of climate change, and also contribute to efforts to improve air quality in the Columbia River Gorge vicinity.

All potential cumulative impacts are discussed below.

3.14.3.1 Earth

Past and present commercial logging of the site and surrounding area, agriculture, and construction of rural residences have resulted in cumulative impacts to geology and soils, primarily through increased erosion and soil disturbance and compaction. As the reasonably foreseeable future actions are developed, these actions likely would contribute to cumulative impacts. Reasonably foreseeable use of the Project Area for both the proposed the Project and for a continuation of commercial forestry could increase the potential for soil erosion, and contribute to these cumulative impacts for the life of the Project.

3.14.3.2 Air Quality

While past and present development and activities have resulted in some deterioration of air quality in the Project vicinity, the cumulative effect of these activities on air quality has been fairly negligible. Overall, the air quality in the region is considered good, as evidenced by

Oregon Department of Environmental Quality (ODEQ) reports on air quality for The Dalles, Oregon, the closest city with an air monitoring station. ODEQ reports air quality data using an air quality index based on particulate matter 2.5 micrometers diameter and smaller ($PM_{2.5}$). ODEQ's 2008 report for The Dalles shows 339 days with good air quality, 25 days with moderate air quality, and no days with unhealthy air quality (ODEQ 2009).

While air quality in the Project Area is generally good, haze is a well-documented problem in the Columbia Gorge and the causes are being studied by the Southwest Clean Air Agency. In a 2008 Report, the agency found that haze was largely caused by winter stagnations that trap pollutants and fog (SWCAA 2008). In the summer, winds flow predominantly from the west, transporting emissions from the Portland metropolitan area into the Gorge. Wildfires also contribute to the haze when smoke is blown into the Gorge. There is no single source that is primarily responsible for haze; however, man-made sources are important contributors (ODEQ 2008). The most significant man-made sources contributing to haze in the Gorge include: power plant emissions; woodstoves; motor vehicles; non-road emissions (e.g. ships, trains, trucks); and agricultural sources of ammonia.

Construction of reasonably foreseeable future actions would be expected to generate dust and emissions during construction activities that could cumulatively contribute to air quality degradation. Construction of the terrestrial portions of the Proposed Action also would generate dust and emissions that likely would incrementally contribute, though slightly and only for a short time, to cumulative air quality impacts in the general Project vicinity.

Climate Change. Past and present actions in the Project vicinity, the region and across the globe have contributed to climate change and global warming. The past and present actions include, without limitation, the post-settlement conversion of native landscapes to residential, commercial and forestry uses, the introduction of carbon dioxide and other greenhouse gases from fossil fuel emission sources, particularly from automobiles and fossil fuel electrical generation sources, and in general, post-industrial manufacturing processes and land uses. Locally, residential, agricultural and commercial development is expected to continue a trend that permanently removes forests and replaces them with land uses that contribute to climate change.

"Climate change" refers to changes in the Earth's global climate, including the rise in average surface temperature known as global warming. At this time, while there is nearly complete scientific consensus concerning the anthropogenic causes of global climate change, and also consensus on its deleterious impacts on the natural and human environment, there is uncertainty regarding the specific, localized effects of projected global warming upon regional temperature, precipitation and ocean conditions. The Federal Environmental Protection Agency (EPA) recently acknowledged that due to its impacts on climate change and related human health effects, carbon dioxide is considered an air quality pollutant requiring a regulatory response.[35]

[35] In December, 2009, Environmental Protection Agency (EPA) Administrator Lisa Jackson announced that the agency had finalized its finding that greenhouse gases, including carbon dioxide, pose a threat to human health and welfare. The ruling allows the EPA to begin regulating greenhouse-gas emissions from power plants, factories and major industrial polluters, although the precise details of that regulation

The effects of global warming on the overall hydrology of the Columbia River Basin are difficult to separate from the natural variability resulting from cycles such as El Niño and the Pacific Decadal Oscillation. Further, forecasted changes to water supply or runoff volumes for the key Columbia River Basin drainages are more susceptible to shorter climatic cycles, such as El Niño and the Pacific Decadal Oscillation, than longer-term trends attributable to global warming. The variability seen in the Columbia River Basin over the last 80 years is greater than the variability experienced in the last 10–15 years. Therefore, even though the precise effects of global warming on the Columbia River Basin cannot be accurately determined at this time, estimated changes are within historic variations.

According to the US Global Change Research Program[36], the predicted future climate change effects to the Pacific Northwest (PNW) are as follows:

> *The climate model results selected for use in the National Assessment study (Hadley and Canadian) show regional warming continuing[37] at an increased rate in the next century, in both summer and winter. Average warming over the region is projected to reach about +3°F by the 2020s and +5°F by the 2050s - well outside the natural range of climate in the 20th century. Annual precipitation changes projected through 2050 over the region range from a small decrease (-7%) to a slightly larger increase (+13%). The projected changes in precipitation, unlike the projected temperature changes, are within the range of year-to-year variability that has been experienced over the past 100 years in the PNW. The models suggest small changes in yearly average precipitation, but the seasonal trends are larger: nearly all the climate models show wetter winters and some show drier summers in the future.*
>
> *After 2050, the projected trend to a warmer, wetter regional climate continues with substantially more warming likely to occur in winter than in summer. By the 2090s,*

---

have yet to be worked out. "The threat is real," said Jackson. "If we don't act to reduce greenhouse-gas emissions, the planet we will leave to the future will be very different than the one we know today."

[36] See: US Global Change Research Program (http://www.usgcrp.gov/usgcrp/nacc/education/pnw/pnw-edu-2.htm)

[37] A Note about General Circulation Models - This paper's discussion about possible futures and their implications was taken from different sources based on a variety of general circulation models (GCMs) but is particularly based on the results of the Hadley Centre and Canadian Centre model simulations used by the National Assessment process. GCMs are tools used by scientists to construct plausible estimates of potential changes in climate. It is generally agreed that these models provide reasonable estimates of changes at the global and latitudinal scale.

However, for a variety of reasons, significant differences can exist on a regional scale between model outputs. Among these reasons are limits in the computational resources needed to resolve regional-scale topography and surface features. Because GCMs are coarse and do not accurately represent changes at the regional scale, caution should be used in interpreting the details of outputs from these models. However, until climate models that can resolve regional scales are available, these models offer the best "what if" scenarios available for consideration of vulnerabilities to climate change. The discussion describes plausible futures given our current understanding; however, these projections should not be considered definitive predictions of changes and effects.

projected average summer temperatures rise by +7.3°F to 8.3°F, while winter temperatures rise +8.5°F to 10.6°F. Projected precipitation increases over the region range from 0 to 50% depending on the model. Warmer temperatures, though, mean less winter precipitation will fall as snow and therefore there will be less snowpack for later melting and use.

These projected changes are associated with large-scale shifts in atmospheric circulation over the Pacific, especially in winter, which resemble the changes that occur during the strongest El Niño events. As a result, winters are warmer and wetter -- both in total precipitation and in the amount of rainfall in heavy storms -- because warmer temperatures increase the quantity of water vapor.

Warming since 1900 in the Pacific Northwest ranges from 0 to 4°F. By 2100, both models project warming near 5°F west of the Cascades, with much larger warming further east in the Canadian model.

Precipitation has increased over most of the Pacific Northwest since 1900. Both climate models project continued precipitation increases, with the largest increases in the southern part of the region.

Although precise forecasting of the future effects of global warming on the Columbia River Basin may not be possible at this time, it is possible to consider how the development of the Project would affect emissions of greenhouse gases such as carbon dioxide. Reasonably foreseeable future actions, including continued use of fossil-fuel-burning automobiles, industrial processes, and electrical power generation are likely to continue, with cumulative impacts to air quality and acceleration of climate change through the continuing introduction of greenhouse gas emissions into the atmosphere. Power generated from wind displaces power generated by carbon dioxide emitting sources. In addition to wind energy generation being a non-emitting source, wind energy also is integrated into the hydropower system to reduce reliance on other thermal energy sources (i.e., coal, natural gas, or nuclear). Because the current mix of power sources in the Northwest relies heavily on thermal sources, electricity sourced from the wholesale market would likely have a significant greenhouse gas component, with attendant deleterious cumulative impacts. Integrating power generated by wind turbines into the hydropower system reduces reliance on other energy alternatives and avoids the need to procure 75 MW of electric power with a significant greenhouse gas component. Consequently, the Proposed Action would have a positive cumulative impact on efforts to combat air quality deterioration and climate change.

3.14.3.3 Water Resources

Creeks and Streams

Past and present development and activities have cumulatively caused various adverse impacts to creeks and streams in the general Project vicinity. Portions of some of these water bodies have been channelized or filled. Others have been affected by pollutants from stormwater runoff, wastewater discharges, and other sources. Reasonably foreseeable future actions, including continued commercial forestry practices and the additional development of rural residences could also contribute to these cumulative impacts.

Roadway construction and maintenance in the Project Area and vicinity could increase stormwater runoff, and increase sedimentation and turbidity if construction equipment crosses drainage ways. The Proposed Action would incrementally contribute to adverse cumulative impacts to creeks and streams in the general Project vicinity. In particular, the Proposed Action would potentially add to cumulative impacts to Little Buck Creek on the east side of the Project and possibly to Lapham Creek near the proposed site of the Operations and Maintenance Facility during Project construction from construction site stormwater runoff that would result in temporarily increased sedimentation and turbidity. The Proposed Action and other cumulative projects also would have a longer-term adverse cumulative impact to these creeks through the addition of increased impervious areas, which would increase the amount of stormwater runoff to these creeks, however the increase in impervious surfaces for the Proposed Action are expected to be minimal and largely limited to the wind turbine foundations and the Operations and Maintenance building. Lapham Creek drains into the Little White Salmon River, which drains into the Columbia River. Implementation of stormwater detention and other stormwater management practices for the Proposed Action would serve to minimize and possibly avoid Project contributions to these cumulative impacts, including contributions to cumulative impacts to other water bodies in the area, such as the Columbia River.

Groundwater Resources

Cumulative impacts to groundwater from past and present development and activities in the general Project vicinity have included groundwater withdrawals for wells. The reasonably foreseeable future actions would cumulatively affect groundwater for additional wells, including the proposed groundwater use of up to 5,000 gallons per day for the Operations and Maintenance Facility. The Proposed Action could contribute to the cumulative effect of potential groundwater contamination; however the potential for spills or contamination would be no larger than existing commercial forestry or agricultural operations.

3.14.3.4 Vegetation and Wetlands

Vegetation and Habitat

Past and present land development, timber harvest, and agricultural uses have resulted in a cumulatively significant change in the composition of vegetation and habitat types in the Project vicinity. In general, land development and agricultural uses have resulted in conversion of forested areas to non-forested areas, and timber harvests have resulted in a mosaic of forest ages, with average stand age declining over time from relatively short stand rotations. Changes in stand structure and complexity, patch size, and species distribution also have occurred. Few large, old-growth conifers or late-successional stands exist in the general Project vicinity. Accordingly, past and present uses have resulted in cumulative habitat conversion and an ongoing pattern of habitat fragmentation. Reasonably foreseeable future actions, such as ongoing land development and timber harvests, would continue this trend.

Project construction would take place in the context of the existing use of the Project vicinity generally for commercial forestry, which includes regular cycles of clearcutting and reforestation. Nonetheless, by removing trees and other vegetation in the wind Project area for

the life of the Project, development of the Proposed Action would contribute incrementally, though in a relatively minor way, to these cumulative impacts.

Special-Status Plant Species

Plant species listed as threatened or endangered and other special-status plant species have been cumulatively affected by past and present development and activities through habitat loss and direct effects to individual species. This trend would likely continue as future development occurs in areas where these species are present. However, the Proposed Action would not contribute to this adverse cumulative impact because, as described in Section 3.4.1.4, the Proposed Action would not affect any threatened or endangered or other special-status plant species.

Wetlands

Incremental losses and degradation of wetlands over time have cumulatively depleted wetland resources in the United States. In the Project vicinity, wetlands likely were previously impacted by construction of a variety of activities, including development of roads and railroads, agricultural activities, and past timber harvests. Reasonably foreseeable future actions may also affect wetlands in the Project vicinity, but it is expected that these future projects would be required to avoid, minimize, and compensate for any potential impacts to wetlands from filling or other activities as part of Project Section 404 permitting requirements. Regardless, because construction and operation of the proposed Project would not impact wetlands, implementation of the Proposed Action would not contribute to cumulative impacts to wetlands.

Noxious Weeds

Past and present activities in the Project vicinity have led to a cumulatively significant spread of noxious weeds in the vicinity, and noxious weed spread could continue with reasonably foreseeable future actions. Although mitigation measures have been identified to minimize the spread of noxious weeds by the Proposed Action, it is likely that noxious weed impacts would nonetheless still occur under the Proposed Action. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to this cumulative impact.

3.14.3.5 Habitat and Wildlife

Terrestrial Wildlife Species

Past and present development and other activities have had a cumulative adverse impact on terrestrial wildlife species and their habitat in the general Project vicinity. The clearing and conversion of land for home sites, utility infrastructure, and other uses since approximately the 19th century has resulted in the cumulative loss of wildlife habitat. Wildlife habitat also has been cumulatively modified through activities such as logging and other silvicultural activities, which have altered and fragmented habitat. This habitat loss and modification has resulted in the displacement of wildlife species. While these changes to existing habitat have been cumulatively detrimental to some species of wildlife, some changes that have resulted in conversion from one habitat type to another (as opposed to conversion to human uses) have been cumulatively

beneficial to other wildlife species. Wildlife species also have been directly affected by hunting and trapping activities, as well as incidental harm and killing from other human activities in the area. Reasonably foreseeable future actions involving highway improvements, residential, commercial, agricultural and other development and logging would be expected to incrementally add to these cumulative impacts.

The Proposed Action would impact terrestrial wildlife habitat through permanent improvement of approximately 56 acres now in grass/forb, field/shrub, managed coniferous or mixed deciduous-coniferous forest from within the Project Area (See Table 1-3 and Section 3.3). Some terrestrial wildlife species may also be disturbed by Project construction activities or avoid the Project Area temporarily during construction. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on terrestrial wildlife species and their habitat.

Bird and Bat Species

Past and present development and other activities have had a cumulative adverse impact on wildlife species, including birds and bats, with permanent alteration and loss of their habitat in the general Project vicinity. The clearing and conversion of land for home sites, utility infrastructure, and other uses since approximately the 19th century has resulted in the cumulative loss of habitat for birds and bats. Habitat for birds and bats has also been cumulatively modified through activities such as logging and other silvicultural activities, which have altered and fragmented habitat. This habitat loss and modification has resulted in the displacement and mortality of these wildlife species. Further, as discussed below, past and present residential and other development has a continuing impact on these species, through building, window, transmission line and telecommunication facility strikes, vehicular strikes, and the predation of these species by domestic cats. Reasonably foreseeable future actions, including non-wind energy generation uses, are expected to have a continuing negative impact on these species.

As documented elsewhere in this DEIS in Section 3.4 Biology, the Proposed Action would impact bird and bat species. Because of the variability in species, habitat, and flight patterns on a regional basis, it is difficult to assess potential cumulative impacts of "full build-out" development of wind power on birds and bats over a large geographic area. However, the National Academy of Sciences National Research Council estimated the best and worse case fatality estimates for birds and bats based on a regional "full-build" scenario in 2020 for the Mid-Atlantic Highlands (NRC 2007). This study is considered the most thorough, objective and "best available science" on the topic of cumulative impacts from wind energy projects, and made use of a real world example (although from a different region of the country from Whistling Ridge). This study concluded that it is unlikely that the predicted level of fatalities would result in measurable impacts to migratory populations of most species, although for rare and local populations, the cumulative impacts when combined with all other man-made sources of mortality could affect population viability.

The reference in this study to "all other man-made sources of mortality" in the National Research Council study highlights one of the numerous caveats and difficulties inherent to such a study: collisions with turbines are only one element of man-made cumulative effects on bird and bat populations in a given region. Examples of other man-made impacts include collisions with

buildings, transmission lines and vehicles, habitat loss, and predation by domestic cats. Erickson et. al. (2005) concluded that these sources of mortality are likely much larger than the potential impacts of wind power development. Other uncertainties included:

- While estimation of bird fatalities caused by wind energy projects is possible, data on bat fatalities is currently sparse, and typically is not species-specific.

- Estimates of turbine fatalities from past projects, especially those from the 1980s through the 1990s, are based on a variety of methodologies and do not include corrections for observer bias and potential removal of carcasses by scavengers.

- Factors such as the turbine height and design, rotor velocity, number and dispersion of turbines, location of turbines in the landscape, and operational schedule of turbines may influence fatalities. Turbine technology is continually changing and it cannot be predicted what technology will be available in the future.

A similar cumulative impact study on avian and bats was performed by WEST, Inc. for the Klickitat County Planning Department in 2008 and updated in 2010 (WEST, Inc. 2010 ~~2008~~). WEST's 2008 study reviewed 17 wind-energy facilities totaling 2,464 MW that were in operation in the CPE of Eastern Washington and Oregon, and an additional 30 potential wind-energy facilities that were planned or being constructed within the CPE as of mid-2008. At the time of their 2008 study, WEST found that there was approximately 6,665 MW of existing or proposed wind-energy facilities in the CPE. For the purpose of their analysis, WEST assumed that 6,700 MW of wind power would be present in the CPE. However, past experience indicates that not all permitted projects are built, so these figures likely overestimate what would actually be constructed. Klickitat County added this study to the Klickitat County energy Overlay Zone Environmental Impact Statement originally issued in September 2004. The 2010 study is included in this EIS as Appendix C-11.[38]

Like the National Research Council study, for the purpose of their cumulative analysis, WEST assumed that for cumulative impacts to occur, there must be a potential for a long-term reduction in the size of a population of birds or bats.

WEST's general approach to the cumulative effects analysis was to summarize results of fatality monitoring studies at operational wind-energy facilities within the CPE, and then use those results to estimate impacts for all constructed and proposed wind-energy facilities within the same ecoregion. At the time of the WEST study, most wind energy development in northern Oregon and southern Washington had been within an area historically characterized by open, arid shrub-steppe and grassland-steppe habitats. WEST found that the current predominant land use of the CPE is dryland agriculture and rangeland, with low precipitation (6 to 12 inches per year). Habitat and land use throughout the entire CPE are similar.

[38] A similar, but somewhat more limited cumulative impact study was prepared for the Shepherd's Flat Wind Energy Facility in 2007. (Included in this EIS as Appendix C-12)

WEST's cumulative effects analysis relies heavily on data from 12 ~~11~~ wind-energy facilities in the CPE where fatality monitoring has occurred. Most of the operating facilities have had or would have some sort of avian and bat post-construction casualty monitoring associated with them, and post-construction fatality monitoring data are available from 12 ~~11~~ operational wind energy facilities in the CPE. For each of the individual study areas from which fatality results are available, the predominant land use was a mosaic of agriculture (mainly dryland wheat farming) and grassland or shrub-steppe rangeland used for livestock grazing.

West estimated the population losses for birds (excluding raptors), raptors, upland game birds, waterfowl, waterbirds, and shorebirds, passerines, sensitive bird species, and bats. Their study estimated 67.1 ~~69.5~~ percent of losses would be to passerines, of which horned lark fatalities made up nearly half. Fatalities to other avian and bat populations were estimated to be substantially less. None of the estimated fatalities were anticipated to cause a significant loss in population, and no cumulative impacts were anticipated.

In comparison to the CPE, the site proposed for the Project is in a different ecoregion, (the Eastern Cascades ecoregion,) which to date has not experienced any wind energy development. In addition, the Project Area is more mountainous, receives more precipitation (an average of 84.06 inches per year as measured at the Skamania fish Hatchery), and is more forested than the CPE. Due to the difference in habitat types between the Project Area and the CPE, the results of the direct impact analysis for the Project cannot be directly applied to the results of WEST's cumulative effects analysis for the CPE. However, WEST's cumulative effects analysis is relevant in considering the added impacts of the Proposed Action to the overall cumulative biological impacts of all wind energy projects in the region.

As described in Section 3.4 Biological Resources, operation of the Project would result in unavoidable mortality to birds and bats through turbine collisions, but there likely would not be enough mortality to negatively affect the population viability of any single species.

The Eastern Cascades Ecoregion likely contains bird and bat populations that are separate from those populations in the CPE due to the significant differences in habitat. The potential for cumulative impacts to birds and bats associated with wind energy development in the Eastern Cascades, and indeed throughout the coniferous forested portions of all of western Washington and Oregon, is extremely small. No existing wind energy developments occur in the Eastern Cascades. With the exception of the Grayland project in Pacific County, a very small 4-turbine wind energy facility, there are no other existing wind energy facilities in forested habitats of western Washington or Oregon. To date, only three additional projects have been proposed in this entire area, including the Middle Mountain Project in Hood River County, Oregon, the Coyote Crest project in Pacific and Lewis Counties, Washington, and the Radar Ridge project in Pacific County, Washington. The only other project proposed in the Eastern Cascades, Middle Mountain, is no longer being pursued by Hood River County, as the County Commission decided to cease efforts to pursue this community scale project of around 10 MW at its meeting on May 17, 2010 (*see http://www.co.hood-river.or.us*).

The one existing project (Grayland) and remaining two projects (Coyote Crest, Radar Ridge) are all in extreme western Washington within another ecoregion, the Northwest Coast Ecoregion. It is not certain that Coyote Crest and Radar Ridge would both be constructed. As with

populations in the CPE, wind energy development in the Northwest Coast ecoregion would have little effect on separate bird and bat populations in the Eastern Cascades Ecoregion. In addition, based on preconstruction avian and bat studies conducted at these projects, both raptor and all bird use is generally lower than within the CPE (Table 3.14-1), indicating the potential for avian impacts is likely lower in forested ecoregions than within the CPE. Bat use is more varied, ranging from quite low to relatively high (Table 3.14-2). Again, however, based on the very few wind energy projects proposed in this region, these projects, taken together, would likely have a very small cumulative impact on birds and bat populations.

~~Operation of the Middle Mountain wind project also would presumably cause some mortality to birds and bats. Raptors, including bald eagles, golden eagles, northern goshawks and others could travel the 12 air miles between the two wind projects, and the two projects would be considered part of the same regional population of raptors.~~ The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on bird and bat species in the region.

Finally, the evaluation of cumulative impacts for wind energy generation facilities should be considered in the context of other mortality threats to these species, which have been estimated in recent research as many times larger than those from wind energy generation (Erickson et al. 2005; 2008). Moreover, the cumulative impacts analysis for wind energy generation facilities does not account for potential mortality to birds and bats caused by climate change, and the beneficial biological impact of renewable energy in avoiding these impacts. For example, one study from 2009 estimated that, based on performance in the United States and Europe, wind facilities and nuclear power stations are responsible each for between 0.3 and 0.4 bird fatalities per gigawatt-hour (GWh) of electricity while fossil-fueled power stations are responsible for about 5.2 fatalities per GWh (Sovacool 2009).

Table 3.14-1
Avian and Raptor Use of Proposed Wind Energy Facilities in Managed Coniferous Forest Habitats of Western Washington Compared to the Columbia Plateau Ecoregion

Proposed Project	County	Mean All Bird Use	Mean Raptor Use	Reference
Coyote Crest	Pacific and Lewis	11.74a	0.15	Tetra Tech 2009
Radar Ridge	Pacific	3.14	0.14	WEST and Turnstone 2009
Grayland	Pacific	2.10	0.18	McGraw et al. 2008
Whistling Ridge	Skamania	9.32	0.28	Johnson et al. 2009a
Columbia Plateau Ecoregion		12.0 a	0.52	Johnson and Erickson 2010

[a] For these studies birds were recorded out to 800 m and therefore avian use values for all birds are not directly comparable to the other studies, which recorded small birds out to 100 m. All raptor use values were derived from recording birds out to 800 m.

Table 3.14-2
Bat acoustic activity indexes for proposed wind energy facilities in managed coniferous forest habitats of western Washington

Proposed Project	County	Mean Bat Activity	Detector Locations	Reference
Coyote Crest	Pacific and Lewis	1.3	Ground and met towers	Hein et al. 2010
Radar Ridge	Pacific	3.25-6.89	Ground and met towers	Erickson et al. 2009
Grayland	Pacific	219.8	Ground	McGraw et al. 2008
Whistling Ridge	Skamania	7.9–148.3	Ground and met towers	Johnson et al. 2009b

Fish Species

Past and present development and other activities have had an adverse impact on fish species, including the alteration and loss of their habitat in the general Project vicinity. Negative impacts to fish and other aquatic resources from past and present, as well as reasonably foreseeable future development in the region include the alteration of streams and rivers by the introduction of hydroelectric generation dams, loss of riparian habitat, increased sediment loading, increased stream temperatures, pollution from herbicide and insecticide use, changes in peak and low stream flows, fragmentation of fish habitat, decreases in streambank stability, altered nutrient supply, and stormwater runoff from roads and bridges. The proposed work on the I-84 bridges may cause temporary increases in impacts from construction activities. These impacts are anticipated to continue into the foreseeable future.

Typically, wind energy generation projects in the region tend to be located in upland areas and generally well away from fish habitat, which is also true of the proposed Project. Therefore, wind energy projects in the region in general, and the proposed Project in particular, would not contribute to direct cumulative impacts to fish species.

Potential indirect cumulative impacts to fish species can occur through a somewhat complex relationship among wind projects interconnected to BPA transmission system, Columbia River hydro operations, and operation of this hydroelectric generation system to meet Clean Water Act (CWA) and ESA requirements for listed fish species. There are currently over 3,500 ~~2,000~~ MW of wind energy connected to the transmission grid within BPA's Balancing Area, and several thousand more MW of wind power are expected to be developed and connected to the grid in the next few years.[39] The majority of these projects are concentrated in the geographic area east of the Columbia River Gorge, and the overall amount of wind power on BPA's transmission system largely depends on wind velocities in this particular area. Accordingly, the amount of wind power on BPA's system can fluctuate widely and relatively quickly, depending on whether wind

[39] BPA. *Factsheet: How BPA Supports Wind Power in the Pacific Northwest.* DOE/BP-4002. March 2009, as updated by Wind Generation Capacity in the BPA Balancing Authority Area, available at http://transmission.bpa.gov/business/operations/Wind/WIND_InstalledCapacity_Plot.pdf (last visited May 2011).

speeds in this area are low (meaning very little wind power is being generated in this area) or high (meaning wind projects in this area are generating close to or at full capacity).

Within BPA's Balancing Area, there must be a match between generation and loads at all times. BPA has historically reserved capability in the hydroelectric system to provide balancing services for wind power output swings when needed. However, the increasingly large proportional share of wind power on BPA's system and the natural fluctuation of this power have combined to result in large, unscheduled swings in wind generation of up to several hundred megawatts within a single hour that cannot be handled by reserved capability alone. In such situations, BPA must immediately decrease generation in the BPA Balancing Area to maintain the constant balance of generation and load needed to keep the system stable. Using the hydroelectric system to decrease generation in these situations is often not available because: (1) reservoir space at the hydro projects is being maintained for required flood protection (meaning that additional water cannot be stored); and/or (2) additional water cannot be spilled, rather than run through turbines, at the hydro projects due to CWA limits on the level of total dissolved gases in the river and potential impacts on ESA-listed fish species from higher levels of total dissolved gases.

For these reasons, BPA has been working with wind project developers and operators for the past few years to develop measures for temporarily reducing sources of wind generation within the BPA Balancing Area when necessary. As part of a comprehensive review of wind project interconnections and their effects that was conducted in winter 2008, BPA established transmission operation protocols under which BPA's dispatch system automatically instructs wind project operators to reduce their generation to specified levels if necessary for reliability and ESA or CWA compliance. BPA has issued Dispatcher Standing Order (DSO) 216 to document these protocols, and is continuing to refine and clarify this DSO as more is learned about wind project operations relative to BPA's transmission system (visit http://www.transmission.bpa.gov/wind/op_controls/default.cfm for more information). More recently, BPA has adopted an interim Environmental Redispatch policy, under which BPA would temporarily limit the energy output of regional generators, including wind generation, only as a last resort to avoid harm to salmon and steelhead and assure reliable energy delivery during unusually high seasonal river flows (see *BPA's Interim Environmental Redispatch and Negative Pricing Policies, Administrator's Final Record of Decision*, May 2011, available at *http://www.bpa.gov/corporate/pubs/RODS/2011/ERandNegativePricing_FinalROD_web.pdf*).

During an Environmental Redispatch, utilities and consumers who purchase wind power or other energy would continue to receive the full energy deliveries associated with their transmission schedules, but the energy would originate from the FCRPS instead of other resources. These measures ensure that wind power on BPA's transmission system does not cumulatively impact Columbia River hydro operations necessary for listed fish species.

The proposed Project would be subject to DSO 216 and BPA's interim Environmental Redispatch policy, which would avoid any contribution from the proposed Project to indirect cumulative impacts to fish species. In addition, because the proposed Project is located at the west end of the Columbia River Gorge rather than the east end (i.e., approximately 60 miles to the west of the Columbia Plateau wind generation vicinity), wind patterns in the Project vicinity

can vary significantly at any given point in time from those in the area where the majority of existing and proposed wind projects are located. This difference adds diversity in wind energy production and further reduces the potential for any contribution of the proposed Project to indirect cumulative impacts to fish species during periods of time when generation needs to be decreased to maintain transmission system stability. The added diversity should assist BPA in implementing regulation requirements on the hydro system. Overall, the proposed Project would not be expected to contribute, either directly or indirectly, to cumulative impacts to fish species.

3.14.3.6 Energy and Natural Resources

Past and present land development, timber harvest, and agricultural uses have resulted in a cumulative use of energy and depletion of energy resources in the Project vicinity. The Project would have a positive effect on energy, in that it would produce more energy than that used to build and operate the facility. The Project would consume a limited amount of natural resources for construction, including steel, concrete, and fuel for machinery. The amount of these resources used would be insignificant compared to available supply. ~~The Middle Mountain wind project would be similar in the balance between consumption of energy and generation of renewable energy to the Project although both the energy payback and the amount of resources consumed would be smaller, since the Middle Mountain project would have only six turbines, and is anticipated at 9 MW to be approximately 12 percent of the size of the Project.~~ The I-84 bridge improvements would consume steel, concrete and fuel. The combined consumption of these natural resources is small compared to available supply. The Proposed Action thus would contribute incrementally, though in a relatively minor way, to the cumulative impact on use of natural resources in the region.

3.14.3.7 Public Health and Safety

Past development of high voltage transmission lines across the Project Area has created a low level of EMF exposure. The Project would include 34.5-kV collector lines and systems, primarily located underground. There would be a new substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line, and a new interconnection from the substation to the 230-kV transmission line. Adding additional overhead and underground cables would cumulatively increase the overall level of EMF exposure. The electric and magnetic fields generated by the collector lines and underground systems under the Proposed Action, which are described in Section 3.6, Public ~~Environmental~~ Health and Safety, would contribute to the cumulative levels of EMF in the Project vicinity, though only slightly because of cable shielding and undergrounding, the minor nature of these Project elements, and the distance to existing residences.

During construction of the Project, there would be a slight increase in risk of traffic or worker accidents during the construction period. This impact would take place in the background of existing land use patterns based on commercial forestry, agriculture, and residential development. ~~Effects of construction of the Middle Mountain wind project and I-84 bridge replacements would most likely be similar, though the impact of the Middle Mountain project would be smaller, given the smaller size of the project.~~ Given the anticipated low number of incidents and the available capacity of the local emergency responders and hospitals to respond

to those incidents, the cumulative impact would be relatively minor, and would be reduced once construction is completed.

3.14.3.8 Noise

Past and present development activities have introduced noise sources to the vicinity, including residential construction and development, commercial forestry operations, motor vehicles, machinery and domestic livestock and pets. Implementation of the cumulative actions identified in Sections 3.14.1 and 3.14.2 would be expected to generate various levels of noise through the Project vicinity, as would the Proposed Action. Depending on the proximity and timing of these actions, there could be cumulative noise impacts if actions are undertaken simultaneously and in relative close relation to each other. For most of the cumulative actions, it is expected that they would not result in cumulative noise impacts due to temporal or spatial separation. However, given the expected timing of the I-84 bridge improvement projects in the vicinity of the proposed Project, it is possible, however not expected, that receptors in the area could be exposed to cumulative noise impacts during the construction of these roadway projects in combination with the Proposed Action.

Operation of the Proposed Action would result in elevated noise levels from the movement of the turbines, maintenance activities, and operation related traffic. The operation noise levels would vary with the speed of the turbines. While the noise levels are not predicted to exceed regulated noise levels, the Proposed Action would contribute in minor ways to cumulative increases in noise levels in the Project vicinity. These contributions would be lessened through the application of mitigation measures described in Section 3.7 Noise.

3.14.3.9 Land Use and Recreation

The cumulative past, present and reasonably foreseeable actions identified in Sections 3.14.1 and 3.14.2 have resulted in changes to land use and would be expected to continue the incremental growth of developed land uses in the Project vicinity. The Proposed Action would be consistent with existing land use planning and zoning designations for Project facilities, and would not result in any inconsistencies with existing or planned adjacent land uses. The Proposed Action also would have little or no effect on existing land use patterns~~. The land use impact of the Middle Mountain wind project has not been studied but is unlikely to be inconsistent with local land use codes, to cause changes to local land use patterns, or to create cumulative impacts.~~

The Project would have little to no impact on recreation resources~~, and this is most likely the case for the Middle Mountain wind project as well~~. The I-84 bridge replacements may have a beneficial impact to recreation users, as roadway improvements may improve access to recreational resources in the area. Given the abundant recreational resources in the area and the low level of impacts, the Proposed Action's contribution to cumulative impacts to recreation would be minor.

3.14.3.10 Visual Resources

While parts of the Gifford Pinchot National Forest near the Project Area remain undeveloped, past and present development activities have changed the visual landscape in the immediate

Project vicinity by introducing manmade features and altering natural forms. These uses include residential, commercial and agricultural development, the construction of highways, bridges and roads, electrical transmission towers and hydroelectric dams, and telecommunication facilities. Ongoing human activities in the vicinity also contribute to continuing cumulative visual impacts, primarily views of clear-cutting and agricultural openings in natural vegetation patterns. Except for private timber operations, private development activity in the Project vicinity would be subject to the visual impact limitations placed on private development by the CRGNSA. Future private development would either be required to not be visually evident or be visually subordinate. Reasonably foreseeable future actions would be expected to continue current trends, as the past and present patterns of land use are expected to continue.

During construction, the Project would contribute to cumulative visual impacts through visible construction activities, although some viewers interested in viewing Project construction may consider the Project's contribution to be a positive impact. After construction is complete, the presence of the proposed wind turbines would contribute to cumulative visual impacts on nearby residents and motorists passing by on county roads, SR 14 and I-84.

~~The visual impacts of the Project would not be higher than low to moderate at any of the viewpoints examined. In considering the two specific reasonably foreseeable future projects, Hood River County estimated that the proposed Middle Mountain project would be visible as far away as 9.32 miles from that project[40]. The two projects are approximately 12 air miles apart, and there may therefore be a few locations where both projects would be visible, though these would be background views at the limit of visibility.~~ The visual impact of the I-84 bridge improvements would be limited to the period of construction. Oregon Department of Transportation states that *"New bridge designs will complement the aesthetic appeal of the Gorge and reflect the allure of the adjacent Historic Columbia River Highway."* Thus, these new bridges may result in a positive impact to visual resources[41]. Therefore, the visual impacts of the Project would not be higher than low to moderate at any of the viewpoints examined.

Past and present development of wind energy projects has also taken place at other locations in the Columbia River Gorge. The visual effect of these projects on the regional landscape and the experience of viewers is also a consideration, since long-distance drivers passing through the Gorge would recall seeing wind energy development in the Columbia Gorge. To assess this impact, the visibility of ten existing wind projects east of the Project Area were modeled in the draft EIS for cumulative impacts using the following assumptions:

- Visibility was modeled to 20 miles. This distance is considered very conservative and was chosen to accommodate recreation users with binoculars.

- Visibility was modeled using bare-earth surfaces without vegetation. In reality, many views would be blocked by trees, particularly in the Project vicinity.

---

[40] ~~See: http://www.co.hood-river.or.us/vertical/Sites/%7B4BB5BFDA-3709-449E-9B16-B62A0A0DD6E4%7D/uploads/%7B909769CE-99F0-47B5-9CAF-77015BF9D737%7D.PDF~~.

[41] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/.

- Visibility was modeled from single points representing the approximate location of each project taken from the Northwest Power and Conservation Council's on-line Northwest Power Generation Map[42].

- This visibility analysis documents visibility of even single elements of wind energy facilities, such as distant and fleeting views of wind energy nacelles and/or turbine blade tips, and does not differentiate these sightings from a more prominent view of entire turbines or generation facilities.

- The visibility analysis also does not account for the overall visual or aesthetic context of landscapes that are not in a pristine condition, most particularly the presence of existing electrical transmission lines which dominate the viewscape in many areas analyzed.

~~Overall, these assumptions almost certainly represent a significant overstatement of the visibility of these facilities, and their cumulative impacts to the landscape.~~

Following publication of the draft EIS, eight additional wind projects were identified within a distance of approximately 70 miles east of the Whistling Ridge Energy Project Area. These projects have been added to the visual quality analysis but have not been modeled for the EIS. In addition, reasonably foreseeable future wind projects have been added to the analysis. Nevertheless, the visual impacts of the additional existing and reasonably foreseeable wind projects would be similar to the impacts of the 10 projects originally modeled in the draft EIS. Thus, for a motorist driving east on I-84, the first of the wind energy projects would become visible near Wishram, approximately 35 miles to the east of the Project Area. From this point eastward, wind projects are potentially visible (using the assumptions stated) for approximately 52 of the following 64 miles (Figure 3.14-2).

Construction of the Project would add some additional views of wind turbines in addition to the past, present, and reasonably foreseeable wind power development projects and existing electrical transmission facilities. Travelers on I-84 through the Gorge would be able to see the Project for a time while traveling near Hood River. Travelers along I-84 could each see at least some part or elements of the Project, for approximately 12.5 miles traveling west and 6.5 miles traveling east[43]. At normal highway speeds this would result in an additional visual impact for between 7 and 12 minutes. Travelers along SR 14 would not see the Proposed Action, which would be blocked by the bluff to the north of the road.

The visual impact of the Project along I-84 would be variable, with the number of turbine strings and turbine equipment elements visible changing with topography. In many places only a few turbines would be visible, and the area where the most turbines would be visible (directly across

[42] See: http://www.nwcouncil.org/maps/power/Default.asp

[43] The project area is within view for approximately 17 miles, however in each direction the curvature of the road and the location of the project mean that the project would be behind drivers and passengers for some of that distance.

the Columbia River from White Salmon and Bingen) would also be the area where the viewer would be the farthest from the Project Area (See Figure 3.9-1).

The maximum impact of the Project along I-84 can be pictured by referring to Figures 3.9-10 (Viewpoint 13) or 3.9-8 (Viewpoint 11), which show viewpoints located on I-84. From Viewpoint 11, for instance, a traveler proceeding west would see a maximum of 25 turbine hubs and 70 blade tips, all at a distance of 14 kilometers (8.9 miles), or far background distance. From Viewpoint 13, a traveler proceeding east would see a maximum of 12 turbine hubs and 25 blade tips, at a distance of around 5.5 kilometers (3.4 miles) or middle-ground distance. As discussed in Section 3.9, however, these numbers overstate the visual impact, for the following reasons:

- The number of hubs and blade tips visible is calculated using bare-earth surface models. In reality, views of many turbines would be blocked by trees.

- All turbine blades would not be visible when the blades are rotating.

- Atmospheric haze, when present, would reduce the visibility of the turbines, especially at background distances.

For westbound travelers, the Project would be the last wind power project visible, and for eastbound travelers it would be the first. Building the Project would therefore add a small cumulative visual impact for long-distance travelers.

A similar cumulative impact could occur, probably on a more consistent basis, for residents of and frequent visitors to the local area. While residents of White Salmon, for example, might not see turbines from Whistling Ridge ~~and Middle Mountain~~ on a daily basis, they would likely experience repetitive views of wind turbines (or portions of wind turbines) through their local travels over a period of weeks, months or years. The "significance" of these perceptions would be individual in nature and inherently subjective, and is considered in the context of an altered landscape that includes hydroelectric generation facilities, transmission towers and lines, roads, bridges, highways and other land uses. Consequently, some local residents and frequent visitors might perceive what they individually consider to be a substantial change to the overall character of the local landscape. Although the geographical and topographical setting of the Project (including north-south trending ridge lines) limits its regional visibility, such a response would be more likely with the development of multiple wind projects.

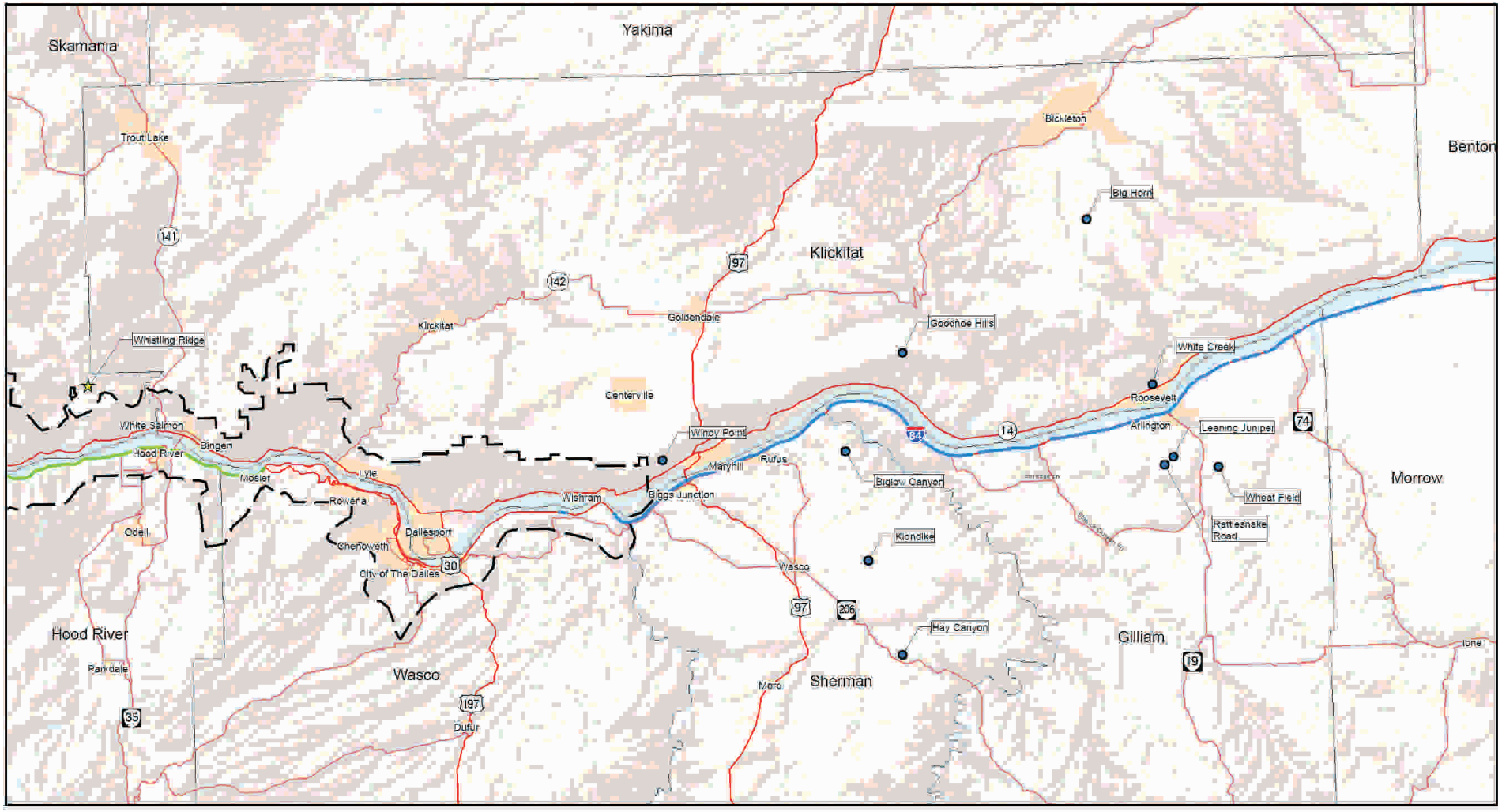


Figure 3.14-2

Existing Wind Projects Visibility from I-84

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.14.3.11 Historical and Cultural Resources

Cultural and historic resources in the Project vicinity have been and are being affected because of past, present, and current development and activities. These cumulative impacts include the redevelopment of land used for pioneer settlements, such as the Underwood town site north of the Project Area, and natural degradation of wooden flumes that were used in the late 1800s and early 1900s to transport logs to the Columbia River. Although the Proposed Action would not affect any known upland archaeological or historic resources, there is the potential for the Proposed Action to impact previously undiscovered cultural resources or artifacts. Mitigation measures are identified in Section 3.10, Historic and Cultural Resources, to lessen or avoid the potential for this impact. However, if the Proposed Action does impact previously undiscovered cultural resources or artifacts, it would contribute incrementally to the adverse cumulative impact to cultural resources in the area.

3.14.3.12 Transportation

The cumulative actions identified in Sections 3.14.1 and 3.14.2 have resulted in increases in traffic and would be expected to continue the incremental growth of traffic in the Project vicinity. The Proposed Action would contribute to cumulative traffic levels in the Project vicinity, but generally only during the construction phase of the Proposed Action. Construction of the Project is scheduled for a one-year period beginning in 2011. Construction of the I-84 bridges would take place in 2009, 2010 and 2011[44], with the majority of construction taking place in 2010. There could be some potential cumulative traffic congestion for travelers along I-84 during periods when both construction projects were active. However, workers traveling to the Whistling Ridge site could use SR 14 as an alternative route.

3.14.3.13 Public Services and Utilities

Past and present development and activities have resulted in an incremental increase in demand for public services and utilities. The Proposed Action would not be expected to adversely affect the overall capacity or ability to serve of any utility in the area, and thus would not contribute to cumulative impacts to utilities. By providing a potential backup or alternative power source for the Skamania County Public Utility District (PUD), the Proposed Action may contribute to a positive impact on utilities.

Construction of the Project, and the use of construction workers from outside the immediate area, could result in a minor and temporary increase in the demand for public services including police departments, providers of emergency medical services, and local fire departments, and would contribute to a cumulative increase in demand when added to the construction of ~~the Middle Mountain wind project and~~ I-84 bridge improvement projects. The temporary increased demand

[44] See: http://www.oregon.gov/ODOT/HWY/REGION1/ColumbiaGorge/May2009GorgewideNewsletter.pdf, especially the construction schedule snapshot on page 2.

for services during the construction period caused by the average of 143 workers (265 during the peak month) would be substantially reduced during operation for the permanent workforce of nine full-time workers.

3.14.3.14 Socioeconomics

During construction, the Proposed Action would contribute incrementally to a positive cumulative impact on the economy of the local community by providing additional employment and increased need for goods and services. While the Proposed Action and other cumulative actions would increase the number of construction workers in the Project vicinity, there appears to be sufficient vacant rental dwellings and available temporary housing, hotel/motel, camping, and RV units in the general Project vicinity to accommodate the potentially overlapping construction schedules of the Proposed Action and some of the possibly concurrent cumulative actions such as the construction of the ~~Middle Mountain wind project and the~~ I-84 bridge improvement project.

During operation, the Proposed Action would employ nine full-time workers. The operational workforce would have a minor cumulative effect on population, employment, and housing in the Project vicinity. The fiscal impact of the Project would be highly positive, as the Project's assessed value of up to $87.5 million would generate approximately $800,000 per year in tax distributions to municipal, county, and other local jurisdictions. Operation of the Proposed Action would be expected to have a major contribution to cumulative financial benefits to Klickitat and Skamania counties.

3.14.4 REFERENCES

Boer, G.J.; Flato, G.M.; Reader, M.C.; Ramsden, D. 1999a. "A transient climate change simulation with historical and projected greenhouse gas and aerosol forcing: experimental design and comparison with the instrumental record for the 20th century", in press Climate Dynamics.

Boer, GJ., Flato, G.M., and Ramsden, D. 1999b. "A transient climate change simulation with historical and projected greenhouse gas and aerosol forcing: projected climate for the 21st century", in press Climate Dynamics.

Boer, G.J., McFarlane, N.A., Laprise, R., Henderson, J.D., and J.-P. Blanchet. 1984. The Canadian Climate Centre spectral atmospheric general circulation model. Atmosphere-Ocean 22(4): 397-429.

Erickson, W., J. Gruver, K. Bay, and M. Kesterke. 2009. Bat Acoustic Studies for the Radar Ridge Wind Resource Area, Pacific County, Washington: August 27, 2008 – September 22, 2009. Prepared by WEST, Inc., for Energy Northwest, Richland, Washington.

Erickson, Wallace P., Gregory D. Johnson, and David P. Young Jr. 2005. *A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions.* USDA Forest Service General Technical Report PSW-GTR-191.

Flato, G.M.; Boer, G.J.; Lee, W.G.; McFarlane, N.A.; Ramsden, D.; Reader, M.C.; Weaver, A.J. 1999. "The Canadian Centre for Climate Modeling and Analysis Global Coupled Model and its Climate", in press Climate Dynamics.

Hein, C.D., L.B. Rodman, N.A. Schwab, and T.J. Mabee. 2010. An acoustic study of bat activity at the proposed Coyote Crest Wind Power Project, Washington, Spring-Fall 2008. Final Report Prepared for Tetra Tech EC, Inc. and Everpower Wind Holdings, LLC by ABR, Inc. —Environmental Research & Services, Forest Grove, Oregon, June 2010.

Johns T.C., Carnell R.E., Crossley J.F., Gregory J.M., Mitchell J.F.B., Senior C.A., Tett S.F.B. and Wood R.A. 1997 The Second Hadley Centre coupled ocean-atmosphere GCM: Model description, spinup and validation. Climate Dynamics 13:103-134.

Johnson, G.D. and W.P. Erickson. 2010. Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Final Report prepared for Klickitat County Planning Department, Goldendale Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 2010.

Johnson, G., T. Enz, and K. Bay. 2009a. Wildlife Baseline Studies for the Whistling Ridge Wind Resource Area, Skamania County, Washington: Final Report, September 11 – November 4, 2004, May 21 – July 14, 2006, and December 4, 2008 – May 29, 2009. Prepared for THE APPLICANT Lumber by WEST, Inc., Cheyenne, WY.

Johnson, G., J. Gruver, T. Enz, J. Baker and K. Bay. 2009b. Bat Acoustic Studies for the Whistling Ridge Wind Resource Area, Skamania County, Washington, June 4th – October 25th, 2009. Unpublished report prepared by WEST, Inc. for THE APPLICANT Lumber Company, Bingen, Washington.

McFarlane, N.A., Boer, G.J., Blanchet, J.P., and M. Lazare. 1992. The Canadian Climate Centre second-generation general circulation model and its equilibrium climate. Journal of Climate 5: 1013-1044.

McGraw, M., T. Dennis, and W. Erickson. 2008. Wildlife baseline study for Grayland Wind Power Project, Pacific County, Washington. Prepared for Coastal Community Action Program by Ecological Land Services and WEST, Inc.

National Research Council (NRC). 2007. *Environmental Impacts of Wind-Energy Projects.* National Academies Press.

Sovacool, Benjamin K. 2009. Contextualizing avian mortality: A preliminary appraisal of bird and bat fatalities from wind, fossil fuel, and nuclear electricity. *Energy*, 37 No. 6:2241-2248. June.

Tetra Tech EC. 2009. 2007-2008 Avian Baseline Study Draft Report, Coyote Crest Wind Resource Area, Pacific and Lewis Counties, Washington. Prepared for Everpower Wind Holdings, Inc., January 2009.

Western EcoSystems Technology, (WEST) Inc. and Turnstone Environmental Consultants, Inc. 2009. Wildlife Baseline Studies for the Radar Ridge Wind Resource Area, Pacific County, Washington: Final Report, April 15, 2008 – June 18, 2009. Prepared for Energy Northwest, Richland, Washington.

West, Inc. 2008. Final Report, Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Prepared for Klickitat County Planning Department. October 30.

Young, David P., Jr. and Victoria K. Poulton. 2007. Avian and Bat Cumulative Impacts Analysis, Shepherd's Flat Wind Project, Gillam and Morrow Counties, Oregon. Prepared for Lifeline Renewable Energy, Inc. March.

3.15 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The Proposed Action under consideration does not pose short-term impacts that would significantly alter the long-term productivity of the affected environment. The turbines and associated facilities would take less than 5 percent of the arable land in the 1,152-acre study area out of production, and the remainder of the land could still be used for commercial forestry. After decommissioning of the Project, all of the land could revert to its previous uses. Little change in the long-term environmental productivity of the land would have been caused.

3.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible commitments of resources occur when a non-renewable resource such as minerals or petroleum-based fuels is used for the construction or operation of a Proposed Action. An irretrievable commitment of resources occurs when a federal agency gives up all rights or protections for a particular resource that it has ownership of or jurisdiction over, whether it be land, trees, water, animal or plant species, or some other resource.

The Proposed Action would include the use of steel, gravel, wood, and other non-renewable material to construct the wind turbines, access roads, electrical power line, operations and maintenance facilities, and substations. Materials would come from outside sources or from local borrow pits. Petroleum-based fuels for vehicles and equipment would also be required. Development of the proposed action would result in the irretrievable commitment of a small amount of commercial forestry land. These commitments are irretrievable rather than irreversible because the Project could be decommissioned in the future and previous land uses

restored. In addition, many materials used to construct and operate the Project could be recycled upon decommissioning.

3.17 INTENTIONAL DESTRUCTIVE ACTS

BPA, like other utilities and government agencies, experiences incidents of criminal activity such as vandalism, theft and burglary. Some of these incidents cause significant operational and financial impacts to the agency. Between 2007 and 2009, BPA experienced approximately 128 incidents of burglary, theft and vandalism. These incidents cost the agency approximately $1,624,110. The BPA Security and Emergency Response Office works closely with Federal Law Enforcement Agencies and, local and state police to ensure all incidents are appropriately reported, investigated and prosecuted. This effort has resulted in the return of BPA property and in court ordered restitution to be paid by the convicted parties.

Issues concerning international terrorist activity, domestic terrorism and sabotage remain a significant concern for BPA and other critical infrastructure operators. BPA maintains close liaison with Federal Law Enforcement Agencies, Department of Homeland Security, and Local jurisdictions to ensure effective communication of information and intelligence.

The impacts from vandalism and theft, though expensive, do not generally cause a disruption of service to the area. Stealing equipment from electrical substations, however, can be extremely dangerous. In fact, nationwide, many would-be thieves have been electrocuted while attempting to steal equipment from energized facilities. On Oct. 11, 2006, a man in La Center, Washington, was electrocuted while apparently attempting to steal copper from an electrical substation.

Federal and other utilities use physical deterrents such as fencing, cameras, and warning signs to help prevent theft, vandalism and unauthorized access to facilities. In addition, through its Crime Witness Program, BPA offers up to $25,000 for information that leads to the arrest and conviction of individuals committing crimes against BPA facilities. Anyone having such information can call BPA's Crime Witness Hotline at (800) 437-2744. The line is confidential, and rewards are issued in such a way that the caller's identity remains confidential.

Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare, though some have occurred. These acts generally focused on attempts to destroy large transmission line steel towers. For example, in 1999, a large transmission line steel tower in Bend, Oregon was toppled.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and end users. The effects of these acts would be as varied as those from the occasional sudden storm, accident or blackout and would depend on the particular configuration of the transmission system in the area. While in some situations these acts would have no noticeable effect on electrical service, in other situations, service could be disrupted in the local area, or if the damaged equipment was part of the main transmission system, a much larger area could be left without power.

When a loss of electricity occurs, all services provided by electrical energy cease. Illumination is lost. Lighting used by residential, commercial, industrial and municipal customers for safe movement and security is affected. Residential consumers lose heat. Electricity for cooking and refrigeration is also lost, so residential, commercial, and industrial customers cannot prepare or preserve food and perishables. Residential, commercial, and industrial customers experience comfort/safety and temperature impacts, increases in smoke and pollen, and changes in humidity, due to loss of ventilation. Mechanical drives stop, causing impacts as elevators, food preparation machines, and appliances for cleaning, hygiene, and grooming are unavailable to residential customers. Commercial and industrial customers also lose service for elevators, food preparation, cleaning, office equipment, heavy equipment, and fuel pumps.

In addition, roadways experience gridlock where traffic signals fail to operate. Mass transit that depends on electricity, such as light rail systems, can be impacted. Sewage transportation and treatment can be disrupted.

A special problem is the loss of industrial continuous process heat. Electricity loss also affects alarm systems, communication systems, cash registers, and equipment for fire and police departments. Loss of power to hospitals and people on life-support systems can be life-threatening.

Overhead transmission conductors and the structures that carry them are mostly on unfenced utility rights-of-way. The conductors use the air as insulation. The structures and tension between conductors make sure they are high enough above ground to meet safety standards. Structures are constructed on footings in the ground and are difficult to dislodge.

While the likelihood for sabotage or terrorist acts on the Proposed Action or alternatives is difficult to predict given the characteristics of the Project, it is unlikely that such acts would occur. If such an act did occur, it could have a significant impact on the transmission system or electrical service because the North Bonneville-Midway 230-kV transmission line is an integral part of BPA's transmission system; however, any impacts from sabotage or terrorist acts likely could be quickly isolated. The Department of Energy, public and private utilities, and energy resource developers include the security measures mentioned above and others to help prevent such acts and to respond quickly if human or natural disasters occur.

3.18 ADVERSE EFFECTS THAT CANNOT BE AVOIDED

Implementation of the Proposed Action would result in some adverse impacts that cannot fully be avoided even with implementation of mitigation measures. However, most of these impacts would occur during the construction phase of the Proposed Action and thus would be temporary. For the proposed wind Project, the unavoidable adverse impacts include:

- Short-term earth-disturbing activities of 108 acres during construction (56 acres of permanent disturbance and 52 acres of temporary disturbance). These impacts, while unavoidable, would take place in landscape of managed timber lands which has for many years and would continue to be a fragmented environment with ongoing disturbance. During construction, direct mortality to birds could occur through nest disturbance.

- Short-term potential for landslide and erosion during construction and operations.
- Short-term impacts to air quality similar to that of existing logging operations during construction.
- Short-term and localized impacts to water resources during construction and operation of the Project.
- Short-term and minimal risk of unintentional or accidental fire or explosion or discharge to the environment during both construction and operations.
- Short-term and minimal delays in traffic in some areas during construction.
- Short-term and minimal risk of accident during construction.
- Short-term accidental fire, release of hazardous materials, or injury could occur during construction, operation, or decommissioning of the Project.
- Short-term noise impacts during construction is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA L_{eq} per Washington State and Skamania County regulations.
- Long-term visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area.
- Long-term mortality to birds and bats through turbine collisions.
- Long-term yet minor unavoidable adverse impacts to energy or natural resources through the consumption of fossil fuels for construction and maintenance of the Proposed Action.
- Long-term socioeconomic impacts are considered to be beneficial as the Project would provide employment during construction and operation. Additionally, increased tax revenues would offset the impacts to public services and utilities.
- Permanent loss, temporary disturbance and fragmentation of existing habitat for a number of wildlife species.

Under the No Action Alternative, although many of the potential impacts of the Proposed Action would not occur, the existing Project Area would continue to be utilized for commercial forestry operations. Additionally, BPA's North Bonneville-Midway 230-kV and the Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines would continue to remain in place and would be subject to impacts related to the need for ongoing repairs and maintenance of these existing transmission lines.

4.0 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMITTING REQUIREMENTS

This chapter addresses federal and Washington state statutes, implementing regulations, and Executive Orders requiring consultation, review, and/or permits or approvals, and discusses the applicability of these requirements to the proposed Project. This EIS is being sent to Tribes, federal agencies, and state and local governments as part of the consultation process for this Project.

Permits and approvals required for the Project construction and operation are listed in Table 4-1 and discussed in more detail in this chapter. Permits and approvals listed in Table 4-1 fall into seven categories: Site Certification Agreement (EFSEC), environmental (NEPA and SEPA), air-related permits, land use approvals, approvals related to the transmission interconnection, consultation, and other required permits. Agencies requiring permits or approvals include EFSEC, Skamania County, BPA, USFWS, National Marine Fisheries Services, Ecology, the Federal Aviation Administration, WSDOT, and WDFW.

4.1 NATIONAL AND STATE ENVIRONMENTAL POLICY ACT

This Draft EIS was prepared jointly by EFSEC and BPA to fulfill the requirements of both Washington's SEPA (43.21C RCW) and NEPA (42 USC 4321 et seq.). Both of these statutes require state and federal agencies, respectively, that are proposing to take action to assess, consider, and disclose the potential impacts of their proposed actions on the environment. Furthermore, the implementing regulations for both SEPA and NEPA both encourage coordination on combined state and federal actions. WAC 463-47-150 states that "[w]hen [EFSEC] is considering an action which also involves federal actions; it shall attempt to coordinate the two governmental processes so that only one environmental impact statement need be prepared for that proposal." In addition, 40 CFR 1506.2 encourages the preparation of joint state and federal environmental impact statements to aid in elimination of duplication with state and local procedures. EFSEC and BPA will consider the Project's potential environmental consequences and comments from agencies, Tribes, and the public when making decisions regarding the proposed Project.

4.2 ENDANGERED SPECIES ACT

The Endangered Species Act of 1973 (16 USC 1536) as amended in 1988, establishes a national program to conserve threatened and endangered species of fish, wildlife and plants, and to preserve the ecosystems on which they depend. The Act is administered by USFWS for wildlife and freshwater species, and by National Oceanic and Atmospheric Administration (NOAA) Fisheries for marine and anadromous species. It defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans and specifies prohibited actions and exceptions.

Table 4-1
Summary of Whistling Ridge Energy Project Permits and Approvals

Type of Permit/Approval	Permit or Requirement	Lead Agency	Comments
Site Certification Agreement	Site Certification Agreement	EFSEC	• Application filed March 10, 2009. • Amended Application filed October 12, 2009.
Environmental	SEPA Compliance/EIS	EFSEC	• Determination of Significance issued April 6, 2009.
Air-related permits	Temporary air permit for concrete batch plant	EFSEC/Ecology/Southwest Clean Air Agency	• EFSEC will coordinate with Southwest Clean Air Agency and Ecology as appropriate.
	Temporary air permit for rock crushing for roadways	EFSEC/Ecology/Southwest Clean Air Agency	• EFSEC will coordinate with Southwest Clean Air Agency and Ecology as appropriate.
Land use approvals	Certificate of Land Use Compliance	Skamania County	• In a letter to EFSEC dated May 4, 2009, Karen Witherspoon, Skamania County Community Development Department Director, found that the proposed Project is consistent with Skamania County Code Title 21 Zoning Code, 21A Critical Areas, Title 24 Clearing and Grading, the Comprehensive Plan, and resource maps.
Approvals related to the transmission interconnection	Transmission Interconnection Agreement Record of Decision NEPA Compliance/EIS	BPA	• NEPA compliance via joint EFSEC/BPA EIS.
Consultation	Endangered Species Act Concurrence	USFWS/NOAA Fisheries	• Concurrence that the proposed action "may affect, but is not likely to adversely affect" ~~no impact on~~ listed species. • ~~Bald Eagle and Golden Eagle Protection Act~~
	Native American Consultation Traditional Cultural Properties Survey	BPA	• Yakama Indian Nation has prepared a Traditional Cultural Properties Report.
	Aviation Obstruction Zone	Federal Aviation Administration	• Concurrence that Project is not an obstacle to aviation.

Type of Permit/Approval	Permit or Requirement	Lead Agency	Comments
Other required permits	Construction Storm Water Discharge Permit	EFSEC/Ecology	• For construction activity that disturbs one acre or more and may result in a discharge of stormwater to surface waters of the state.
	Building Permits	EFSEC/Skamania County	• Construction of permanent buildings or additions to existing facilities.
	Clearing and Grading Permit	EFSEC/Skamania County	• For vegetation removal and earthwork associated with construction activities.
	Water Availability Verification Evaluation and Group B Public Water System Approval	EFSEC/Skamania County	• Developing new sources of potable water.
	On-site Septic System Site Evaluation and Design Review	EFSEC/Skamania Community Development	• Construction of a septic system for sanitary waste.
	Forest Practices Application	Washington Department of Natural Resources	• For harvesting timber and other activities related to timber harvest operations.
	Approval for Over Height and Over Length Loads on State Highways	WSDOT	• For hauling of turbine equipment.
	Industrial Water Well Approval	EFSEC/Ecology	• Notification of Intent to Construct a Water Well (less than 5,000 gallons per day).
	Electrical Construction Permit	Department of Labor and Industries	• For interior and exterior electrical wiring and power supply connections.
	Road Approach Permit	Skamania County Department of Public Works	• Allows a property owner the authority to access a county road.
	Haul Route Agreement / Right – of-Way Use Permit	Skamania County Department of Public Works	• Use of County roads by oversized or overweight vehicles.
	Negotiated Private Road Agreements	Skamania County Department of Public Works	• To use private roads for temporary or permanent access.

BPA = Bonneville Power Administration
Ecology = Washington State Department of Ecology
EFSEC = Energy Facility Site Evaluation Council
EIS = environmental impact statement
NEPA = National Environmental Policy Act
NOAA = National Oceanic and Atmospheric Administration
SEPA = State Environmental Policy Act
USFWS = US Fish and Wildlife Service
WSDOT = Washington State Department of Transportation

Section 7 of the Endangered Species Act requires federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize endangered or threatened species or their critical habitats. A federal agency is required to consult with USFWS and/or NOAA Fisheries if it is proposing an action that may affect listed species or their designated critical habitat. If listed species or designated critical habitat are present and could be affected by the Proposed Action, Section 7 requires that the federal agency prepare a biological assessment to analyze the potential effects of the action on listed species and critical habitat and make an effect determination for each species. BPA prepared and submitted a Biological Assessment (dated June 8, 2010) to USFWS for informal consultation as provided in Appendix E. The Project has received a concurrence letter from USFWS (July 19, 2010) that the Project "may affect, but is not likely to adversely affect" northern spotted owls, and through concurrence from the USFWS has complied with Section 9 of the ESA as also provided in Appendix E. ~~As described in Section 3.4 Biological Resources, no listed species or critical habitat are anticipated to be affected by the project.~~

4.3 FISH AND WILDLIFE CONSERVATION ACT AND FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Conservation Act of 1980 (16 USC 2901 et seq.) encourages federal agencies to conserve and promote conservation of non-game fish and wildlife species and their habitats. In addition, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies undertaking projects affecting water resources to consult with USFWS and the state agency responsible for fish and wildlife resources.

As described in Section 4.2, BPA is in the process of consulting with USFWS concerning fish and wildlife resources that could be affected by the proposed Project. In addition, BPA has consulted with WDFW and has incorporated recommendations to avoid and minimize potential impacts to fish and wildlife resources. Mitigation designed to avoid and minimize impacts to fish and wildlife and their habitat is identified in Section 3.4 Biological Resources.

4.4 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

NOAA Fisheries is responsible for ensuring compliance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976. In the exclusive economic zone, except as provided in Section 102, the US claims, and will exercise, sovereign rights and exclusive fishery management authority over all fish and all continental shelf fishery resources. Beyond the exclusive economic zone, the US claims and will exercise exclusive fishery management authority over all anadromous species throughout the migratory range of each such species, except when in a foreign nation's waters, and all continental shelf fishery resources.

Public Law 104-297, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Act to establish requirements for essential fish habitat descriptions in federal fishery management plans, and to require federal agencies to consult with NOAA Fisheries on activities that may adversely affect essential fish habitat, which can include all streams, lakes, ponds, wetlands, and other viable water bodies and most of the habitat historically accessible to salmon. Activities above impassible barriers are subject to consultation provisions of the Magnuson-Stevens Act.

No species administered under the amended Magnuson-Stevens Act occur in the vicinity of the proposed Project.

4.5 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act implements various treaties and conventions between the US and other countries, including Canada, Japan, Mexico, and the former Soviet Union, for the protection of migratory birds (16 USC 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986, and 1989). Under this Act, taking, killing, or possessing migratory birds or the eggs or nests is unlawful. Most species of birds are classified as migratory under the Act, except for upland and nonnative birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove.

Potential impacts to migratory birds as a result of the proposed Project are discussed in the Section 3.4 Biological Resources. Although the proposed Project would not be expected to result in a take or killing of migratory bird species within the meaning of the Act, impacts to migratory birds could occur through temporary disturbance both during construction and operation of the Project ~~impacts to migratory birds could occur through temporary disturbance during construction.~~ BPA would ensure appropriate mitigating measures are employed to minimize and avoid impacts to migratory birds.

4.6 EXECUTIVE ORDER 13186, RESPONSIBILITIES OF FEDERAL AGENCIES TO PROTECT MIGRATORY BIRDS

Executive Order 13186 was issued on January 17, 2001. It directs each federal agency that is taking actions that may negatively impact migratory bird populations to work with the USFWS to develop an agreement to conserve those birds. The protocols developed by this consultation are intended to guide future agency regulatory actions and policy decisions; renewal of permits, contracts, or other agreements; and the creation of or revisions to land management plans. This order also requires that the environmental analysis process include effects of federal actions on migratory birds. On August 3, 2006, the USFWS and the US Department of Energy signed a Memorandum of Understanding to complement the Executive Order. BPA, as part of the Department of Energy, will work cooperatively in accordance with the protocols of the Memorandum of Understanding.

4.7 BALD AND GOLDEN EAGLE PROTECTION ACT

The Bald Eagle Protection Act of 1940 prohibits the taking or possessing of and commerce in bald and golden eagles, with limited exceptions (16 USC 668–668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978). The Act only covers intentional acts or acts in “wanton disregard” of the safety of bald or golden eagles.

Potential occurrence of bald eagles in the Project vicinity and potential impacts from the proposed Project are discussed in Section 3.4 Biological Resources. Mitigation measures to avoid and minimize impacts to bald eagle also are identified. The Project would not involve intentional acts or acts in wanton disregard of bald or golden eagles. Any accidental injuries or deaths would be subject to Federal law. ~~Because the project would not involve intentional acts or~~

~~acts in wanton disregard of bald or golden eagles, this project is not considered to be subject to compliance with the Act.~~

4.8 HERITAGE CONSERVATION ACTS

Because of the recognized importance of cultural and historic resources, several laws have been passed to protect and provide appropriate treatment for these resources. In addition, American Indian Tribes are afforded special rights under certain laws and treaties. Laws and orders related to cultural and historic resources include:

- Antiquities Act of 1906 (16 USC 431–433)
- Historic Sites Act of 1935 (16 USC 461–467)
- National Historic Preservation Act (NHPA) of 1966 (16 USC 470 et seq.), as amended, inclusive of Section 106
- Archaeological Data Preservation Act of 1974 (16 USC 469 a-c)
- Archaeological Resources Protection Act of 1979 (16 USC 470 et seq.), as amended
- Native American Graves Protection and Repatriation Act (25 USC 3001 et seq.)
- American Indian Religions Freedom Act of 1978 (PL 95-341, 92 Stat. 469, 42 USC 1996, 1996a)
- Executive Order 13007 Indian Sacred Sites
- Interior Secretarial Order 3175 of 1993

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are properties that are included in the Natural Register of Historic Places (NRHP) or that meet the criteria for the Natural Register. If a federal agency plans to undertake a type of activity that could affect historic properties, it must consult with the appropriate State and/or Tribal Historic Preservation Officers to assess adverse effects on identified historic properties. BPA fully respects tribal law and recognizes tribal governments as sovereigns. BPA consults affected tribes about potential cultural and/or other tribal impacts prior to taking project and program actions. As a federal agency, BPA is responsible for conducting NHPA review and Section 106 compliance activities during NEPA environmental review processes. As necessary, BPA's Tribal Policy of 1996 further commits the agency to policy level government-to-government consultation upon request of tribal policy makers and elected officials to better understand the technical and legal issues necessary to make informed decisions. ~~BPA's 1996 government-to-government agreement with 13 federally-recognized Native American Tribes of the Columbia River basin provides guidance for the Section 106 consultation process with the Tribes.~~

The NHPA amendments specify that properties of traditional religious and cultural importance to a Native American Tribe (also known as Traditional Cultural Properties) may be determined to be eligible for inclusion on the NRHP. In carrying out its responsibilities under Section 106, a federal agency is required to consult with any Native American Tribe that attaches religious or cultural significance to any such properties.

The Native American Graves Protection and Repatriation Act requires consultation with appropriate Native American Tribal authorities prior to excavation when human remains or cultural items (including funerary objects, sacred objects, and cultural patrimony) on federal lands or for projects that receive federal funding are found. The Act recognizes Native American ownership interests in some human remains and cultural items found on federal lands and makes illegal the sale or purchase of Native American human remains, whether or not they derive from federal or Indian land. Repatriation, on request, to the culturally affiliated tribe is required for human remains.

Executive Order 13007 addresses "Indian sacred sites" on federal and tribal land. "Sacred site" means any specific, discrete, narrowly delineated location on federal land that is identified by a Tribe, or a Tribal individual determined to be any appropriately authoritative representative of a Native American religion. The site is sacred by virtue of its established religious significance to, or ceremonial use by, a Native American religion, provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site. This order calls on agencies to do what they can to avoid physical damage to such sites, accommodate access to and ceremonial use of Tribal sacred sites, facilitate consultation with appropriate Native American Tribes and religious leaders, and expedite resolution of disputes relating to agency action on federal lands.

The American Indian Religious Freedom Act protects and preserves to American Indians their inherent right of freedom to believe, express, and exercise traditional religions. BPA has identified the Yakama Indian Nation as having general concerns about the management of certain areas along the Columbia River Gorge, including the Project vicinity. These concerns include, but are not limited to, access to sites, use and possession of sacred objects, and the freedom to practice sacred worship ceremonies.

In addition to these various laws and directives, the federal government has general trust responsibilities to tribes under a government-to-government relationship to ensure that their reserved treaty rights are protected. Ongoing consultation with the Yakama Indian Nation ensures that their rights are protected.

BPA has consulted with the DAHP as well as with The Confederated Tribes of the Umatilla Indian Reservation, The Cowlitz Indian Tribe, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission pursuant to 36 CFR 800.4(a)(4) under Section 106 of NHPA. These correspondences are provided in Appendix E. ~~for the federal undertaking with the Yakama Indian Nation, the Washington State Historic Preservation Officer, and any other interested parties.~~ This consultation process did not identify any effects to historic properties ~~if any, and will provide for resolution of any impacts with the consulting parties~~.

Throughout the EIS process, the Applicant has worked to involve and consult with Yakama Nation, including the Chiefs of the Cascade and Klickitat Tribes. Representatives from both tribes participated in site trips conducted in 2009 to provide advice and perspective in developing project alternatives. Initially, the Yakama Indian Nation did not agree with the definition of BPA's APE. However, the Yakama Nation and BPA have reached an agreement concerning the APE and the Tribe will continue to work with the Applicant when the final micrositing process occurs.

If, during construction, previously unidentified cultural resources that would be adversely affected by the proposed Project are found, the Applicant would be required to follow all required procedures set forth in the NHPA, Native American Graves Protection and Repatriation Act, Archaeological Resources Protection Act, and the American Indian Religious Freedom Act.

4.9 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. Minority populations are considered members of the following groups: American Indian or Alaska Native, Asian or Pacific Islander, Black not of Hispanic Origin, or Hispanic if the minority population of the affected area exceeds 50 percent, or is meaningfully greater than the minority population in the Project Area. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not exclude persons from participating in or deny persons the benefits of those programs and activities, and that does not subject persons to discrimination because of their race, color, or national origin.

The proposed Project has been evaluated for disproportionately high environmental effects on minority and low-income populations (see Section 3.13, Socioeconomics). The Project would not result in disproportionately high and adverse effects to minority or low income groups.

BPA has considered all input from persons or groups regardless of race, income status, or other social and economic characteristics. Potentially affected minority populations include American Indian tribes with an interest in the federal lands that could be affected. BPA, with EFSEC as a participant, is consulting with Yakama Indian Nation regarding the potential impacts of the Proposed Action. For more information on these consultations, see Section 4.8, Heritage Conservation, as well as Section 3.10, Historical/Cultural Resources.

4.10 STATE, AREA-WIDE, AND LOCAL PLAN AND PROGRAM CONSISTENCY

4.10.1 ENERGY FACILITY SITE EVALUATION COUNCIL

Chapter 80.50 RCW are the laws which the Energy Facility Site Evaluation Council must follow in siting and regulating major energy facilities. WAC Title 463 provides the regulations by which the EFSEC functions under state and federal law. Chapters 80.70 and 80.80 RCW also apply to some energy facilities under EFSEC jurisdiction. For more information on the

consistency of the proposed Project with Skamania County land use regulations, see Section 3.8, Land Use and Recreation.

Chapter 80.50 RCW (Energy Facilities–Site Locations) and Title 463 WAC specify that during the siting of energy facilities such as the Project, EFSEC will specify the conditions of construction and operation. This provision operates to supersede all state and local land use permitting related to energy facility sites that are under EFSEC's jurisdiction. However, a determination of consistency with local land use regulation is required. In the event that a proposed Project is determined to be inconsistent with local land use regulations, the applicant may request that the Project be regulated at the state level by EFSEC, rather than by the local jurisdiction. Because Skamania County has found the Project to be consistent with its Comprehensive Plan and Zoning Ordinance, the Applicant does not anticipate requesting this type of preemption for this Project. However, if EFSEC were to determine that, notwithstanding the County's determination, the Project is inconsistent with any element of local land use plans or ordinances, EFSEC retains preemption authority to resolve such inconsistency.

4.10.2 SKAMANIA COUNTY

Skamania County has provided EFSEC with a letter and Resolution 2009-54 stating that the proposed Project would comply with the land use policies and zoning regulations for the vicinity of the proposed Project. (Appendix D)

4.11 COLUMBIA RIVER GORGE NATIONAL SCENIC AREA ACT

The Columbia River Gorge National Scenic Area Act (16 U.S.C. 544-544p) established the Columbia River Gorge National Scenic Area (CRGNSA) to: (1) protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Gorge; and (2) protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development. The Act also authorized creation of the Columbia River Gorge Commission, a bi-state regional planning agency that was created by an inter-state Compact between the states of Washington and Oregon.

The Gorge Commission, the U.S. Forest Service, and the six counties with land in the CRGNSA all work together to implement the provisions of the Act. The Gorge Commission has several responsibilities under the Act, including planning for the CRGNSA, implementation of the CRGNSA Management Plan, and monitoring and hearing appeals of land-use decisions. The local counties and the Gorge Commission are responsible for drafting and enforcing land-use ordinances to implement the Management Plan. The Forest Service administers recreation facilities, assists in resource protection programs, provides technical assistance, and manages National Forest lands within the CRGNSA.

The 292,500 acre CRGNSA extends along the Columbia River from approximately the confluence of the Columbia and Sandy rivers on the west to just past the village of Wishram, Washington on the east. The proposed WREP Project Area is located outside of, but immediately adjacent to, the northern boundary of the CRGNSA near White Salmon, Washington (see Figure 1-1). The Scenic Area comprises three land use classifications: GMAs, SMAs, and Urban Areas. SMAs, which contain the most sensitive resources, are managed by USFS. GMAs include a mixture of historic land uses such as farming, logging, residential, and

cattle grazing. Development on GMA lands is administered by five of the six Gorge Counties and the Columbia River Gorge Commission. Both SMAs and GMAs are subject to local Scenic Area codes deemed consistent with the Scenic Area Management Plan by the Columbia River Gorge Commission and the US Secretary of Agriculture prior to adoption. In Skamania County, Scenic Area development regulations are codified in SCC Title 22.13. Urban Areas (including Cascade Locks, Hood River, Mosier, and The Dalles in Oregon, and North Bonneville, Stevenson, Carson, Home Valley, White Salmon, Bingen, Lyle, Dallesport, and Wishram in Washington) are exempt from Title 22 Scenic Area regulations.

Although the proposed Project thus is in close proximity to the CRGNSA, the CRGNSA Act expressly states that:

> *Nothing in [this Act] shall . . . establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas*.

See (16 USC § 544O(a)(10). Accordingly, because the proposed Project is located outside of the CRGNSA, the provisions of the CRGNSA Act do not apply to the proposed Project.

4.12 FARMLAND PROTECTION POLICY ACT

The Farmland Protection Policy Act (7 USC 4201 et seq.) directs federal agencies to identify and quantify adverse impacts of federal programs on farmlands. The Act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to non-agricultural uses.

The location and extent of prime and other important farmlands is designated by the Natural Resource Conservation Service and can be found in their soil survey information. Prime farmland refers to land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oil seed crops. None of the lands within the Project Area boundary are considered to be prime farmland, and the access road also does not cross or affect other farmlands.

4.13 RECREATION RESOURCES

BPA used the Wild and Scenic River inventory of listed and proposed rivers (16 USC Sec. 1273 [b]) qualifying for Wild, Scenic, or Recreation River status to evaluate recreational resources and impacts. The Project Area area does not contain and will not cross any listed segments. Impacts to the visual quality in the vicinity of the Columbia River Gorge National Scenic Area are discussed in Section 3.9, Visual Resources.

The Northwest Power Planning Council's Protected Area Amendments to the Pacific Northwest Electric Power Planning Council Designation Act of 1980 are not applicable to the Project.

No National Recreation or National Scenic Trails identified in the National Trail System (16 USC Sec. 1242–1245) lie within the Project Area. Two national trails, the Lewis and Clark

National Historical Trail and the Oregon National Historic Trail, are located within 5 miles of the Project Area. These trails roughly follow SR 14 and I-84, respectively. Within 5 miles of the site, the White Salmon River is designated as a Wild and Scenic River, and within 25 miles, the Klickitat River is also so designated.

4.14 CLEAN WATER ACT

The Clean Water Act (933 USC § 1251 et seq.) regulates discharges into waters of the United States:

- ***Section 401.*** A federal permit to conduct an activity that causes discharges into navigable waters is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. No discharges to navigable waters are proposed as part of the Project.

- ***Section 402.*** This section authorizes storm water discharges under NPDES. The State of Washington was delegated the NPDES program under the Clean Water Act in 1974, and has adopted its own NPDES program. The Applicant would file an NOI to obtain coverage under the Washington general permit and would prepare a SWPPP. The SWPPP will address stabilization practices, structural practices, stormwater management, and other controls (see Section 3.1 Geology and Section 3.2 Water Resources).

- ***Section 404.*** Authorization from the US Army Corps of Engineers under Section 404 is required when there is a discharge of dredge or fill material into waters of the US, including wetlands. As discussed in Section 3.4 Biological Resources, the proposed Project would not cause any impact to wetland areas.

4.15 FLOODPLAIN / WETLANDS ASSESSMENT

The U.S. Department of Energy mandates that impacts to floodplains and wetlands be assessed and that alternatives for protecting these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12), and Federal Executive Orders 11988 and 11990.

Section 3.4 Biological Resources evaluates Project impacts on floodplains and wetlands. The Project Area is not within a floodplain as determined from Flood Insurance Rate Maps published by the Federal Emergency Management Agency. Wetlands occur within the Project Area boundary but would not be affected by the construction and operation of the Project. This evaluation serves as the notice of floodplain/wetlands involvement for this Project.

4.16 COASTAL ZONE MANAGEMENT ACT

As an agency of the federal government, BPA follows the guidelines of the Coastal Zone Management Act of 1972 (16 USC Sections 1451–1464) and would ensure that projects would be, to the maximum extent practicable, consistent with the enforceable policies of the state management programs. The proposed Project is not in the coastal zone, nor would it directly affect the coastal zone.

4.17 THE SAFE DRINKING WATER ACT

The Safe Drinking Water Act (42 USC Section 200f et seq.) protects the quality of public drinking water and its source. BPA would comply with state and local public drinking water regulations. The proposed Project would not affect any sole source aquifers or other critical aquifers, or adversely affect any surface water supplies.

4.18 CLEAN AIR ACT

The Clean Air Act, as revised in 1990 (PL 101-542 [42 USC 7401]), requires the EPA and individual states to carry out a wide range of regulatory programs intended to assure attainment of the National Ambient Air Quality Standards.

The proposed the Project lies entirely in Skamania County, Washington. As discussed in Section 3.2 Air, the county is an attainment area within the National Ambient Air Quality Standards for all criteria pollutants. Impacts to air quality would be limited primarily to the construction period and would be minor, and would conform to state and federal CAA regulations. See Section 3.2 Air Quality for a complete analysis and discussion of this issue.

4.19 GLOBAL CLIMATE CHANGE

Global climate change is an increase in the average temperature of the Earth's surface. Since the late 1800s, data shows that the global average temperature has increased about 0.7 to 1.4 degrees F (0.4 to 0.8 degrees C), and some projections estimate that the average temperature will rise an additional 2.5 to 10.4 degrees F (1.4 to 5.8 degrees C) by 2100 (NASA 2009). A majority of scientists who study climate have concluded that human activities are responsible for most of this warming primarily through emission of certain gases that enhance Earth's natural greenhouse effect. Gases that absorb infrared radiation and prevent heat loss to space are called greenhouse gases. These gases include water vapor, carbon dioxide, methane, nitrous oxide, nitrogen oxides, non-methane volatile organic compounds, and stratospheric ozone-depleting substances such as chlorofluorocarbons.

The clearing of large areas of vegetation from the Earth's surface is also believed to contribute to global climate change because trees and other plants remove carbon dioxide from the air during photosynthesis, the process they use to produce food. Removal of vegetation contributes to the buildup of carbon dioxide by reducing the rate at which the gas is removed from the atmosphere and by the decomposition of dead vegetation.

Operation of the proposed Project would not generate emissions of gases (such as carbon dioxide) that contribute to global climate change, other than small amounts of emissions from vehicles used for site access and maintenance activities.

About 26 acres of tall-growing conifer vegetation would be cleared for the Proposed Action. The removal of this vegetation would result in a net reduction in the collectors of carbon in the Project Area. However, because the amount of clearing would be extremely small, and because low-growing vegetation would regrow in cleared areas, the proposed Project's contribution to global climate change would be negligible to nonexistent.

4.20 POLLUTION CONTROL ACTS

Several pollution control acts potentially apply to the proposed Project, depending on the exact quantities and types of hazardous materials that may be stored on site. Regulations would be enforced by EFSEC, and development of a Hazardous Materials Management Plan in accordance with the Uniform Fire Code may be required by local fire districts.

The Resource Conservation and Recovery Act, as amended, is designed to provide a program for managing and controlling hazardous waste by imposing requirements on generators and transporters of this waste, and on owners and operators of treatment, storage, and disposal facilities. Each treatment, storage, and disposal facility owner or operator is required to have a permit issued by EPA or the state. Typical construction and maintenance activities in BPA's experience have generated small amounts of these hazardous wastes: solvents, pesticides, paint products, motor and lubricating oils, and cleaners. Small amounts of hazardous wastes may be generated by the Project. These materials would be disposed of according to state law and the Resource Conservation and Recovery Act.

The proposed Project would not generate large amounts of solid waste.

The Toxic Substances Control Act is intended to protect human health and the environment from toxic chemicals. Section 6 of the Act regulates the use, storage, and disposal of polychlorinated biphenyls (PCBs). BPA adopted guidelines to ensure that PCBs are not introduced into the environment. Equipment used for this Project will not contain PCBs. Any equipment removed that may have PCBs will be handled according to the disposal provisions of the Toxic Substances Control Act.

The SPCC Act is intended to prevent discharge of oil into navigable waters of the US or adjoining shorelines, as opposed to response and cleanup after a spill occurs. Facilities subject to the Act must prepare and implement an SPCC Plan to prevent any discharge of oil into or upon navigable waters or adjoining shorelines. Because the proposed Project does not include the storage of large amounts of oil, the Project is not subject to this Act. However, EFSEC may likely require the preparation of an SPCC Plan for the Project.

The Federal Insecticide, Fungicide and Rodenticide Act registers and regulates pesticides. BPA uses herbicides (a kind of pesticide) only in a limited fashion and under controlled circumstances. Herbicides are used on transmission line rights of way and in substation yards to control vegetation, including noxious weeds. When BPA uses herbicides, the date, dose, and chemical used are recorded and reported to state government officials. Herbicide containers are disposed of according to Resource Conservation and Recovery Act standards.

If a hazardous material, toxic substance, or petroleum product is discovered, and may pose an immediate threat to human health or the environment, BPA requires that the contractor notify the Contracting Officer's Technical Representative immediately. Other conditions such as large dump sites, drums of unknown substances, suspicious odors, stained soil, etc., also must be reported immediately to the Technical Representative, who will coordinate with the appropriate personnel within BPA. In addition, the contractor will not be allowed to disturb such conditions until the Contracting Officer's Technical Representative has given the notice to proceed.

4.21 NOISE CONTROL ACT

The Federal Noise Control Act of 1972 (42 USC 4901) requires that federal entities, such as BPA, comply with state and local noise requirements. The EPA has established a guideline of 55 dBA for the annual average L_{dn} in outdoor areas. In computing this value, a 10 dB correction (penalty) is added to night-time noise between the hours of 10 PM and 7 AM.

WAC 463-62-030 states that energy facilities shall meet the noise standards established in Chapter 70.107 RCW, also known as the Noise Control Act of 1974, as implemented in the requirements of WAC 173-60. SCC Title 8 Chapter 22: Noise Regulations identifies limits and exceptions specific to noise in Skamania County. SCC 8.22 was adopted pursuant to, and is consistent with, WAC 173-60. Depending on the classification of receiving properties, the noise limits range from 50 dBA to 70 dBA.

Traffic on public roads, aircraft, and railroad traffic are exempt from the applicable environmental noise limits. Construction activities also are exempt from the noise regulations during daytime hours.

The Project would operate at or below existing state noise limits. The facilities would be designed to meet the limits for the worst case, that is, at night, at the edge of the right-of-way, a limit of 50 dBA. See Section 3.7 Noise for detailed analysis of this issue.

4.22 NOTICE TO THE FEDERAL AVIATION ADMINISTRATION

The Federal Aviation Administration requires a Project Proponent to submit its designs for approval if a proposed structure is taller than 200 feet from the ground, if a conductor is 200 feet above the ground, or the structures are within the approach path of an airport. Final locations, structures, and structure heights would be required to be submitted to the Federal Aviation Administration for the Project because the proposed turbine heights are over the 200-foot level.

4.23 FEDERAL COMMUNICATIONS COMMISSION

Federal Communications Commission regulations require that transmission lines be operated so that radio and television reception would not be seriously degraded or repeatedly interrupted. Further, the regulations require that the operators of these devices mitigate such interference. No interference with radio, television, or other reception is expected as a result of the proposed Project (Section 3.6 Public Health and Safety). If any such interference were to occur, BPA would comply with the Federal Communications Commission requirements relating to radio and television interference from the proposed Project.

5.0 DISTRIBUTION LIST

5.1 FEDERAL AGENCIES

USDOC NOAA
National Marine Fisheries Service
Administration
525 N.E. Oregon St., Suite 500
Portland, Oregon 97232-2778

USDOC NOAA
National Marine Fisheries Service
510 Desmond Drive S.E., Suite 103
Lacey, Washington 98503-1291

USDOC NOAA
Northwest Power Planning Council
851 S.W. 6th Ave., Suite 1100
Portland, OR 97204-1348

U.S. Department of the Interior
Fish & Wildlife Service
P.O. Box 848
Ephrata, WA 98823-0848

U.S. Department of the Interior
Fish & Wildlife Service
911 N.E. 11th Avenue
Portland, OR 97232-4181

U.S. Department of the Interior
Fish and Wildlife Service
Hanford Reach National Monument/
Saddle Mountain National Wildlife Refuge
3250 Port of Benton Blvd.
Richland, WA 99352-1670

U.S. Department of the Interior
Fish and Wildlife Service
Arid Lands Wildlife Refuge
3250 Port of Benton Blvd.
Richland, WA 99352-1670

U.S. Department of the Interior
Bureau of Land Management
Spokane District Office
1103 N. Fancher Road
Spokane, WA 99212-1275

U.S. Department of the Interior
Bureau of Indian Affairs
Yakima Agency Land Operations P11
Environmental Coordinator
P.O. Box 632
Toppenish, Washington 98948-0632

U.S. Department of the Interior
Bureau of Reclamation
1917 Marsh Road
Yakima, WA 98901-2058

U.S. Army Corps of Engineers
P.O. Box 3755
Seattle, Washington 98124-3755

U.S. Department of Energy
Office of NEPA Compliance
1000 Independence Ave. S.W.
Washington, D.C. 20585-0001

U.S. Department of Energy
Richland Operations Office
825 Jadwin Ave.
Richland, WA 99352-3589

U.S. Department of Transportation
Federal Aviation Administration
2200 W. Washington Ave.
Yakima, WA 98903-1249

U.S. Environmental Protection Agency
1200 Pennsylvania Ave. N.W.
Washington, DC 20004-2403

U.S. Environmental Protection Agency
Region 10
1200 6th Ave.
Seattle, Washington 98101-3123

Dan Wiley, Chief of Resources Stewardship
Lewis and Clark National Historic Trail
National Park Service
601 Riverfront Drive
Omaha, NE, 68102

Lee Kreutzer
National Trails System
National Park Service
324 S. State, Suite 200
Salt Lake City, UT, 84111

5.2 TRIBAL GOVERNMENTS

Confederated Tribes and Bands of
The Yakama Nation
Ms. Lavina Washines, Vice Chair
P.O. Box 151
Toppenish, WA 98948

Confederated Tribes and Bands of
The Yakama Nation
Mr. Johnny Jackson, Cascade Chief
P.O. Box 190
Underwood, WA 98651

Confederated Tribes and Bands of
The Yakama Nation
Wildlife Resource Management
P.O. Box 151
Toppenish, WA 98948

Confederated Tribes and Bands of
The Yakama Nation
Mr. Wilbur Slockish, Chief
P.O. Box 782
The Dalles, OR 97058

Confederated Tribes and Bands
Of the Yakama Nation
Mr. Harry Smiskin, Chairman
Tribal Council
P.O. Box 151
Toppenish, WA 98948

Confederated Tribes of the Umatilla
Indian Reservation
Mr. Elwood Patawa, Chairman
46411 Timine Way
Pendleton, OR 97801

Confederated Tribes of the Umatilla
Indian Reservation
Ms. Teara Ferman
CRPP
46411 Timine Way
Pendelton, OR 97801

Confederated Tribes of the Umatilla
Indian Reservation
Mr. Shawn Steinmetz
CRPP
46411 Timine Way
Pendleton, OR 97801

Confederated Tribes of the Umatilla
Indian Reservation
Ms. Catherine Dickson
CRPP Principal Investigator
46411 Timine Way
Pendleton, OR 97801

Confederated Tribes of the Umatilla
Indian Reservation
Ms. Carey Miller
CRPP
46411 Timine Way
Pendleton, OR 97801

Nez Perce Tribe
Mr. Samuel Penney, Chairman
P.O. Box 365
Lapwai, ID 83540

Nez Perce Tribe
Ms. Vera Sonneck
P.O. Box 365
Lapwai, ID 83540

Nez Perce Tribe
Mr. Josiah
P.O. Box 365
Lapwai, ID 83540

Confederated Tribes of the Warm Springs Reservation of Oregon
Mr. Ronald Suppah, Chairman
P.O. Box C
Warm Springs, OR 97761

Ms. Sally Bird, Cultural Resources Manager
Warm Springs GeoVisions
P.O. Box 460
Warm Springs, OR 97761

Confederated Tribes of the Warm Springs Reservation of Oregon
Mr. Robert Brunoe, THPO
P.O. Box C
Warm Springs, OR 97761

Cowlitz Indian Tribe
Mr. William Iyall, Chairman
P.O. Box 2547
Longview, WA 98632

Cowlitz Indian Tribe
Mr. David Burlingame
P.O. Box 2547
Longview, WA 98632

Cowlitz Indian Tribe
Mr. John Barnett
P.O. Box 2547
Longview, WA 98632

5.3 PUBLIC OFFICIALS

State of Washington
Office of the Governor
Honorable Christine Gregoire, Governor
P.O. Box 40002
Olympia, WA 98504-0002

State of Washington
State Senate District 15
Honorable Jim Honeyford, Senator
P.O. Box 40415
Olympia, WA 98504-0415

State of Washington
House of Representatives
House District 15
Honorable Bruce Chandler, Representative
P.O. Box 40600
Olympia, WA 98504-0600

State of Washington
House of Representatives
House District 15
Honorable David Taylor, Representative
P.O. Box 40600
Olympia, WA 98504-0600

U.S. Senate
Honorable Patty Murray, Senator
Jackson Federal Bldg., Suite 2988
915 2nd Ave.
Seattle, WA 98174-1009

U.S. Senate
Honorable Maria Cantwell, Senator
915 2nd Ave., Suite 3206
Seattle, WA 98174-1011

U.S. House of Representatives
House District 3
Honorable Brian Baird, Representative
120 Union Avenue, Suite 105
Olympia, WA 98501

U.S. House of Representatives
House District 4
Honorable Richard Hastings, Representative
302 E. Chestnut Ave.
Yakima, WA 98901-2718

5.4 STATE AGENCIES

State of Washington
Office of Archaeology and Historic Preservation
420 Golf Club Road
Olympia, WA 98504-8343

State of Washington
Department of Ecology
SEPA Review Section
P.O. Box 47703
Olympia, WA 98504-7703

State of Washington Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, Washington 98902-3452

State of Washington
Department of Natural Resources
SEPA Center
P.O. Box 47015
Olympia, WA 98504-7015

State of Washington
Department of Fish and Wildlife
Anne Friez, Regional Habitat Program Manager
WDFW, Region 5
2108 Grand Blvd.
Vancouver, WA 98661

State of Washington
Department of Natural Resources
Washington Natural Heritage Program
P.O. Box 47016
111 Washington St. S.E.
Olympia, WA 98504-7016

State of Washington
Department of Transportation
1231 Scale House Rd
PO Box 125
Goldendale, WA 98620

State of Washington
Department of Transportation
Southwest Region
P.O. Box 1709
Vancouver, Washington 98682

5.5 LOCAL GOVERNMENTS AND UTILITIES

Skamania County Commissioner
Jim “JR” Richardson
PO Box 790
Stevenson, WA 98648

Skamania County Commissioner
Paul Pearce
PO Box 790
Stevenson, WA 98648

Skamania County Commissioner
Bob Anderson
PO Box 790
Stevenson, WA 98648

Skamania County Community Development Department
Karen Witherspoon, Director
PO Box 790
Stevenson, WA 98648

Skamania County Community Development Department
Mark Mazeski, Senior Planner
PO Box 790
Stevenson, WA 98648

Skamania County Public Works Department
Larry Douglass, Director
PO Box 790
Stevenson, WA 98648

Skamania County Noxious Weed Program
Todd Murray
PO Box 790
Stevenson, WA 98648

Southwest Clean Air Agency
11815 NE 99th Street
Suite 1294
Vancouver, WA 98682

Skamania County Public Utility District #1
1492 Wind River Highway
Carson, Washington 98610

5.6 LIBRARIES AND EDUCATIONAL INSTITUTIONS

Fort Vancouver Regional Library
120 NW Vancouver Avenue
P.O. Box 818
Stevenson, Washington 98648

White Salmon Community Library
5 Town & Country Square
White Salmon, Washington 98672

Cascade Locks Branch Library
140 SE Wa-Na-Pa Street
Cascade Locks, Oregon 97014

Hood River County Library
502 State Street
Hood River, Oregon 97031

State of Washington
Joel M. Pritchard Library MS 42460
415 15th St. S.W.
Olympia, WA 98504-0001

Yakima Valley Regional Library
Reference Coordinator
102 N. 3rd Street
Yakima, Washington 98901-2705

Washington State University
2710 University Drive
Richland, WA 99352-1671

Bonneville Power Administration Library
905 NE 11th Avenue, NHTL-1
Portland, Oregon 97232

5.7 MEDIA

Yakima Herald Republic
City Editor
P.O. Box 9668
Yakima, WA 98909-0668

KNDO TV
News Director
1608 S. 24th Ave.
Yakima, WA 98902-5719

KIMA TV
2801 Terrace Heights Dr.
Yakima, WA 98901-1455

KAPP TV
Applevalley Broadcasting Avenue 77
P.O. Box 10208
Yakima, WA 98909-1208

The Oregonian
803 State St, Hood River, OR 97031
(541) 386-3944

Hood River News
419 State St, Hood River, OR 97031
(541) 386-1234

Goldendale Sentinel
117 W Main St, Goldendale, WA 98620
(509) 773-3777

Skamania County Pioneer
P.O. 219
Stevenson, WA 98648

5.8 UTILITIES

Northwest Pipeline Company

5.9 INTERESTED GROUPS

Columbia Gorge Audubon Society

Friends of the Columbia Gorge

Gifford Pinchot Task Force

Kittitas Audubon

Northwestern Lake Development Homeowners' Association

Renewable Northwest Project

Save our Scenic Area (SOSA)

Salem Audubon Society

Seattle Audubon

Skamania County Agri-Tourism Association

Vancouver Audubon Society

5.10 INTERESTED INDIVIDUALS

Sally Newell

Gretchen Starke

Mary Repar

Robert Graham

Carol Taylor

Dawn Stover

Tom Rousseau

Rick Aramburu

Gary Kahn

Jessica Walz

Sallie Jones

Nathan Baker

Peter Cornelison

Ron Reynier

Rick Till

Keith Brown and Teresa Robbins

This page intentionally left blank.

6.0 LIST OF PREPARERS

The Whistling Ridge Energy Project EIS was prepared by the Washington Energy Facility Site Evaluation Council (EFSEC) and Bonneville Power Administration (BPA), with the assistance of URS Corporation (URS), a consulting firm, West Inc., Northwest Wildlife Consultants, GeoDataScape, and Carroz Consulting. In addition, ENTRIX Consulting was retained by Washington EFSEC to provide an independent, third-party review of the EIS for SEPA and NEPA compliance. The following lists those individuals who participated in the preparation of this EIS. Consultant disclosure statements required under NEPA (*see* 40 CFR 1506.5(c) and 10 CFR 1021.310) are included in Appendix F of this EIS.

6.1 WASHINGTON EFSEC

Al Wright, EFSEC Manager. Mr. Wright has over 40 years experience in the energy and environmental fields. Mr. Wright has been Managing Director of EFSEC since 2010 and is responsible for all facets of EFSEC activities. Before joining EFSEC Mr. Wright was consultant to NW Utilities on hydro-electric operations and power sales contracts. Mr. Wright has also served as Executive Director of the Pacific Northwest Utilities Conference Committee, a NW association of public and private electric utilities. He also served a director of the Oregon Water Resources Board and as the Regional Coordinator for the Mid-Columbia Public Utilities Districts. Mr. Wright holds a Civil Engineering degree from University of California at Berkeley and has completed graduate studies in Watershed Management from Humboldt State College.

Stephen Posner, EFSEC Compliance Manager. Mr. Posner has over 25 years experience working in various environmental regulatory programs. As EFSEC's Compliance Manager for the last 3 years, Mr. Posner is responsible for managing environmental compliance activities for facilities under EFSEC's jurisdiction. Mr. Posner also coordinates and participates in the review of applications for site certification. Prior to working at EFSEC, Mr. Posner worked for the California Environmental Protection Agency as a hazardous waste/solid waste compliance inspector. Education: Bachelor's Degree in Biological Sciences.

Jim La Spina, EFSEC Compliance Specialist. Jim has been a state environmental regulator for almost 14 years. He wrote NPDES Permits for Ecology for 11 years and joined EFSEC in September 2007 as an Energy Facility Siting Specialist. Jim is responsible for coordinating the review of a project proponent's Application for Site Certification. After the governor approves a proposed project, Jim verifies the Certificate Holder's compliance with requirements in the Site Certification Agreement. Education: Master's in Environmental Studies.

6.2 BPA

Andrew M. Montaño, EIS Project Manager, Environmental Protection Specialist. Mr. Montaño has nearly 20 years experience within the environmental field. His primary background was in water quality-related research while working as an Aquatic Biologist with his former agency, the Bureau of Reclamation. Additionally, he has also specialized in toxicology and hazardous wastes site management, nuisance species control, and some fisheries-related activities. His NEPA experience includes projects that proposed modified flow regimes on regulated rivers in the western United States as well his recent experience with transmission-

related projects. Education: MS in Environmental Science and Engineering; BS in General Studies (biology emphasis)

Amy Freel, Electrical Engineer. Mrs. Freel has 19 years of experience working at BPA of which she has been an electrical engineer for 14 years. She worked as a Substation Designer for 10 years, a Customer Service Engineer for 1 year, and as a Project Manager for the last 3 years. In her role as an electrical engineer, she designed and managed the installation of high voltage projects from the planning stage through the commissioning stage. Projects include new and up grades to substations and transmission lines 500kV and below. Education: BS, Electrical Engineering

Hub Adams, Attorney. Mr. Adams has 20 years of experience preparing environmental documents for compliance with NEPA, state "little NEPA" laws, and other environmental laws. As BPA's NEPA attorney, he is responsible for ensuring NEPA compliance for BPA's activities and assisting in the preparation of EISs and other NEPA documents. Prior to BPA, he worked as an environmental consultant managing and preparing joint NEPA/state EISs, other environmental documents, and project permitting processes for a variety of proposed projects, including complex energy, mining, and transportation projects. He is a member of the American Planning Association (APA) and the American Institute of Certified Planners (AICP). Education: JD, Certificate in Environmental and Natural Resources Law; BA, Urban and Regional Planning.

6.3 CONSULTANTS

6.3.1 URS CORPORATION

Katy Chaney, Project Manager. Ms. Chaney has over 27 years of experience. As vice president and manager of URS's Pacific Northwest environmental services, her management responsibilities include environmental impact statements, permitting efforts, and planning and siting studies. Education: BA, Political Science.

Dale Bennett, JD, Senior Planner. Mr. Bennett has 20 years of experience managing large and small planning, land use, regulatory, and remote sensing projects.

Mark DuLaney, Senior Graphics Illustrator. Mr. DuLaney has over 30 years of experience in graphic illustration and design. He has experience using Corel Draw and Corel Photo Paint, PageMaker, and Power Point. Education: Air Force 223X1 course in Technical Illustration and drawing classes at The New School of Visual Concepts.

David Every, PhD, Senior Ecologist. Dr. Every has over 30 years of experience as an environmental consultant on wetland and terrestrial ecological issues throughout the United States. Education: PhD, Botany; MS, Botany; BS, Zoology.

Mike Kelly, Senior Archaeologist. Mr. Kelly has 27 years of experience in cultural resource management and has been responsible for directing numerous archaeological investigations throughout the Pacific Northwest, California, and the Great Basin. Education: MA, Anthropology; BA, Anthropology.

Louise Kling, Ecologist and Environmental Planner. Ms. Kling has over 15 years of experience in fisheries and wildlife research, with an emphasis on disturbance ecology. She is well versed in survey methods used to quantify a variety of taxa, including terrestrial and aquatic habitat. She has implemented and managed projects for public agency, university, and private sector clients. Her analytical skills include a wide range of multivariate statistical methods and spatial analysis using GIS. For the past three years, she has focused on visual resource assessment and ecological design, land use evaluation, and environmental justice in support of the NEPA process. Her experience in visual resources assessment includes BLM, USFS, FHWA, and US Army Corps of Engineers methodologies and management of georeferenced photosimulation production. Her expertise has been applied to energy facilities siting, energy transmission, pipeline and transportation projects. In addition, she currently serves as a visual resources technical advisor to the Columbia River Gorge Vital Signs Indicator Project.

Sarah McDaniel, RPA, Staff Archeologist. Ms. McDaniel provides technical support for URS Corporation's cultural resources program in the Pacific Northwest Region and California. Responsibilities include archaeological site identification, recordation, and evaluation; historic resource documentation; and preparation of summary reports for compliance with federal and state regulations. Ms. McDaniel has six years of experience in cultural resources management and archaeological investigations.

Dan Meier, Engineering Geologist. Mr. Meier is a Certified Engineering Geologist located in Portland, Oregon. He has over 17 years of professional geologic experience in the western United States. His specialties include on-site geologic mapping, subsurface exploration, as-constructed geologic mapping, construction inspection, interpretation of field data, and preparation of maps and reports. He is experienced in seismic hazard evaluations, landslide evaluations, engineering geology and construction management and inspection.

Dautis Pearson, Environmental Planner. Mr. Pearson is a Senior Planner, NEPA, Endangered Species Act, and Federal/State agency and private compliance specialist. He has 23 years of experience in land management planning; interdisciplinary and interagency team leading and facilitation, and NEPA/SEPA environmental preparation. Dautis' experience with all federal agencies' NEPA and Endangered Species Act process provides great insight into various agency directions for collaboration and streamlining. He has 12 years of experience with USFS as a Land Use Planning Specialist and has supported or managed several energy and transmission related or linear projects. Education: BS, Biology; Riparian and Fire Ecology; Forestry; Silviculture.

Mark Storm, Senior Noise Control Engineer. Mr. Storm has over 18 years of experience managing tasks for environmental noise regulation review, field surveys, acoustical impact assessment, mitigation planning and compliance evaluation for various energy project types such as solar-to-thermal, wind turbine, biomass and natural gas. He is INCE board certified.

Jeff Walker, Botanist and Wetland Biologist. Mr. Walker has over 10 years of experience as a botanist. He has conducted vascular and nonvascular plant surveys, performed monitoring of rare plant populations, and conducted wetland delineations and evaluations. Education: BS, Botany and Environmental Studies.

6.3.2 WEST, INC

Kimberly Bay. Ms. Bay has 9 years of experience working primarily on the coordination of the data and reports for wind-energy projects. This task includes data and database management, data quality assurance/quality control, data analysis, and finally compiling the results for the reports. She has experience with most statistical computer packages including SAS, R, SPLUS, and SPSS, the database application ACCESS, and the GIS application ARCVIEW.

Greg Johnson. Mr. Johnson has over 22 years of consulting experience in wildlife and ecological studies. He is a Certified Wildlife Biologist through The Wildlife Society, a Professional Wetland Scientist through the Society of Wetland Scientists, and a certified Senior Ecologist through the Ecological Society of America. His specialty areas include wildlife research with an emphasis on contaminants and wind power development; endangered species; wetland delineation, mitigation, and functional value assessment; and vegetation sampling. He has supervised 17 field studies to assess effects on terrestrial and aquatic wildlife of pesticides and other contaminants throughout the US. Over the last 14 years, he has studied wildlife-windpower interactions at proposed or existing wind energy facilities in 16 US states and Alberta, Canada, and is currently Project Manager for the first large-scale greater sage-grouse telemetry study to evaluate impacts of wind energy development on this species.

Tamara Enz, Research Biologist. Tamara Enz is a project manager and biologist for WEST. After becoming fluent in Japanese, Tamara learned the more challenging language of botanical terms, earning a Master's of Science in plant biology at the University of Massachusetts, Amherst. Working throughout New England, Puerto Rico, and Montana, Tamara conducted community and wetland delineations and habitat suitability studies, coordinated rare plant searches, and participated in numerous research projects ranging from genetics studies to weed control. She has also done extensive bird work, including breeding and migratory bird surveys and point counts, banding, and call playback response surveys in New England, Alaska, Montana, and Canada. Her mammalian experience includes an ice based bowhead whale census in Barrow, Alaska, lynx tracking surveys in Wyoming, and general track surveys in Maine.

Jeffrey Gruver, Research Biologist. Jeff Gruver joined WEST in 2007. Jeff has been involved in bat research since 1996, and has studied bat ecology in the Pacific Northwest, the Rocky Mountains, and the Badlands of southern Alberta. He earned a B.S. in Economics (1993) from Penn State University and an M.S. in Zoology and Physiology from the University of Wyoming (2002). Jeff's M.S. research examined the assemblage of bats near a wind power facility in southern Wyoming in relation to documented bat fatalities at the facility. His PhD research focused on the how physiological constraints influence ecological responses of bats in northern arid climates. Jeff has authored or co-authored scientific publications on topics ranging from species conservation assessments to factors influencing bat fatality risks at wind energy installations.

6.3.3 NORTHWEST WILDLIFE CONSULTANTS, INC

Scott Downes, Bob Gritski, and Karen Kronner. Northwest Wildlife Consultants, Inc. is an environmental consulting firm based in eastern Oregon and Washington. They specialize in wind energy studies and bird, reptile, amphibian and mammal surveys. They are partnering with

the WDFW and Oregon Department of Fish and Wildlife on ferruginous hawk telemetry studies in the Columbia Basin.

6.3.4 GEODATASCAPE, INC

Chris Watson. Mr. Watson, owner of GeoDataScape, has over ten years of experience in providing GIS and visual simulation experience for a variety of projects. He has worked as a field geologist. Education: MS and BS, Geology.

6.3.5 TURNSTONE ENVIRONMENTAL

Jeff Reams, Wildlife Biologist. Mr. Reams is also a partner with Turnstone Environmental Consultants, Inc. for 14 years. He is the senior wildlife biologist and oversees the northern spotted owl, northern goshawk and western gray squirrel surveys. Education: BS Oregon State University

Devin Sahl, Wildlife Biologist. Mr. Sahl has been employed by Turnstone Environmental Consultants Inc. for past 8 years. He served as a wildlife biologist and as the field coordinator on the Whistling Ridge project. He was involved with the northern spotted owl, northern goshawk and the western gray squirrel survey efforts associated with the project.

6.3.6 CARROZ CONSULTING

Katie Carroz, Socioeconomist. Ms. Carroz has 10 years of environmental analysis experience specializing in economic, socioeconomic, environmental justice, demographic, and fiscal analyses, and EIS preparation and coordination. Education: MA, Economics with an emphasis on natural resources; BA, Economics with minor in environmental studies.

6.3.7 CARDNO ENTRIX, INC

Jeremy Pratt, Project Manager. Jeremy Pratt leads the ENTRIX Western Division Environmental Management, Permitting and Compliance practice. Jeremy has more than 30 years' experience preparing environmental documents for compliance with NEPA, and throughout his career he has focused on managing large-scale, controversial projects to resolve long-standing resource conflicts in complex regulatory environments. Jeremy works with project applicants and local stakeholders concerned with the development, use, protection or environmental management of their sites, communities, or resources. He works easily in both the technical and policy areas to evaluate the environmental effects of proposed actions, programs, or projects; achieve permits and assure regulatory compliance; or develop management plans. Education: BS Interdisciplinary Studies, Evergreen State College; MS Environmental and Energy Sciences, Washington State University.

Jan Aarts, Deputy Project Manager. Mr. Aarts has over 25 years of experience preparing technically sound and legally defensible environmental documents for a wide variety of energy-related projects in the Pacific Northwest. Projects have included wind energy projects, geothermal exploration projects, hydroelectric projects, natural gas pipelines, and high-voltage transmission lines. Mr. Aarts has prepared the full range of NEPA environmental documents, including Notices of Intent, Documented Categorical Exclusions, Environmental Assessments,

Environmental Impact Statements, Findings of No Significant Impact, and Records of Decision. He has also prepared the full range of State Environmental Policy Act (SEPA) environmental documents, including Environmental Checklists and Environmental Impact Statements. His technical expertise includes the subjects of land use, regulatory compliance, recreation, socio-economics, community impacts, environmental justice, public services, utilities, and cumulative impacts. He is also experienced at managing the work of other technical experts conducting cultural resource investigations, air and noise studies, hazardous waste investigations, fish and wildlife studies, biological assessments, wetland delineations, stream studies, and mitigation plans.

Chelsea Ayala, Air Quality Specialist. Ms. Ayala has over 17 years of regulatory agency, analytical laboratory, and environmental consulting experience. She has served as project manager, deputy project manager, senior reviewer, technical writer, and technical lead for environmental projects throughout California and the United States. Her areas of expertise include air quality, noise, and climate change for a variety of projects, including oil and gas pipelines, electric transmission lines, and water projects. She has experience preparing environmental documentation for Projects involving NEPA and state environmental policy laws and has managed multiple projects for electric transmission lines and prepared environmental analyses for multiple oil and gas projects. Education: BA Environmental Studies, California State University.

Eliza Ghitis, Geomorphologist. Eliza Ghitis has a background in coastal, estuarine and fluvial geomorphology, specializing in the ways physical systems interact with ecology. She has managed numerous salmon habitat restoration projects through all phases of design, permitting, implementation, and post-construction monitoring and maintenance. She has conducted ecological and geomorphic studies, including study design, data collection, data analysis and compilation of reports, and preparation of numerous NEPA environmental documents and NEPA technical supporting documents. She is trained in environmental hazard assessment and mitigation, including slope stability, water quality, and relative sea level rise. Education: MS Environmental Geomorphology, Oxford University; BS Earth and Space Sciences, University of Washington.

Dave Harvey, Historian. Mr. Harvey has over 30 years of experience in historic preservation, cultural resources management, architectural history, and historic research in the Pacific Northwest, California, Alaska, and Montana, and has assisted federal and state agencies, local governments and utilities, and private architectural and engineering firms in carrying out their cultural resources obligations under sections 106 and 110 of the National Historic Preservation Act (NHPA) and NEPA (EA/EIS). Mr. Harvey has worked closely with federal land management agencies, such as the U. S. Forest Service, National Park Service, Bureau of Reclamation, Bureau of Land Management, and U. S. Army Corps of Engineers throughout the Pacific Northwest and Alaska, where he conducted determination of National Register eligibility studies, Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentations, assessments of agricultural/early settlement landscapes, and historic land use studies. Education: MA History/Historic Preservation, Western Washington University; BA History and Government, Fairleigh Dickinson University.

Melissa Klungle, Environmental Scientist. Ms. Klungle has ten years of experience in environmental science consulting specializing in terrestrial and aquatic biology, and environmental policy. Ms. Klungle has experience preparing federal and state environmental documentation for energy projects. Education: BS Fisheries and Wildlife Management, Michigan State University.

Gretchen Lebednik, Biologist. Ms. Lebednik has managed numerous restoration, monitoring, and permitting projects. Ms. Lebednik has served as principal biologist or principal botanist in the preparation and review of Biological Assessments/Evaluations, FERC documents, NEPA/CEQA documents, California Energy Commission applications, and mitigation plans for projects in a variety of habitats in California and the Pacific Northwest. She has extensive training and field experience in plant ecology and taxonomy on the Pacific Coast and has performed numerous field investigations in freshwater seasonal wetland, vernal pool, riparian, estuarine, alkali meadow, coastal dune, desert, grassland, foothill woodland, and montane communities in California. Ms. Lebednik has served as principal biologist or principal botanist in the preparation and review of Biological Assessments/Evaluations, FERC documents, NEPA/CEQA documents, California Energy Commission applications, and mitigation plans for projects in a variety of habitats in California and the Pacific Northwest. Education: MS Botany, University of Washington, BA Environmental Biology, University of California.

Darcey Miller, Environmental Biologist. Ms. Miller has twelve years of experience in environmental science consulting, specializing in wetland biology, wildlife habitat, and environmental permitting and policy. She has designed and monitored restoration and mitigation projects, led field efforts for delineations and biological assessments, and coordinated with agencies at all levels to assist clients in obtaining environmental permits. Ms. Miller has experience preparing and editing federal and state environmental documentation for linear and other energy projects. She is a Professional Wetland Scientist and a member of the Society of Wetland Scientists. Education: BS, Environmental Science, additional major in English, University of Mary Washington.

Kirk Ranzetta, Cultural Resource Specialist. Dr. Ranzetta has over fourteen years of private, public, and non-profit sector work experience in cultural resource management, historic preservation, and environmental permitting including NEPA and state environmental policy laws. He has extensive experience in the Pacific Northwest, Midwest, and Mid-Atlantic regions managing, technically reviewing, and completing cultural resource surveys for compliance with Section 106 of the NHPA and NEPA (EA/EIS). He has also served as a technical editor, drafted text, and conducted fieldwork for cultural resource reports and other NHPA and NEPA related-documents. Prior to working at ENTRIX, Dr. Ranzetta served as the Review and Compliance Coordinator for the Oregon SHPO where he consulted with federal agencies on hundreds of projects, evaluated cultural resource reports for technical sufficiency, assisted agencies in the negotiation and preparation of MOAs, and worked to streamline project reviews. This experience included working closely with cultural resources staff from the Oregon DOT, Oregon Energy Siting Council, USFS, FERC, BPA, USFWS, BIA and BLM in Oregon. These reviews were conducted in compliance with Section 106 of the NHPA, Section 4(f), NEPA, HABS/HAER requirements, ORS 358.653, and OAR Chapter 345. Education: PhD Urban Affairs and Public Policy, University of Delaware; MA Urban Affairs and Public Policy, University of Delaware; BA Historic Preservation, University of Mary Washington.

Ryan Shatt, Geologist. Mr. Shatt has over twelve years of experience as a geologist. His expertise includes Remedial Investigations, Human Health Risk Assessments, and Remedial Action. He conducts and manages environmental field investigations including supervision of subsurface drilling operations, monitoring well installation, lithologic identification, soil classification and interpretation, rock coring, borehole geophysics, and sampling of soil and ground water. He also assesses soil and ground water analytical data to evaluate compliance with applicable regulations, conducts pump test analysis and groundwater flow evaluations, performs Phase I ESAs, prepares NEPA environmental documents and manages projects. He has experience as contributing author for soil, geology, and water resources sections for numerous EIS and EA reports. Education: BA Geosciences, Penn State University.

Sandra Slayton, Environmental Scientist. Ms. Slayton has nine years of experience in environmental science consulting specializing in watershed planning, GIS, water quality, floodplain management, and environmental policy. Ms. Slayton has experience preparing federal and state environmental documentation for linear and other energy projects. She has been involved in numerous watershed planning projects including work related to water quality analysis, habitat conservation and enhancement, and hydrologic and hydraulics studies. She is a member of the American Water Resources Association. Education: MA, Ecology, University of North Carolina at Chapel Hill; BA, Environmental Science, University of Virginia.

Rachel Tamigniaux, Project Coordinator. Ms. Tamigniaux is an environmental social scientist with experience in the public, private, and non-profit sectors. She has assisted in the writing, editing and preparation of environmental documents for a wide variety of projects, including wind facilities, oil pipelines, river dredging, and hydroelectric projects. She has experience in the development of National Environmental Policy Act (NEPA) and Washington State Environmental Policy Act (SEPA) environmental documents, specifically Environmental Impact Statements (EISs), as well as experience with Section 106 processes and the development of related documents including Programmatic Agreements (PAs) and various monitoring plans. She has in-depth experience in the public comment management process, particularly for large projects. Ms. Tamigniaux has written planning guidance for environmental conferences for the U.S. Environmental Protection Agency as well as environmental policy and sustainability guidance documents for local non-profits. She is also a contributing author for the websites www.thechicecologist.com; www.theclimatecommunity.com; www.hohm.microsoft.com; and www.tag.microsoft.com. Education: MSc Environmental Social Science, University of Kent, Canterbury; BA Environmental Studies, University of Washington.

Lucy Zuccotti, Archaeologist. Ms. Zuccotti has over 12 years of technical and professional experience as an Archaeologist and Osteologist. Her background includes directing multiple field investigations in Western Washington and conducting background investigations in preparation for fieldwork. She has extensive experience writing reports summarizing research and field results in compliance with federal and state laws and regulations including NEPA and SEPA. Ms. Zuccotti has worked directly with and for Native American governments to mitigate impacts on tribal areas of interest. She is considered an expert in identification and analysis of human remains. Education: MA Anthropology, University of Arkansas; BA Anthropology, Hampshire College.

7.0 INDEX

Access Roads, 2-9, 2-26
Affected Environment, 3-1, 3-16, 3-25, 3-35, 3-96, 3-102, 3-123, 3-130, 3-147, 3-233, 3-257, 3-268
Air Transportation, 3-242
alder, 3-36, 3-38
ALTERNATIVES, 1-9
Ambulance Service Providers, 3-107
Amphibians and Reptiles, 3-75
Analysis of Environmental Noise, 3-123
Area of Potential Effect, 3-214
Ausplund Road, 3-130, 3-132, 3-133, 3-134, 3-184, 3-187, 3-193, 3-207, 3-209
Avian Use Surveys, 3-34
Background Air Quality, 3-19
bald eagle, 3-47, 3-49, 3-68, 3-82, 3-85
Barred Owl, 3-55, 3-59
Bat Acoustic Studies, 3-35
Bats, 3-66, 3-72, 3-84, 3-88
big-leaf maple, 3-36
Birds, 3-66, 3-70, 3-83, 3-87
BMPs, 3-11, 3-13, 3-28, 3-29, 3-32, 3-33, 3-34, 3-84, 3-89
bolandra, 3-42
Bonneville Power Administration (BPA), 1-1
branching montia, 3-42
Brushfield/Shrub Stand, 3-38, 3-39, 3-80, 3-81
Canopy, 3-36, 3-38
carbon dioxide, 3-17, 3-18, 3-20, 3-21, 3-22, 3-23, 3-90, 3-295, 3-296, 3-297
Cascade Range, 3-1, 3-12, 3-97
Clean Air Act, 1-3
collision risk, 3-85
Columbia Gorge, 3-19, 3-20, 3-154, 3-187, 3-295, 3-309
Columbia Intermontane Physiographic Province, 3-1
Columbia Plateau, 3-1, 3-3, 3-214, 3-216, 3-306, 3-316
Columbia River Gorge National Scenic Area, 3-25, 3-103, 3-105, 3-148, 3-149, 3-153, 3-154, 3-177, 3-179, 3-184, 3-185, 3-210, 3-211, 3-212, 3-223, 3-231, 3-288, 3-289
Columbia River Highway, 3-154, 3-187, 3-193, 3-209, 3-308
Common Noise Levels, 3-127
Conditional Use Permit, 3-162, 3-163, 3-168
Conifer Forest, 3-38, 3-39, 3-80, 3-81
Conservation Support Area, 3-60
Construction Injury and Illness Prevention Plan, 3-266
Construction Noise, 3-138
Construction Off-Site Fire Suppression Support, 3-266
Construction On-Site Fire Suppression Prevention, 3-266
Construction Personnel Protective Devices, 3-266
Construction Written Safety Program, 3-266
Construction, 2-10, 2-14, 2-15, 2-16, 2-17
Cook-Underwood Road, 3-149, 3-165, 3-170, 3-184, 3-193, 3-207, 3-233, 3-234, 3-235, 3-238, 3-239, 3-240, 3-241, 3-243, 3-244, 3-247, 3-248, 3-249, 3-250, 3-252, 3-253, 3-254
Core Areas, 3-55
Council on Environmental Quality, 1-9
County Expenditures, 3-279
County Services, 3-284
cultural resources, 3-159, 3-212, 3-213, 3-214, 3-221, 3-223, 3-224, 3-225, 3-228, 3-229, 3-230, 3-313
Cumulative Impacts, 1-39, 1-43
Cumulative impacts, 3-287, 3-294, 3-298
Daytime Operational Noise, 3-140
Demographics, 3-268
Designated Critical Habitat Area, 3-60
Dog Mountain, 3-154, 3-180, 3-210
Dust, 3-14, 3-21, 3-23, 3-24
Earthquakes, 3-8, 3-11
Electromagnetic Fields, 3-109, 3-115
Emergency Action Plan, 3-119
Emergency Medical Services, 3-104, 3-107, 3-257, 3-261
Emergency Plan, 3-116, 3-117, 3-118

Emissions, 3-20, 3-21, 3-22, 3-23, 3-25
Employment, 3-271, 3-277, 3-280, 3-286, 3-287
Endangered, 3-42, 3-49, 3-50, 3-54, 3-61, 3-75, 3-83, 3-86, 3-94
Energy, 3-16, 3-18, 3-22, 3-24, 3-34, 3-35, 3-36, 3-49, 3-54, 3-55, 3-66, 3-72, 3-83, 3-85, 3-87, 3-92, 3-93, 3-94, 3-95, 3-96, 3-97, 3-99, 3-102, 3-104, 3-105, 3-107, 3-112, 3-114, 3-122, 3-123, 3-144, 3-146, 3-171, 3-212, 3-214, 3-231, 3-233, 3-241, 3-257, 3-258, 3-280, 3-281, 3-282, 3-285, 3-286, 3-288, 3-289, 3-290, 3-293, 3-294, 3-297, 3-301, 3-302, 3-306, 3-307, 3-308, 3-309, 3-310, 3-311, 3-313, 3-315, 3-316, 3-318
Energy, 4-9
environmental impact statement (EIS), 1-1
Environmental Policy Act (SEPA), 1-1
Erosion, 3-5, 3-11, 3-12, 3-13
Exhaust, 3-20
Existing Roadways, 3-236
Existing Sound Levels, 3-130
Explosion, 3-107, 3-110, 3-120
FCRTS, 3-97
Fire Departments, 3-105
Fire Prevention, 3-103, 3-119
Fire Protection, 3-117, 3-260
Fire, 3-15, 3-103, 3-105, 3-107, 3-108, 3-110, 3-117, 3-118, 3-119, 3-120, 3-122, 3-123, 3-257, 3-260, 3-263, 3-265, 3-267, 3-274
Fish, 3-19, 3-35, 3-40, 3-75, 3-78, 3-84, 3-89, 3-94, 3-95, 3-164, 3-277, 3-280, 3-304
Floodplains, 3-26, 3-29, 3-30
Frankton Road, 3-186, 3-193, 3-209
Geologic Hazards, 3-8
Geology, 3-1, 3-3
gnome plant, 3-47, 3-82
golden chinquapin, 3-42
golden eagle, 3-47, 3-50, 3-68, 3-82, 3-86
grand fir, 3-35, 3-38
Grass-Forb Stand, 3-37, 3-39, 3-80, 3-81
Greenhouse Gases, 3-17
Groundwater, 3-26, 3-28, 3-29, 3-298
Habitat Conservation Plans, 3-61
Habitat Types, 3-39, 3-79, 3-80, 3-81
Habitats, 3-37, 3-40, 3-72, 3-85, 3-94, 3-95
Hazardous Materials, 3-108
Historical Activity Centers, 3-56
Hood River Valley, 3-3
Housing, 3-270, 3-278, 3-281
Husum, 3-103, 3-149, 3-154, 3-180, 3-184, 3-193, 3-207, 3-217
I-84 Eastbound, 3-186, 3-193, 3-208
I-84 Westbound, 3-185, 3-193, 3-208
Ice Throw, 3-109, 3-113, 3-123
IMPACTS, 3-10
Impacts, 3-229
Infrasound, 3-144, 3-146, 3-147
Interconnection, 1-8, 1-11, 1-24
Interconnection, 2-7
Keen's myotis, 3-47, 3-49, 3-65, 3-82
kilovolt, 1-4
Klickitat County, 1-6, 1-7, 1-20, 1-34, 1-40, 1-43
Koberg Park, 3-185, 3-193, 3-208
Land Use Plan, 3-155, 3-167
Land Use Regulations, 3-153, 3-167
Landslides, 3-8, 3-12
Law Enforcement, 3-104, 3-257, 3-260, 3-263, 3-317
Liquefaction, 3-11
Little White Salmon River, 3-1, 3-26, 3-35, 3-36, 3-75, 3-78, 3-217, 3-219, 3-220, 3-223, 3-247, 3-298
Local Landscape Setting, 3-178
Low Frequency Noise, 3-129, 3-147
Low Frequency Sound, 3-141
Mammals, 3-75, 3-84, 3-89, 3-92
Managed Owl Conservation Area, 3-60
Maple Street, 3-240, 3-242, 3-244
Mill A, 3-103, 3-105, 3-108, 3-110, 3-130, 3-148, 3-185, 3-190, 3-193, 3-208, 3-219, 3-258, 3-259, 3-260, 3-261, 3-263, 3-270
Mitigation Measures, 3-13, 3-24, 3-31, 3-90, 3-101, 3-117, 3-120, 3-169, 3-170, 3-211, 3-255, 3-265, 3-285
nacelle, 3-116
National Environmental Policy Act (NEPA), 1-1
National Historic Preservation Act (NHPA), 3-213

National Register of Historic Places (NRHP), 3-213
Natural Resources, 3-5, 3-15, 3-34, 3-59, 3-96, 3-105, 3-122, 3-123, 3-154, 3-232, 3-267, 3-274, 3-306
Night Lighting, 3-210
Nighttime Operational Noise, 3-139
nitrogen oxide emissions, 3-23
No Action Alternative, 1-13, 1-24, 1-41
Noise Limits, 3-126, 3-128
Noise Receivers, 3-130
North Bonneville-Midway 230-kV transmission line, 2-2, 2-7, 2-25
northern goshawk, 3-35, 3-47, 3-49, 3-50, 3-51, 3-65, 3-68, 3-72, 3-82, 3-86, 3-87, 3-91, 3-94
northern spotted owl, 3-35, 3-36, 3-47, 3-51, 3-52, 3-54, 3-56, 3-59, 3-60, 3-82, 3-86, 3-91, 3-93, 3-94
Noxious Weeds, 3-78, 3-84, 3-89, 3-299
Occupational Safety and Health Administration, 3-113, 3-129
Odor, 3-22
olive-sided flycatcher, 3-47, 3-82, 3-87
Operations and Maintenance Facility, 1-11, 1-24, 1-29
Operations and Maintenance, 2-2, 2-5, 2-6, 2-8, 2-9, 2-11, 2-16, 2-25
Oregon white oak/Idaho fescue, 3-42
Oversize Motor Vehicles, 3-244
Pacific dogwood, 3-36, 3-38
phantom orchid, 3-47, 3-82
pileated woodpecker, 3-47, 3-62, 3-68, 3-82
Police Department, 3-105
Project Decomissioning, 2-21
Project Operation, 2-16
Proposed Action, 1-9, 1-16, 1-29, 1-41
Providence Hospital Hood River, 3-187
Public and Private Water Supplies, 3-26, 3-29, 3-30
Public Finance and Fiscal Conditions, 3-273
Pucker Huddle, 3-180, 3-193, 3-207
Rail Transportation, 3-242
Rare Plant, 3-34, 3-42, 3-92, 3-95
RECREATION, 3-147
Regional Landscape Setting, 3-177
Releases to the Environment, 3-110
Renewable Energy, 1-4
Riparian Deciduous Forest, 3-39, 3-80, 3-81
River Transportation, 3-242
Saddleback Mountain, 2-2
Sales Tax Revenue, 3-278
Scenic Quality Assessment, 3-172, 3-193
Schools, 3-103, 3-258, 3-261, 3-263
SDS Lumber Company, 1-6
Settlement, 3-11, 3-220
Shadow Flicker, 3-109, 3-114
Siskiyou false hellebore, 3-42
Site Certificate, 2-1, 2-14, 2-21, 2-28
Skamania County, Washington, 1-1, 1-9
socioeconomics, 3-267
Soil Erosion Potential, 3-5
Soil Types, 3-5
Southern Washington Cascades Province, 3-35, 3-39
Special Status Plant Species, 3-42, 3-82, 3-85
Special Status Wildlife Species, 3-47, 3-82, 3-85
Spotted Owl Special Emphasis Area, 3-61
Substation, 1-11
Suksdorf's desert parsley, 3-42
sulfur dioxide emissions, 3-23
Surface Rupture, 3-11
Surface Water, 3-25, 3-28, 3-29
the Applicant, 1-1, 1-3, 1-4, 1-6, 1-7, 1-8, 1-9, 1-12, 1-13, 1-14, 1-15, 1-16, 1-17, 1-18, 1-20, 1-23, 1-25, 1-27, 1-28
Threatened, 3-42, 3-49, 3-94
timber, 3-23, 3-36, 3-37, 3-39, 3-75, 3-80, 3-91, 3-99, 3-113, 3-114, 3-128, 3-148, 3-155, 3-162, 3-168, 3-170, 3-178, 3-184, 3-185, 3-211, 3-219, 3-220, 3-221, 3-223, 3-225, 3-272, 3-281, 3-283, 3-288, 3-298, 3-299, 3-306
Topography, 3-1, 3-11, 3-35
Townsend's big-eared bat, 3-47, 3-49, 3-66, 3-82
Traditional Cultural Resources, 3-221
traffic accidents, 3-102, 3-109, 3-110, 3-111, 3-117, 3-121
Traffic Safety, 3-239
Traffic Volumes, 3-234

Traffic, 3-109, 3-111, 3-121, 3-181, 3-234, 3-238, 3-239, 3-248, 3-249, 3-250, 3-252, 3-254, 3-256
Transmission, 1-4, 1-6, 1-24
Transportation Improvements, 3-241
Transportation Plans, 3-241
Tribal Consultation, 3-221
Turbine Structural Failure, 3-109
Turbines, 3-123, 3-146, 3-147, 3-188, 3-190
Unavoidable Adverse Impacts, 1-37
US Fish and Wildlife Service, 1-21, 1-22
USFWS, 3-35, 3-42, 3-50, 3-51, 3-54, 3-55, 3-56, 3-59, 3-60, 3-61, 3-82, 3-86, 3-91, 3-94
Utilities, 3-102, 3-119, 3-257, 3-258, 3-262, 3-264, 3-274, 3-277, 3-280, 3-313
Vandalism, 3-108, 3-111
Vaux's swift, 3-47, 3-49, 3-62, 3-68, 3-71, 3-82, 3-83
Viento State Park, 3-154, 3-186, 3-193, 3-209
Viewpoints, 3-179
visual impact assessment, 3-171, 3-188, 3-190
visual impacts, 3-166, 3-170, 3-171, 3-172, 3-174, 3-175, 3-188, 3-190, 3-192, 3-211, 3-293, 3-308, 3-309
Visual Sensitivity Assessment, 3-173
Visual Simulations, 3-175
Visual, 3-166, 3-169, 3-170, 3-171, 3-172, 3-173, 3-175, 3-176, 3-188, 3-193, 3-211, 3-212, 3-308
Volcanic Eruption, 3-10
Washington Department of Ecology, 1-8
Washington Department of Fish and Wildlife, 3-35, 3-40, 3-94, 3-95
Washington Maximum Permissible Sound Levels, 3-128
Washington Natural Heritage Program, 3-35, 3-42, 3-95
Washington State Department of Transportation, 2-30
Washington State Energy Facility Site Evaluation Council (EFSEC), 1-1
West Pit Road, 3-10, 3-26, 3-28, 3-39, 3-47, 3-78, 3-80, 3-84, 3-108, 3-165, 3-166, 3-167, 3-168, 3-169, 3-178, 3-189, 3-214, 3-234, 3-243, 3-247, 3-260, 3-264, 3-270
western gray squirrel, 3-35, 3-47, 3-62, 3-65, 3-75, 3-82, 3-83, 3-94
Wetland Delineation, 3-34, 3-92
Wetlands, 3-28, 3-42, 3-81, 3-85, 3-298, 3-299
Whistling Ridge Energy LLC, 1-1, 1-6, 1-28, 1-30, 1-32, 1-33, 1-33, 1-34
Whistling Ridge Energy Project, 1-1, 1-3, 1-4, 1-6, 1-7, 1-8, 1-9, 1-13, 1-16, 1-17, 1-39, 1-40, 1-41, 1-42
White Salmon River, 3-1, 3-26, 3-49, 3-75, 3-78, 3-148, 3-149, 3-216, 3-217, 3-218, 3-219, 3-220, 3-223, 3-231
white-top aster, 3-42
Willard Road, 3-234
Willard, 3-148, 3-165, 3-184, 3-185, 3-193, 3-207, 3-219, 3-220, 3-223, 3-234, 3-243, 3-247, 3-258, 3-259, 3-260, 3-270, 3-272
Wind Turbines, 1-10
wind turbines, 2-1, 2-2, 2-6, 2-8, 2-16, 2-17, 2-23, 2-24, 2-25

ENERGY FACILITY SITE EVALUATION COUNCIL
August 2011

Whistling Ridge Energy Project

Final Environmental Impact Statement

Appendices A-B

August 2011



Washington State Environmental Policy Act Lead Agency:
State of Washington, Energy Facility Site Evaluation Council

Appendix A

Application for Site Certification
as amended October 12, 2009

Whistling Ridge Energy Project

Application for Site Certification Agreement

Submitted to

Washington Energy Facility Site Evaluation Council

Application 2009-01

Whistling Ridge
ENERGY PROJECT

Submitted March 10, 2009
Amended October 12, 2009

PLEASE NOTE: Both original and revised application sections are included on this CD. Originial application sections have a footer dated March 10, 2009. Revised sections have a footer dated October 12, 2009.

Revised application sections include:

Table of Contents
Introduction
2.1 Site Description
2.2 Legal Description and Ownership Interests
2.3 Construction on Site
2.12 Construction and Operation Activities
2.14 Construction Methodology
2.17 Study Schedules
2.19 Analysis of Alternatives
2.20 Pertinent, Federal, State and Local Regulations
3.1 Earth
3.3 Water
3.4 Habitat, Vegetation, Fish and Wildlife
3.5 Wetlands
3.6 Energy and Natural Resources
4.2 Land and Shoreline Use
4.3 Transportation

Whistling Ridge
ENERGY PROJECT

October 12, 2009

Mr. Jim Luce, Chair
Washington Energy Facility Site Evaluation Council
905 Plum Street SE, Third Floor
P. O. Box 43172
Olympia, Washington 98504-3172

Subject: **SUBMITTAL OF AMENDED APPLICATION 2009-01**
WHISTLING RIDGE ENERGY PROJECT
SKAMANIA COUNTY, WASHINGTON

Dear Mr. Luce:

Whistling Ridge Energy LLC hereby submits an Amendment to our Application 2009-01 for Site Certification for construction and operation of the Whistling Ridge Energy Project.

The primary revision is the change in site access. We are no longer proposing to use forest service road CG 2930 through the Columbia River Gorge National Scenic Area (CRGNSA). Instead site access is proposed from SR 14 to Cook-Underwood Road, to Willard Road, and then to West Pit Road. West Pit Road is an existing forest road that connects to the western boundary of the project site. West Pit Road is located entirely outside of the CRGNSA and would require some widening. Construction impacts are similar to those already described in the application for project access. No roadway improvements would be required to roads within the CRGNSA.

In addition to the change in road access description and associated roadway lengths, we have made 6 other minor changes to the Application:

- The size of the maintenance and operations yard has been increased from 2 acres to approximately 5 acres.
- A second alternative location has been included for the maintenance and operation yard along the new access road.
- The construction schedule in Section 2.12 has been updated to reflect a later decision date by the Governor, and therefore a later start to construction and operation.
- The zoning for the southern portion of turbine string A has been corrected from R-10 to For/Ag-20 based on testimony from Skamania County during the land use hearing.
- The recreation section has been corrected to add the location of two national trails, the Lewis and Clark National Historical Trail and the Oregon Pioneer National Historic Trail. As pointed out by the National Park Service in their EIS comment letter, both are located within five miles of the proposed facility. These trails roughly follow Highway 14 and Interstate 84, respectively.

The amendment package includes only those sections of the Application that have been revised and is intended to be an errata package to the existing application. Only those sections that have been changed would be replaced.

To assist the reviewers in inserting the amendment package, we have included a listing of the sections as an attachment to this letter. We have also marked the revised text using a strike-out and underline format along with a vertical line in the left hand margin. Text that is not marked as a change is identical to that shown in the March 2009 Application. The vast majority of the revisions result from the new access roadway.

The Amendment to the Application being submitted has been prepared in compliance with the regulations found in Section 463-60 of the Washington Administrative Code. The submittal includes:

(1) Sixty-five (65) copies of the Amendment
(2) Twenty (20) copies of the Amendment in electronic format (Adobe .pdf format)

The Amendment was prepared jointly by Whistling Ridge Energy LLC and URS Corporation. Whistling Ridge Energy LLC hereby certifies that, to the best of our knowledge, all Energy Facility Site Evaluation Council requirements have been reviewed, that the data has been prepared by qualified professional personnel, and the Amended Application is substantially complete.

As stated in Section 1.2, Designation of Agent, in the Application, Mr. Jason Spadaro and Mr. Allen Barkley will continue to serve as the primary points of contact during the review process, along with our legal counsel. Our project team remains ready to meet with you to discuss the application and its review process at your convenience.

Sincerely,

Jason Spadaro, President
Whistling Ridge Energy LLC

P.O. Box 266
Bingen, WA 98605
Tel: (509) 493-6103
Cell: (541) 490-5013
Fax: (509) 493-2535

Instructions for inserting Amendments into Application 2009-01

PLEASE NOTE: Only revised application sections are included in this package. Please retain unchanged sections, and replace only those sections that are included herein.

Application Section #	Section Title	Revised or Not
	Table of Contents	**Revised – please replace**
	Introduction	**Revised – please replace**
1.1	Description of Application	*Not revised – retain existing*
1.2	Designation of Agent	*Not revised – retain existing*
1.3	Assurances	*Not revised – retain existing*
1.4	Mitigation Measures	*Not revised – retain existing*
1.5	Sources of Information	*Not revised – retain existing*
2.1	**Site Description**	**Revised – please replace**
2.2	**Legal Description and Ownership Interests**	**Revised – please replace**
2.3	**Construction on Site**	**Revised – please replace**
2.4	Energy Transmission Systems	*Not revised – retain existing*
2.5	Water Supply	*Not revised – retain existing*
2.6	System of Heat Dissipation	*Not revised – retain existing*
2.7	Characteristics of Aquatic Discharge System	*Not revised – retain existing*
2.8	Wastewater Treatment	*Not revised – retain existing*
2.9	Spillage Prevention and Control	*Not revised – retain existing*
2.10	Surface Water Runoff	*Not revised – retain existing*
2.11	Emission Control	*Not revised – retain existing*
2.12	**Construction and Operation Activities**	**Revised – please replace**
2.13	Construction Management	*Not revised – retain existing*
2.14	**Construction Methodology**	**Revised – please replace**
2.15	Protection for Natural Hazards	*Not revised – retain existing*
2.16	Security Concerns	*Not revised – retain existing*
2.17	**Study Schedules**	**Revised – please replace**
2.18	Potential for Future Activities at the Site	*Not revised – retain existing*
2.19	**Analysis of Alternatives**	**Revised – please replace**
2.20	**Pertinent, Federal, State and Local Regulations**	**Revised – please replace**
3.1	**Earth**	**Revised – please replace**
3.2	Air	*Not revised – retain existing*
3.3	**Water**	**Revised – please replace**
3.4	**Habitat, Vegetation, Fish and Wildlife**	**Revised – please replace**
3.5	**Wetlands**	**Revised – please replace**
3.6	**Energy and Natural Resources**	**Revised – please replace**
4.1	Environmental Health	*Not revised – retain existing*
4.2	**Land and Shoreline Use**	**Revised – please replace pages 4.2-1 through 4.2-24**
	NOTE: Revisions are only made to pages 4.2-1 through 4.2-24, and to 4.2-73 to the end of the section – please REPLACE those portions with the new sections and RETAIN pages 4.2-25 through 4.2-72	**Retain pages 4.2-25 through 4.2-72**
		Revised – please replace pages 4.2-73 through to the end of section 4.2
4.3	**Transportation**	**Revised – please replace**
4.4	Socioeconomics	*Not revised – retain existing*
5.1	Air Emissions	*Not revised – retain existing*
5.2	Wastewater/Storm Water Discharge Permit Applications	*Not revised – retain existing*

TABLE OF CONTENTS

INTRODUCTION

PART 1 GENERAL

SECTION 1.1 DESCRIPTION OF APPLICANT 1.1-1
- 1.1.1 Applicant 1.1-1
- 1.1.2 Whistling Ridge Energy LLC 1.1-1
- 1.1.3 SDS Lumber Company and S.D.S. Co., LLC 1.1-1
- 1.1.4 Broughton Lumber Company 1.1-2

SECTION 1.2 DESIGNATION OF AGENT 1.2-1

SECTION 1.3 ASSURANCES 1.3-1
- 1.3.1 Insurance 1.3-1
- 1.3.2 Environmental Impairment 1.3-2
- 1.3.3 Site Closure Bond 1.3-2

SECTION 1.4 MITIGATION MEASURES 1.4-1
- 1.4.1 Mitigation Measures 1.4-1
- 1.4.2 Fair Treatment 1.4-12

SECTION 1.5 SOURCES OF INFORMATION 1.5-1
- 1.5.1 Introduction 1.5-1
- 1.5.2 Section 2.1, Site Description 1.5-2
- 1.5.3 Section 2.3, Construction on Site 1.5-2
- 1.5.4 Section 2.14, Construction Methodology 1.5-2
- 1.5.5 Section 2.15, Protection From Natural Hazards 1.5-3
- 1.5.6 Section 2.19, Analysis of Alternatives 1.5-4
- 1.5.7 Section 3.1, Earth 1.5-4
- 1.5.8 Section 3.2, Air 1.5-7
- 1.5.9 Section 3.3, Water 1.5-7
- 1.5.10 Section 3.4, Habitat, Vegetation, Fish and Wildlife 1.5-7
- 1.5.11 Section 3.5, Wetlands and Other Jurisdictional Waters 1.5-9
- 1.5.12 Section 3.6, Energy and Natural Resources 1.5-9
- 1.5.13 Section 4.1, Environmental Health 1.5-10
- 1.5.14 Section 4.2, Land and Shoreline Use 1.5-10
- 1.5.15 Section 4.3, Transportation 1.5-11
- 1.5.16 Section 4.4, Socioeconomic Impact 1.5-11

PART 2 PROPOSAL

SECTION 2.1 SITE DESCRIPTION 2.1-1
- 2.1.1 Location of Whistling Ridge Energy Project 2.1-1
- 2.1.2 Prominent Geographic Features 2.1-4
- 2.1.3 Typical Geological and Climatological Characteristics 2.1-4
- 2.1.4 Land Use Plans and Zoning Ordinances 2.1-6

TABLE OF CONTENTS
Cont'd

SECTION 2.2 LEGAL DESCRIPTIONS AND OWNERSHIP INTERESTS 2.2-1
- 2.2.1 Introduction 2.2-1
- 2.2.2 Legal Description of Property 2.2-1
- 2.2.3 Legal Description of Alternative Maintenance and Operation Facility ... 2.2-2

SECTION 2.3 CONSTRUCTION ON SITE 2.3-1
- 2.3.1 Whistling Ridge Energy Project Summary 2.3-1
- 2.3.2 Project Overview 2.3-1
- 2.3.3 Project Components 2.3-3
- 2.3.4 Transmission Interconnection 2.3-6
- 2.3.5 Construction 2.3-7
- 2.3.6 Forest Harvest 2.3-9
- 2.3.7 Decommissioning 2.3-12
- 2.3.8 Capital and Operating Costs 2.3-12

SECTION 2.4 ENERGY TRANSMISSION SYSTEMS 2.4-1

SECTION 2.5 WATER SUPPLY SYSTEM 2.5-1
- 2.5.1 Water Intake and Conveyance Facilities 2.5-1
- 2.5.2 Water Supply and Usage Alternatives 2.5-1
- 2.5.3 Water Rights and Authorizations 2.5-1
- 2.5.4 Process Water 2.5-1
- 2.5.5 Potable Water 2.5-2
- 2.5.6 Mitigation Measures 2.5-2

SECTION 2.6 SYSTEM OF HEAT DISSIPATION 2.6-1

SECTION 2.7 CHARACTERISTICS OF AQUATIC DISCHARGE SYSTEMS 2.7-1

SECTION 2.8 WASTEWATER TREATMENT 2.8-1

SECTION 2.9 SPILLAGE PREVENTION AND CONTROL 2.9-1
- 2.9.1 Purpose and Scope 2.9-1
- 2.9.2 Spill Prevention Plan 2.9-1

SECTION 2.10 SURFACE WATER RUNOFF 2.10-1
- 2.10.1 Stormwater Erosion Control During Construction 2.10-1
- 2.10.2 Permanent Stormwater Management 2.10-4
- 2.10.3 Permanent Waterways 2.10-7

SECTION 2.11 EMISSION CONTROL 2.11-1
- 2.11.1 Introduction 2.11-1
- 2.11.2 Construction 2.11-1
- 2.11.3 Operation 2.11-1
- 2.11.4 Mitigation 2.11-2

SECTION 2.12 CONSTRUCTION AND OPERATION ACTIVITIES 2.12-1
- 2.12.1 Introduction 2.12-1
- 2.12.2 Construction Schedule and Milestones 2.12-1
- 2.12.3 Construction Workforce 2.12-2
- 2.12.4 Operation 2.12-3

TABLE OF CONTENTS
Cont'd

SECTION 2.13 CONSTRUCTION MANAGEMENT 2.13-1
2.13.1 Construction Management Organization 2.13-1
2.13.2 Safety Program 2.13-3
2.13.3 Environmental Protection Program 2.13-3
2.13.4 Training Programs 2.13-4
2.13.5 Quality Control Systems and Record Keeping 2.13-5

SECTION 2.14 CONSTRUCTION METHODOLOGY 2.14-1
2.14.1 Construction Summary 2.14-1
2.14.2 Site Preparation and Road Construction 2.14-2
2.14.3 Foundation Construction 2.14-3
2.14.4 Electrical Collection System Construction 2.14-4
2.14.5 Wind Turbine Assembly and Installation 2.14-5
2.14.6 Startup Testing 2.14-5
2.14.7 Project Construction Clean-Up 2.14-5

SECTION 2.15 PROTECTION FROM NATURAL HAZARDS 2.15-1
2.15.1 Introduction 2.15-1
2.15.2 Earthquake Hazard 2.15-1
2.15.3 Slope Failure and Mass Wasting 2.15-4
2.15.4 Volcanic Eruption 2.15-7
2.15.5 Flooding 2.15-9

SECTION 2.16 SECURITY CONCERNS 2.16-1
2.16.1 Security Plan 2.16-1
2.16.2 Emergency Response Plan 2.16-2

SECTION 2.17 STUDY SCHEDULES 2.17-1
2.17.1 Introduction 2.17-1
2.17.2 Additional Studies 2.17-1

SECTION 2.18 POTENTIAL FOR FUTURE ACTIVITIES AT THE SITE 2.18-1
2.18.1 Expansion of Whistling Ridge Energy Project 2.18-1

SECTION 2.19 ANALYSIS OF ALTERNATIVES 2.19-1
2.19.1 Introduction 2.19-1
2.19.2 Site Selection 2.19-1
2.19.3 Electrical Transmission Routing Alternatives 2.19-2
2.19.4 Alternative Technologies and Fuel 2.19-3
2.19.5 Alternative Construction Access 2.19-3
2.19.6 Alternative Haul Routes and Methods of Transport 2.19-4
2.19.7 Alternative Site for Operations and Maintenance Facility 2.19-5
2.19.8 No Action Alternative 2.19-6

SECTION 2.20 PERTINENT FEDERAL, STATE AND LOCAL REQUIREMENTS 2.20-1
2.20.1 Applicable Federal, State and Local Permit Requirements 2.20-1
2.20.2 Federal Permits 2.20-3
2.20.3 State Permits 2.20-5
2.20.4 Skamania County 2.20-10

TABLE OF CONTENTS
Cont'd

PART 3 NATURAL ENVIRONMENT

SECTION 3.1 EARTH 3.1-1
- 3.1.1 Introduction 3.1-1
- 3.1.2 Geology 3.1-1
- 3.1.3 Seismicity 3.1-4
- 3.1.4 Soils 3.1-13
- 3.1.5 Topography 3.1-16
- 3.1.6 Unique Physical Features 3.1-19
- 3.1.7 Erosion/Enlargement of Land Area (Accretion) 3.1-21

SECTION 3.2 AIR QUALITY 3.2-1
- 3.2.1 Air Quality 3.2-1
- 3.2.2 Construction Emissions 3.2-1
- 3.2.3 Operation Emissions 3.2-2
- 3.2.4 Odor 3.2-2
- 3.2.5 Dust 3.2-2
- 3.2.6 Mitigation Measures 3.2-3

SECTION 3.3 WATER 3.3-1
- 3.3.1 Surface Water Resources (Movement/Quality/Quantity) 3.3-1
- 3.3.2 Runoff/Absorption 3.3-4
- 3.3.3 Floodplains 3.3-5
- 3.3.4 Groundwater Resources 3.3-5
- 3.3.5 Public and Private Water Supplies 3.3-7

SECTION 3.4 HABITAT, VEGETATION, FISH AND WILDLIFE 3.4-1
- 3.4.1 Habitat and Vegetation 3.4-1
- 3.4.2 Fish 3.4-13
- 3.4.3 Wildlife 3.4-15

SECTION 3.5 WETLANDS AND OTHER JURISDICTIONAL WATERS 3.5-1
- 3.5.1 Existing Conditions 3.5-1
- 3.5.2 Impacts 3.5-4
- 3.5.3 Mitigation Measures 3.5-4

SECTION 3.6 ENERGY AND NATURAL RESOURCES 3.6-1
- 3.6.1 Introduction 3.6-1
- 3.6.2 Energy Required 3.6-1
- 3.6.3 Source and Availability of Energy and Natural Resources 3.6-2
- 3.6.4 Nonrenewable Resources 3.6-2
- 3.6.5 Conservation and Renewable Resources 3.6-3
- 3.6.6 Scenic Resources 3.6-3
- 3.6.7 Mitigation Measures 3.6-3

PART 4 BUILT ENVIRONMENT

SECTION 4.1 ENVIRONMENTAL HEALTH 4.1-1
- 4.1.1 Noise 4.1-1
- 4.1.2 Risk of Fire or Explosion 4.1-17

TABLE OF CONTENTS
Cont'd

4.1.3 Releases or Potential Releases to the Environment Affecting Public Health 4.1-18
4.1.4 Safety Standards Compliance 4.1-19
4.1.5 Radiation Levels 4.1-21
4.1.6 Emergency Plans 4.1-21

SECTION 4.2 LAND AND SHORELINE USE 4.2-1
4.2.1 Land Use 4.2-1
4.2.2 Light and Glare 4.2-24
4.2.3 Aesthetics 4.2-27
4.2.4 Recreation 4.2-73
4.2.5 Historic and Cultural Preservation 4.2-79
4.2.6 Agricultural Crops/Animals 4.2-89

SECTION 4.3 TRANSPORTATION 4.3-1
4.3.1 Existing Conditions 4.3-1
4.3.2 Impacts 4.3-9
4.3.3 Mitigation Measures 4.3-23

SECTION 4.4 SOCIOECONOMIC IMPACT 4.4-1
4.4.1 Existing Conditions 4.4-1
4.4.2 Impacts 4.4-21
4.4.3 Mitigation 4.4-34

PART 5 APPLICATIONS FOR PERMITS AND AUTHORIZATIONS

SECTION 5.1 AIR EMISSIONS PERMITS AND AUTHORIZATIONS 5.1-1

SECTION 5.2 WASTEWATER AND STORMWATER DISCHARGE PERMIT APPLICATION 5.2-1
5.2.1 Wastewater Discharge 5.2-1

TABLE OF CONTENTS
Cont'd

List of Tables

1.4-1 Race and Sex Composition in the Project Vicinity, 2008 ..... 1.4-13
1.4-2 Population Living Below the Poverty Level 1.4-14

2.1-1 Area of Development 2.1-3
2.1-2 Summary of Access Roadway Improvements and Construction 2.1-4
2.9-1 Oils, Fuels and Hazardous Materials Anticipated to be Stored at the Whistling Ridge Energy Project Site 2.9-2
2.12-1 Proposed Project Construction Schedule 2.12-2
2.12-2 Construction Staff Breakdown 2.12-2
2.12-3 Construction Labor Resource Loading 2.12-3
2.12-4 Operations and Maintenance Staff Breakdown 2.12-3
2.15-1 2006 IBC Seismic Design Values 2.15-3
2.20-1 Applicable Federal, State, and Local Requirements 2.20-1
2.20-2 Skamania County Zoning and Comprehensive Plan Designations for Proposed Turbine Corridors 2.20-10

3.1-1 Largest Known Earthquakes Felt in Washington 3.1-8
3.4-1 Habitat Types within the Project Site 3.4-5
3.4-2 Noxious Weed Observations 3.4-9
3.4-3 Temporary Impacts from Project Elements to Habitat Types 3.4-11
3.4-4 Permanent Impacts from Project Elements to Habitat Types 3.4-11
3.4-5 Federal and State Status of Special Status Species with the Potential to Occur at the Whistling Ridge Energy Project Site 3.4-16

4.1-1 Sound Levels of Typical Noise Sources and Noise Environments 4.1.3
4.1-2 Short-Term Noise Measurement Data Summary 4.1-7
4.1-3 Long-Term Noise Measurement Data Summary 4.1-8
4.1-4 Average Ambient for ST1/LT1 Measurement Area 4.1-9
4.1-5 Class A EDNA Receiver Noise Limits 4.1-9
4.1-6 Construction Noise Levels at Receivers Closest to Project 4.1-11
4.1-7 Noise Model Sound Level Parameters 4.1-12
4.1-8 Operational Noise Impact Assessment, Nighttime – 6 m/sec 4.1-13
4.1-9 Operational Noise Impact Assessment, Nighttime – 9 m/sec 4.1-13
4.1-10 Operational Noise Impact Assessment, Daytime – 6 m/sec 4.1-13
4.1-11 Operational Noise Impact Assessment, Daytime – 9 m/sec 4.1-13
4.1-12 Fire and Explosion Risk Mitigation Plan 4.1-18
4.2-1 Populations of Counties and Incorporated Cities in the Vicinity of the Proposed Whistling Ridge Energy Project 4.2-4
4.2-2 Uses By Class Which Are, or May Be Authorized Subject to Standards in the R-10 and For/Ag 20 Zones Under Existing SCC Title 21 ..... 4.2-16
~~4.2-3 KVA Locations From Which the Road Improvement Area is Visible ..... 4.2-22~~
4.2-4 Landscape Scenic Quality Scale 4.2-29

TABLE OF CONTENTS
Cont'd

4.2-5 Summary of Existing Scenic Quality Assessment and Project Visual Impacts 4.2-67
4.2-6 Public Park and Recreation Facilities within 25 Miles 4.2-74
4.2-7 Prehistoric Cultural Sequence in the Project Vicinity 4.2-82
4.2-8 Previously Documented Cultural Resources in the Project Vicinity in Relation to the Project Area of Potential Effect 4.2-85
4.3-1 Estimated 2009 PM Peak Hour Traffic Volumes at SR 14 and Cook-Underwood Road 4.3-6
4.3-2 Level of Service Criteria for Two-Way-Stop-Control Intersections 4.3-7
4.3-3 Level of Service Summary Estimated 2009 Traffic Volumes at West and East Junctions of SR 14 and Cook-Underwood Road 4.3-7
4.3-4 Estimated 2011 and 2012 Traffic Volumes without the Project 4.3-8
4.3-5 Level of Service Summary Estimated 2011 and 2012 Traffic Volumes Without Project at Junctions of Cook-Underwood Road and SR 14 ..... 4.3-8
4.3-6 Road and Bridge Restrictions for Oversize Motor Vehicles on SR 14 ..... 4.3-11
4.3-7 Estimated Traffic Volumes during Construction 4.3-19
4.3-8 Level of Service Summary during Construction West Junction of Cook-Underwood Road and SR 14 ..... 4.3-20
4.3-8a Level of Service Summary during Construction East Junction of Cook-Underwood Road and SR 14 ..... 4.3-20
4.3-9 Estimated Traffic Volumes during Operation at Junctions of Cook-Underwood Road and SR 14 ..... 4.3-21
4.3-10 Level of Service Summary during Operation West Junction of Cook-Underwood Road and SR 14 ..... 4.3-22
4.3-10a Level of Service Summary during Operation East Junction of Cook-Underwood Road and SR 14 ..... 4.3-22
4.4-1 Population Distribution in the Project Vicinity 4.4-2
4.4-2 Population Age Distribution in the Project Vicinity, 2008 ..... 4.4-2
4.4-3 Race and Sex Composition in the Project Vicinity, 2008 ..... 4.4-3
4.4-4 Population Living Below the Poverty Level 4.4-4
4.4-5 Population Growth Trends and Projections for the Project Vicinity 4.4-5
4.4-6 Housing Characteristics in the Project Vicinity, 2000 and 2008 ..... 4.4-6
4.4-7 Housing Values 4.4-8
4.4-8 Temporary Lodging Units 4.4-8
4.4-9 Employment and Income Data for Skamania County, 2006 ..... 4.4-9
4.4-10 Employment and Income Data for Klickitat County, 2006 ..... 4.4-10
4.4-11 Employment and Income Data for Hood River County, 2006 ..... 4.4-11
4.4-12 Unemployment Trends 4.4-12
4.4-13 Major Employers in Skamania County 4.4-13
4.4-14 Skamania County General Fund, 2007 ..... 4.4-15
4.4-15 Breakdown of Taxing District No. 109 Millage Rate 4.4-16
4.4-16 Fire Departments in the Whistling Ridge Energy Project Vicinity 4.4-18
4.4-17 Police Department Staffing Levels in the Whistling Ridge Energy Project Vicinity 4.4-19
4.4-18 Ambulance Service Providers in the Whistling Ridge Energy Project Vicinity 4.4-19

TABLE OF CONTENTS
Cont'd

4.4-19 Enrollment Trends in the Whistling Ridge Energy Project Vicinity 4.4-20
4.4-20 Estimated Quarterly Construction Personnel..... 4.4-22
4.4-21 Average Power Plant Construction Workforce Composition, by Occupation 4.4-22
4.4-22 Economic Impacts of Construction..... 4.4-24
4.4-23 Economic Impacts of Operation 4.4-28

TABLE OF CONTENTS
Cont'd

List of Figures

2.1-1 Location of Proposed Whistling Ridge Energy Project 2.1-2
2.3-1 Proposed Project Elements 2.3-2
2.3-2 Current Forest Types 2.3-8
2.3-3 Harvesting Schedule 2.3-10
2.3-4 Turbine Timber Buffer 2.3-11
2.13-1 Project Construction Management Organizational Structure 2.13-2
2.15-1 Landslide Hazard Classifications 2.15-5
2.15-2 Annual Probability of ≥ 10 cm of Volcanic Ash 2.15-8
2.18-1 Potential Expansion Area 2.18-2

3.1-1 Site Geology 3.1-3
3.1-2 Tectonic Setting of the Cascadia Subduction Zone 3.1-5
3.1-3 Cascadia Subduction Zone 3.1-6
3.1-4 Epicenters and Dates of M ≥ 5.0 Pacific Northwest Earthquakes 3.1-7
3.1-5 Quaternary Faults and Seismic Source Zones in Northwest Oregon and Southwest Washington 3.1-12
3.1-6 Soil Classifications 3.1-14
3.1-7 Site Topography 3.1-18
3.3-1 Waterways in the Project Vicinity 3.3-2
3.4-1 Habitat Types, 2003 Survey 3.4-3
3.4-2 Habitat Types, 2009 Aerial 3.4-6
3.4-3 Rare Plant Surveys (2003 – 2006) 3.4-8
3.4-4 Location of Designated Critical Fish Habitat 3.4-14
3.4-5 Potential Spotted Owl Habitat Area 3.4-18
3.4-6 Northern Goshawk and Western Gray Squirrel Surveys 3.4-20
3.4-7 Location of Avian Surveys (Fall 2004) 3.4-23
3.4-8 Location of Avian Surveys (Spring 2006) 3.4-24
3.4-9 Location of Bat Acoustic Studies 3.4-27
3.5-1 Project Site Wetlands 3.5-2
3.5-2 Access Route NWI Wetlands 3.5-3

4.1-1 Noise Level Contours 4.1-5
4.2-1 Land Uses Within 25 Miles of Site 4.2-3
4.2-2 Comprehensive Plan Designations 4.2-7
4.2-3 Southwestern Klickitat County Land Use Designations 4.2-8
4.2-4 Skamania County Zoning 4.2-13
4.2-5 Locations of Simulation Viewpoints 4.2-35
4.2-6 Viewpoint 1 – Pucker Huddle 4.2-36
4.2-7 Viewpoint 2 – Strawberry Mountain 4.2-37
4.2-8 Viewpoint 3 – Husum 4.2-38
4.2-9 Viewpoint 4 – Ausplund Road and Cook-Underwood Road 4.2-39
4.2-10 Viewpoint 5 – Willard 4.2-40

TABLE OF CONTENTS
Cont'd

4.2-11 Viewpoint 7 – Mill A 4.2-41
4.2-12 Viewpoint 8 – Windance 4.2-42
4.2-13 Viewpoint 10 – Panorama Point 4.2-43
4.2-14 Viewpoint 11 – I-84 Westbound 4.2-44
4.2-15 Viewpoint 12 – Koberg Beach State Park 4.2-45
4.2-16 Viewpoint 13 – I-84 Eastbound 4.2-46
4.2-17 Viewpoint 14 – Viento State Park 4.2-47
4.2-18 Viewpoint 15 – Frankton Road 4.2-48
4.2-19 Viewpoint 16 – Fairview Road 4.2-49
4.2-20 Viewpoint 17 – Providence Hospital 4.2-50
4.2-21 Viewpoint 18 – Rosauers 4.2-51
4.2-22 Viewpoint 19 – Columbia River Highway 4.2-52
4.2-23 Viewpoint 20 – State Route 35 ..... 4.2-53
4.2-24 Viewpoint 21 – Kollock-Knapp and Scoggins Road 4.2-54
4.2-25 Viewpoint 22 – Cook-Underwood Road and King Road 4.2-55
4.2-26 Viewpoint 23 – Ausplund Road End 4.2-56
4.2-27 Recreational Facilities and Key Viewpoints Within Approximately 25 Miles 4.2-75
4.2-28 Area of Potential Effects 4.2-80
4.3-1 Project Site Roadway Network 4.3-2
4.3-2a Other Roads with Potential Impact 4.3-3
4.3-2b Other Roads with Potential Impact 4.3-4

TABLE OF CONTENTS
Cont'd

List of Appendices
(included on disk)

Appendix A Geotechnical Report
Appendix B Wildlife Reports
- B-1 CH2M HILL. No date on this document. Vegetation Technical Report: Saddleback Wind Project EIS, Skamania County, Washington.
- B-2 CH2M HILL (Peggy O'Neill). 2003. Rare Plant Survey Report: Saddleback Wind Project, Skamania County, Washington. Prepared for PPM Energy.
- B-3 Turnstone Environmental Consultants, Inc. 2004. Final Report: Northern Spotted Owl, Northern Goshawk, Western Gray Squirrel Survey Results Conducted for the Saddleback Wind Energy Project. Submitted to CH2M HILL.
- B-4 Turnstone Environmental Consultants, Inc. 2008. Final Report: Results of Northern Spotted Owl, Northern Goshawk, Western Gray Squirrel Surveys Conducted for the Saddleback Wind Energy Project. Prepared for SDS Lumber.
- B-5 WEST, Inc and Northwest Wildlife Consultants, Inc. 2005. Final Baseline Avian use of the Saddleback Wind Energy Project, Skamania County, Washington, Fall Migration 2004. Prepared for CH2M HILL.
- B-6 WEST, Inc and Northwest Wildlife Consultants, Inc. 2006. Baseline Avian use of the Saddleback Wind Energy Project, Skamania County, Washington, Fall Migration 2004 and Spring Breeding Season 2006. Prepared for CH2M HILL.
- B-7 WEST, Inc. 2007. Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, August 20 – October 21, 2007. Prepared for SDS Lumber Company.
- B-8 WEST, Inc. 2009. Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, July 3 – October 7, 2008. Prepared for SDS Lumber Company.

Appendix C Wetlands Report
Appendix D Representative Health and Safety Codes
Appendix E Proposed Skamania Zoning Code
Appendix F Tribal Consultation

List of Acronyms

A

AADT	average annual daily traffic
aMW	average MW
Applicant	Whistling Ridge Energy LLC

B

BLM	Bureau of Land Management
BMPs	best management practices
BNSF	Burlington Northern Sante Fe
B&O	Business and Occupation
BP	before the present
BPA	Bonneville Power Administration
bgs	below ground surface

C

CFR	Code of Federal Regulations
CRBG	Columbia River Basalt Group
CSZ	Cascadia Subduction Zone
CRL 40	Commercial Resource Land 40
CWM	coarse woody material

D

dB	decibels
dBA	A-weighted decibels
dBG	G-weighted decibel
dbh	diameter at breast height
DTM	digital terrain model

E

Ecology	Washington State Department of Ecology
EDNA	environmental designations for noise abatement
EFSEC	Energy Facility Site Evaluation Council
EIS	environmental impact statement
EPA	Environmental Protection Agency
EPC	Engineering, Procurement, and Construction
ESA	Endangered Species Act

F

°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FCRTS	Federal Columbia River Transmission System
FEMA	Federal Emergency Management Agency
FL 20	Forest Land 20

TABLE OF CONTENTS
Cont'd

For/Ag-20	Resource Protection
FPA/N	Forest Practices Application/Notification

G

gpd	gallons per day
GMA	General Management Area
GMA Ag-1	GMA large-scale agricultural
GMA F-1	commercial forest

H

H	horizontal
HCS+	Highway Capacity Software Plus
Hz	hertz

I

I	interstate
IBC	International Building Code

K

kV	kilovolt
KVA	key viewing areas

L

L_{10}	noise levels equaled or exceeded 10 percent of the measured time interval
L_{50}	noise levels equaled or exceeded 50 percent of the measured time interval
L_{90}	noise levels equaled or exceeded 90 percent of the measured time interval
L_{dn}	day-night average sound level
L_{eq}	equivalent sound level
L_{max}	maximum equivalent sound level
L_{min}	minimum equivalent sound level
LHA	landslide hazard area
LOS	level of service

M

M	magnitude
mm/yr	millimeters per year
MP	milepost
mph	miles per hour
msl	mean sea level
M_w	moment magnitude
MW	megawatt

N

NAAQS	National Ambient Air Quality Standards

NAT	Natural
NOI	notice of intent
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Services

P

µPa	micropascals
project area	the area within the project boundary
project site	the area within the project boundary and the surrounding area
PSD	Prevention of Significant Deterioration
PUD	Public Utility District
PWL	sound power level

Q

QA/QC	quality assurance/quality control

R

R-10	Residential 10
RCW	Revised Code of Washington
RES-20	Rural Estates 20
rpm	revolutions per minute
RV	recreational vehicle

S

SCADA	supervisory control and data acquisition
SCC	Skamania County Code
Scenic Area	Columbia River Gorge National Scenic Area
SCFD3	Skamania County Fire District No. 3
SEPA	State Environmental Policy Act
SMA	Special Management Area
SPCC	spill prevention, control, and countermeasure
SPL	sound pressure level
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan

T

TCP	traditional cultural properties
TECI	Turnstone Environmental Consultants
TMP	Transportation Management Plan
Turbine string	a series of turbines in a row; spaced approximately 350 to 800 apart

U

UNM	Unmapped

USC	United States Code
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey

V

V	vertical
vpd	vehicles per day

W

WAC	Washington Administrative Code
WAVE	Water Availability Verification Evaluation
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WEST	Western Ecosystems Technology
WFPA	Washington Forest Practices Act
WNHP	Washington Natural Heritage Program
WSDOT	Washington State Department of Transportation

INTRODUCTION

Whistling Ridge Energy LLC, a limited liability corporation operating in the State of Washington, seeks a Site Certification Agreement to construct and operate the approximately 75-megawatt (MW) Whistling Ridge Energy Project to generate electricity using wind turbine technology. The project would be constructed in south-central Washington on an approximately 1,152-site approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington. The project would be located on commercial forest land owned by S.D.S. Co., LLC and Broughton Lumber Company in an unincorporated area of Skamania County, outside of the Columbia Gorge National Scenic Area.

I.1 PROJECT SUMMARY

The Whistling Ridge Energy Project is intended to provide both a new source of non-polluting renewable energy in the State of Washington, and to provide much-needed economic development in Skamania County fully compatible with existing land use.

The Whistling Ridge Energy Project is designed to provide low-cost renewable electric energy to meet the growing needs of the Pacific Northwest. Located north of the Columbia Gorge, the project site has been selected primarily for its wind resource and its proximity to Bonneville Power Administration (BPA) power transmission lines, which traverse the site. The transmission lines have adequate capacity for the wind-generated power to be integrated into the power grid system, and the Applicant has made transmission and interconnection requests to BPA. The project site has the further advantage of being in proximity to the Vancouver/Portland metropolitan areas, with the capability of delivering cost-effective renewable energy to these growing communities.

Skamania County is entering its second decade of severe economic downturn, largely a result of the area's long dependence on timber harvests on public lands. Unlike urban counties with a diversity of businesses, Skamania County has been hard hit by the precipitous decline of timber harvest and associated revenues, and the pending sunset of federal timber payments created as mitigation for the impacts of enforcement of the Endangered Species Act. As described in Section 4.4 Socioeconomics, in 2006, employment in Skamania County averaged 3,116 jobs, of which 2,284 (73 percent) were held by wage and salary workers and 832 (27 percent) by merchants and sole proprietors. Place of work earnings (wages, salaries, and proprietors' earnings) accounted for approximately one-quarter of total personal income in the county, with income from property (dividends, interest, and rent) and transfer payments (mainly Social Security) making up the balance. The principal sources of employment were local government, accommodation and food services (tourism), federal government, and small scale manufacturing. The data available for this application does not reflect the current economic crisis that has greatly exacerbated Skamania County's already depressed economy rife with growing poverty, underemployment, and lost jobs.

The annual unemployment rate in Skamania County was 6.6 percent in 2007, and rose to 8.4 percent in 2008, before the full impact of the current recession took effect. Relative to the state as a whole, Washington unemployment rates in 2007 and 2008 were 4.5 percent and 5.5 percent, respectively, having risen from 5.0 percent in 2000 (WESD 2008). Per capita personal income in 2006 in Skamania County was $28,265, which was 74 percent of per capita personal income for the State of

Washington as a whole (BEA 2008). Median household income the same year (2006) was $39,476, or 70 percent of the same measure for Washington State as a whole ($56,184) (WOFM 2008). These statistics indicate relatively lower income in the area near the project when compared to other areas in Washington.

These current unemployment rates and trends and income levels not only reflect that the economy in Skamania County is more depressed than some other areas in Washington, but also that the current national economic slowdown that began in 2008 is affecting areas near the project. The 2008 annual unemployment rate in Skamania County was almost three percentage points higher than the state average, indicating a slow economy.

Fortunately, Skamania County has another natural resource, its winds, that can be developed to benefit local residents and the wider community.

The site on Whistling Ridge, located north of the Columbia River Gorge National Scenic Area and high above the Columbia Gorge, enjoys the same winds that have made the Gorge area a national center of wind power development. These are the same winds that draw wind surfers from around the world to wind swept reaches of the Columbia River near Hood River.

The proposed project site has been used for the last century for commercial forest operations. Most of the areas of the site identified for turbines have been forested recently in general conformance with established timber harvest schedules, and are connected by a network of existing forest roads.

Four major BPA high voltage transmission lines, located in two corridors, cross the site. A Williams Northwest natural gas pipeline is located on the northern edge, their natural compressor station is located to the west, and cellular towers and communications facilities are located nearby. Resource mining in the area has left rock pits in places. In short, the project site is heavily developed, includes no native habitat, and is permanently committed to its use as a utility corridor. The project, once developed, will be a highly compatible companion to sustainable forestry operations on the site, strengthening the landowners' capability to weather through economic cycles and to keep its 325 forestry and wood products personnel employed.

Approximately fifty 1.2 to 2.5 MW wind turbine generators would be placed on the site and connected to BPA's existing North Bonneville to Midway 230-kilovolt (kV) transmission line. The winds that traverse the site are robust, with high energy generation due to the well-understood, unique geographic features of the Columbia Gorge area. The site's potential ability to produce clean electricity so close to urban load, with ready access to transmission and minimal impacts to the natural environment, make it one of the premier as-yet undeveloped wind power sites in the Pacific Northwest.

I.2 DEMAND FOR ELECTRIC POWER IN THE PACIFIC NORTHWEST

Whistling Ridge Energy LLC is proposing to develop a reliable source of clean and cost-effective renewable electrical power in the Pacific Northwest. The Fifth Northwest Electric Power and Conservation Plan was issued by the Northwest Power and Conservation Council in May 2005. The Plan found that Northwest electricity demand was projected to grow at an average annual rate of nearly 1 percent per year, resulting in an over 5,000-MW deficit by 2025 using the medium forecast.

The Fifth Power Plan states that "*Renewable resources are also a priority resource in the Northwest Power Act. Like conservation, their potential and cost-effectiveness are sensitive to developing technology and the cost of more traditional generating alternatives… Renewables have potential risk reduction benefits related to their ability to hedge risks of fuel price volatility and the risks of possible measures to mitigate greenhouse gas emissions."*

The Washington Department of Community, Trade and Economic Development in recent reports to the Washington State Legislature has found that*: "…the region should begin an aggressive program to capture the large amount of cost-effective conservation that is available and to lay the groundwork for building a large amount of wind generation…"* (Washington CTED 2005).

More recently, state policy has been driven by the electorate's enactment of a Renewable Portfolio Standard that requires all but the state's smallest utilities to acquire new sources of renewable energy with which to supply consumers with clean electricity. This policy, mandated by the voters, resembles similar (though more aggressive) standards in Oregon and California, and has spurred active development of potential wind energy resources within the state to serve in-state utilities.

The Renewable Portfolio Standard, coupled with load growth in Washington's urban areas, has prompted investor-owned and public power utilities to seek new sources, most often developed by Independent Power Producers, to meet their resource goals.

According to the American Wind Energy Association, the power of the wind can be imposing. Winds capable of flagging trees, prohibiting crop cultivation or even, on occasion, blowing a semi-trailer truck off the road, can be harnessed to be a non-polluting, never-ending source of energy.

Wind power is a form of renewable energy—energy that is replenished daily by the sun. As the earth is heated by the sun, air rushes to fill the low pressure areas, creating wind power. The wind is slowed dramatically by friction as it brushes the ground and vegetation, so it may not feel very windy at ground level. The kinetic power in the wind, the energy of moving air molecules, may be five times greater at the height of a 40-story building (the height of the blade tip on a utility-scale wind turbine) than the breeze on your face. Meanwhile, the wind may be accelerated by certain types of land forms, so that certain areas of the country may be very windy while other areas are relatively calm. Since our country's founders tended to build our cities and towns where the wind doesn't blow strongly, the vast majority of people don't live in high-wind areas. Yet, when wind power is converted to electricity, it can be sent long distances to serve the needs of the cities and towns where we live.

Wind power is converted to electricity by a wind turbine. In a typical, utility-scale wind turbine, the kinetic energy in the wind is converted to rotational motion by the rotor – typically a three-bladed assembly at the front of the wind turbine. The rotor turns a shaft that transfers the motion into the nacelle (the large housing at the top of a wind turbine tower). Inside the nacelle, the slowly rotating shaft enters a gearbox that greatly increases the rotational shaft speed. The output (high-speed) shaft is connected to a generator that converts the rotational movement into electricity at medium voltage (a few hundred volts). The electricity flows down heavy electric cables inside the tower to a transformer, which increases the voltage of the electric power to the distribution voltage (a few thousand volts). The distribution-higher voltage power flows through underground lines to a collection point where the power may be combined with other turbines. In many cases, the

electricity is sent to nearby farms, residences and towns where it is used. Otherwise, the distribution-voltage power is sent to a substation where the voltage is increased dramatically to transmission-voltage power (a few hundred thousand volts) and sent through very tall transmission lines many miles to distant cities and factories (AWEA 2007).

I.3 REDUCTION OF ENVIRONMENTAL IMPACTS

The project's location is intended to reduce or eliminate the environmental impacts that would occur if a similar project were to be construction on an undisturbed site:

- The site has been in commercial forest operation for over a century and the majority of the locations proposed for the wind turbines have recently been harvested and reforested, eliminating the need for large amounts of clearing for the purpose of locating a wind project. With this project, the site will remain in sustainable forestry operation.

- The site has existing forest roads that can be used with minimal widening for equipment delivery and for Operations and Maintenance, eliminating the need for new clearing. The site can be accessed from County roads via existing roads, requiring only minor improvements.

- The site is crossed by BPA's existing North Bonneville to Midway 230-kV transmission line, allowing direct connection through a substation, and eliminating the environmental impacts associated with the need to create a new high voltage transmission line.

- The site is situated in proximity to the Vancouver/Portland metropolitan area, and can provide a robust source of new clean energy to these markets.

- Unlike a fossil fueled power generation plant, wind energy produces no air emissions, and contributes no green house gas emissions

I.3.1 Water Use

The project would have minimal water needs. Small amounts of water would be used during construction for dust control. During operation, the only water needs are for the Operations and Maintenance staff. The staff of eight to nine employees would use less than 5,000 gallons per day for domestic purposes.

I.3.2 Transmission System

Whistling Ridge Energy LLC proposes to connect the project to the BPA electrical transmission grid. These transmission lines are outside the scope of this Application.

I.4 ELEMENTS OF THE PROJECT SUBMITTED FOR APPROVAL

The project submitted for review and approval under Chapter 80.50 Revised Code of Washington includes the following elements:

- An installed capacity of approximately 75 MW of electricity
- Up to fifty 1.2- to 2.5-MW wind turbines
- Electrical transformers
- 34.5 kV collector lines and systems (primarily underground)
- Permanent meteorological towers
- ~~An~~ Two alternative locations for an Operations and Maintenance facility
- A substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line
- Approximately 2.4 miles of newly-constructed and ~~7.2~~7.9 miles of improved roads to provide access to the wind turbine locations during construction and for Operations and Maintenance

In addition to Operations and Maintenance facilities, the project proposes temporary facilities, including construction phase laydown and storage/staging areas, rock crusher and portable concrete batch plant(s). If built, these facilities will be on site or along the access road to the site, minimizing the impacts on the surrounding roads. The project substation would be built on the project site adjacent to BPA's North Bonneville to Midway 230-kV transmission line, facilitating interconnection with the BPA grid. The proposed electrical interconnection to BPA will provide the access to the regional transmission grid for sales to the wholesale electric market. The development of the proposed interconnection requires a federal action, limited exclusively to the interconnection with the BPA grid.

I.5 SUMMARY OF ENVIRONMENTAL FINDINGS

The project has been planned and designed to eliminate or fully mitigate all environmental impacts. The following is a summary of the elements of the environmental in terms of project design and operation.

I.5.1 Geology, Soils, and Floodplains

The project would have minor and insignificant impacts on earth resources, as described in Section 3.1 of this Application. This includes excavation, grading, trenching, backfill, and compaction associated with site development, the wind turbine foundations, and roadway improvements.

Because surface soils on the project site are considered moderately susceptible to erosion, there is potential for adverse impacts on the site soil in areas of steep topography during grading and foundation construction activities. During the dry season, soils that are disturbed and stripped of vegetative cover may be susceptible to wind erosion. The potential for erosion by wind and water will be minimized through the use of erosion control measures outlined in Section 3.1.7.3 Mitigation Measures.

I.5.2 Air

Because the project uses wind technology to generate electricity, no impacts to air quality would be created during project operation.

During construction, there would be temporary and localized minor impacts from construction vehicle exhaust, similar in nature to those produced by any construction project that involves heavy equipment and transportation of materials to the project site. Construction of the project would produce limited odors associated with exhaust from diesel equipment and vehicles, fugitive dust emissions from construction-related traffic, and additional wind-blown dust as a result of ground disturbance. Whistling Ridge Energy LLC would implement an effective dust control program to minimize any potential disturbance from construction-related dust.

I.5.3 Water

Sections 2.10 Surface Water Runoff and 3.3 Water describe water discharges, water resources, and stormwater management. A Stormwater Pollution Prevention Plan would be prepared and implemented during construction to control the flow of stormwater.

No perennial streams are located in or adjacent to the Whistling Ridge Energy Project. Five drainage ways have been identified on site, ultimately draining to the east of the project site. Runoff is conveyed via these drainage way, and by additional ditches in the southwest portion of the site downslope to perennial streams outside the project site that eventually drain to the Columbia River.

The proposed access road, West Pit Road, crosses one unnamed drainage in the Lapham Creek watershed. This stream had observed flow through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to Lapham Creek. The planned improvements to West Pit Road would cross the unnamed drainage~~existing roads that would occur inside the Scenic Area would cross one intermittent stream~~. This ~~stream~~ drainage has no defined channel ~~and carries water only during runoff events~~downstream of the existing culvert. It is classified as a Class V stream under Skamania County Code 21.04.020(B). Buffers are established for Class V streams. However, expansion of existing uses is allowed within these water resource buffers. The road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold. For a full discussion of fish, wildlife, their habitats, and project impacts to these, please see Section 3.4. Additional details regarding water sources and pathways are identified in Section 3.3 Water and Section 3.5 Wetlands.

Project operations would not require the use of any water for cooling or any other use aside from the limited needs of the Operations and Maintenance facilities. There would be no industrial wastewater stream from the project beyond wastewater from the Operations and Maintenance building discharging to an on-site septic system. The anticipated use is expected to be less then 5,000 gallons per day for kitchen and bathroom use. Potable water intake would be in the form of a well accommodating the Operations and Maintenance facilities' needs.

I.5.4 Wetlands

No wetlands or wetland indicators were identified within the study area (the project site and ~~previously proposed~~ access roadways). One undelineated wetland is identified as occurring outside the study area perimeter west of turbines C1-C4 (see Figure 3.5-1, Project Site Wetlands in Section 3.5 Wetlands).[1]

A preliminary review of the National Wetland Inventory maps indicates wetlands occur along State Route (SR) 14 near White Salmon, Washington (Figure 3.5-2, Access Route NWI Wetlands in Section 3.5 Wetlands). As described in Section 4.3 Transportation, ~~only minor~~ no roadway improvements to SR 14 would ~~possibly~~ be required at the intersection of SR 14 and Cook-Underwood Road. No wetland impacts are anticipated to occur. The National Wetland Inventory does not show the presence of wetlands along the local secondary and forest roads proposed to be used by the project. As the National Wetland Inventory is based on historic aerial photography interpretations, a field investigation ~~will occur in spring~~conducted in 2009 ~~to~~ confirmed ~~whether or not~~that wetlands and other regulated waters of the US or the State ~~may~~ would not be impacted by the project.

I.5.5 Plants and Animals

Construction and operation of the Whistling Ridge Energy Project would require the removal of vegetation in some areas to accommodate roadway construction and improvement, turbine siting, staging, and construction. Because no rare plants were identified in the portion of project site surveyed to date, no project-related impacts on any federal- or Washington State-listed plant species are anticipated during construction or operation of the proposed project.

With the exception of the planned improvement to ~~existing roads~~West Pit Road that would cross one ~~intermittent stream~~unnamed drainage, no water bodies on the project site would be impacted. No impacts to aquatic species, their habitat, or designated critical habitat are expected as a result of construction and operation of the proposed facility. Water quality would be maintained during construction and operation of the project by incorporating best management practices.

Construction and operation of the Whistling Ridge Energy Project is expected to have limited impacts on wildlife resources. Project actions would include the construction of permanent roadways, improvement (i.e. widening and resurfacing) of existing roadway, and installation and operation of wind turbines. Impacts to wildlife habitat may result from vegetation removal in forested areas where the proposed roadway and turbine alignment is planned. Vegetation management in areas surrounding each turbine would range from complete removal of vegetation to limitations on tree height.

Three federally-listed or candidate species have the potential to occur within the project site, including northern spotted owl, western gray squirrel, and northern goshawk. Ongoing forest management on lands located within the proposed project site has reduced suitable habitat for these

[1] The wetland on the project site results from a constructed impoundment according to National Wetland Inventory maps and so is not regulated locally as a critical area according to Skamania County Code Title 21A.04.020(A)(1)(b).

species through fragmentation of mature forest stands.

Northern Spotted Owl. The spotted owl prefers forest habitats characterized by multi-layered canopy, and a high incidence of large trees that provide suitable structure for nesting and roosting. No late-seral forests are present within the project site. Further, no spotted owls have been detected in the proposed project site or spotted owl activity centers located in proximity to the proposed project. No impacts to northern spotted owls are expected.

Western Gray Squirrel. The gray squirrel prefers habitat where contiguous tree canopy allows arboreal travel in a minimum of a 198-foot (60-meter) radius around the nest (Ryan and Carey 1995). Contiguous forest habitat located on the project site would not persist indefinitely in the absence of the proposed project. The project site also contains very few oak trees, and those that were observed were of small stature (less than 20 feet tall), stunted, and growing in openings on exposed rocky slopes in shallow soils. Acorn crops from oak trees are an important food source for western gray squirrels, and the lack of this primary food source may deter use of the project site by gray squirrels. Because habitat for this species is considered rare or of moderate/poor quality on the project site, impacts to western gray squirrel are expected to be negligible.

Northern Goshawk. Goshawks inhabit a wide variety of forest habitats, including true fir, mixed conifer, montane riparian deciduous forest and Douglas fir forests. Goshawk nest sites tend to be associated with patches of relatively large, dense forest located in proximity to water; however, home ranges often consist of a wide range of forest age classes and conditions. Although no goshawks were detected during protocol surveys, individuals were spotted during general avian migration and breeding surveys. Potential impacts to this species may include turbine collision-related mortality or displacement; however, the risk for this species is considered low.

Potential operation-related impacts to avian species include turbine collision and displacement. The data collected from the project site indicate that the area is not within a major migratory pathway, at least during fall migration.

Based on the two seasons of surveys plus two season studies by Klickitat County (Kennedy Jenks 2003), overall use of the project site by golden eagle, northern goshawk, pileated woodpecker, prairie falcon, and willow flycatcher was very low. Adverse impacts to these species are not anticipated. Of the species that were commonly observed, turkey vultures have very low susceptibility to turbine collisions (Orloff and Flannery 1992). To date, this species has not been documented as a turbine fatality in the Pacific Northwest. Vaux's swifts, western bluebirds, and olive-sided flycatchers were commonly observed flying at rotor-swept heights, and some turbine-related mortality may occur for these species over the life of the project. These collisions would likely be rare, and it is unlikely that the Whistling Ridge Energy Project would have any negative impacts on population levels on and near the project site. Higher numbers of Vaux's swifts and western bluebirds were recorded during fall migration, whereas olive-sided flycatcher appears to primarily use the project site for breeding.

Waterfowl, waterbirds, and shorebirds were not observed using lands within the project site during this study, and mortality involving this group is expected to be rare.

Based on surveys conducted during high activity periods over two years, it is likely that some bat

mortality would occur during operation; however, mortality estimates are difficult due to our lack of understanding of why bats collide with wind turbines (Kunz et al. 2007, Baerwald et al. 2008). Data collected to date on species composition, activity patterns, and habitat use indicates that adverse impacts to bats are not anticipated as a result of the proposed project. Data collected during 2009 surveys will improve our understanding of bat use and activity patterns, and help to refine our assessment of the degree of impacts.

Mule deer, black-tailed deer, and elk may be displaced temporarily from winter range if the timing of construction activities coincides with use of these habitats. Construction-related displacement is expected to be of short duration. Because data on operational impacts to big game as a result of wind farm operation is limited, it is difficult to predict the impact of the proposed project on wildlife using priority habitats on the proposed project site. Additional coordination with Washington Departmen of Fish and Wildlife (WDFW) is ongoing, and will continue to address this resource.

I.5.6 Noise

The large distances between much of the project area and potentially affected residences, the temporary nature of construction, and the restriction of construction activities to daytime hours would serve to minimize potential noise impacts from construction activities. Based on the anticipated noise levels and the timing aspects of these impacts, construction noise impacts are expected to be insignificant.

The two nearest residences to the turbines are located 0.48 mile (2,560 feet) and 0.8 mile (4,265 feet) away. In addition, an application has been submitted for a new homesite that would be located approximately 0.38 mile (2,000 feet) from the nearest turbine. Existing noise levels range are 34 to 35 A-weighted decibels (dBA) at night, and 38 dBA during the daytime. With the project, night time noise levels could increase to 39 to 43 dBA, and 40 to 43 dBA during the day. These levels are considered to be low under applicable State standards.

I.5.7 Land Use

The project is consistent with existing and proposed zoning and comprehensive plan designations, and no impacts to land use are anticipated.

I.5.8 Visual Resources

The project has the potential to create low to moderate levels of visual impact at most key viewpoints. Selected viewpoints have been included in Section 4.2.3 Aesthetics of the Application that represent a variety and range of views in the project area. The photos used for the simulations show the worst-case seasonal conditions for visual contrast between the wind turbines and the primarily green and brown landscape backdrop. The period with the least visual contrast is anticipated to occur when there is snow cover and gray skies.

I.5.9 Recreation

It is expected that the project would not “unreasonably diminish the scenic, recreational, and fish

and wildlife values present in the area" (Wild and Scenic Rivers Act, 16 United States Code 1271-1287), so no impacts to wild and scenic rivers would occur. The project would not have a direct impact on any recreation area as measured by impairing access, diminishing use, or restricting planned installations and improvements. The project would affect the visual experience of visitors in some locations (see Figure 4.2-27 Key Recreation Viewing Areas and Recreational Facilities within Approximately 25 Miles). See 4.2.3 Aesthetics for more information about visual and aesthetic qualities and impacts.

I.5.10 Historic and Cultural Resources

No archaeological sites or historic properties were identified in the project area during the field inventory. All previously documented archaeological sites in the project vicinity are located well outside of the project area. Construction or operation of the proposed facilities would not result in impacts to known/recorded cultural resources. Traditional cultural properties are not known to exist in the project area and no impacts are anticipated.

I.5.11 Transportation

Access to the proposed project site would be provided through the existing County and private roadway network. Access to all proposed wind tower locations would require road improvements and limited new road construction within the project area. In addition to approximately ~~7.2~~7.9 miles of existing private logging roads that would require improvement, approximately 2.4 miles of new private gravel access roads would need to be constructed. The new gravel roadways would extend toward and run along the turbine strings, and would be designed and constructed according to the County private roadway standards. The new private roadways that extend toward the turbine strings would be designed for a minimum drivable section width of 25 feet with allowance for side slope and drainage.

The new private roadways that would run along or between the turbine strings would be designed for a minimum drivable section width of 25 feet with an additional 5-foot section on both sides to accommodate drainage and clearance for the project crane that will be on site to assemble the tower sections, the nacelles, and blades. None of the newly constructed roads would need to be paved, but they would require an all-weather driving surface.

During construction, there would be an average of 143 workers on site, and a maximum of 265 workers at the site daily. Estimated traffic volumes include existing local traffic, construction workers and vehicles, and over-size and over-weight trucks. Approximately 65 to 75 percent of the construction labor force would most likely be hired from the cities of Portland and Vancouver. Approximately 25 to 30 percent of the workers would likely be residents of Skamania, Klickitat, and Hood River counties. The respective percentages are based on the relative populations in the cities of Portland and Vancouver when compared to Skamania, Klickitat, and Hood River Counties. All construction workers are expected to commute up to approximately 60 miles each way daily to and from the proposed project site.

During the one-year construction period, there would be over-size and over-weight trucks transporting large wind energy components to the proposed project site throughout the day. Over-

size and over-weight trucks are only expected during an approximate two to three month period when the wind energy components are transported to the proposed project site. It is expected that during the AM peak hour, approximately 30 construction vehicles would travel through the junction of SR 14 and Cook-Underwood Road. During the afternoon peak hour, as many as 10 construction vehicles could travel through this junction.

Peak-hour LOS analyses were completed for the junction of SR 14 and Cook-Underwood Road using estimated ~~2010~~ 2011 traffic volumes. The results indicate that estimated ~~2010~~ 2011 traffic volumes, including construction vehicles, would have a minimal impact on the operations of the intersection of SR 14 and Cook-Underwood Road. Delays would increase slightly (approximately 4 to 5 seconds per vehicle) for vehicles turning left or right from Cook-Underwood Road over estimated ~~2008~~ 2009 operations. The southbound approach on Cook-Underwood Road at SR 14 ~~also~~ has ~~would experience degradation~~ degraded in level of service from A to B over estimated 2008 operations, and would remain at LOS B in 2011 with construction traffic..

I.5.12 Socioeconomics

The project would generate new local employment, additional business for local service and materials providers, and additional tax revenues to Skamania County and the state. The overall permanent socioeconomic impact of the project would be positive.

Construction

During the estimated one-year construction period (excluding engineering, design, specifications, and survey), approximately 330 full-time and part-time workers would be employed at some point during construction. Some of these jobs would not last the entire construction period. The on-site construction work force would peak at approximately 265 workers over the construction period and average 143 workers over the 12 months. Eight to nine permanent full- or part-time Operations and Maintenance staff would be required once the project is operational.

Whistling Ridge Energy Project local procurements[2] for construction materials, services and equipment leasing associated with construction are projected to total approximately $13.2 million. These procurements would augment the revenues of many construction-related businesses in Skamania County and the three-county area in general. In addition, the consumption spending of local project workers and their households out of their wages and salaries would stimulate the retail trade and services sector of the local and regional economies. Total payroll costs for project construction, including fringe benefits and other labor overhead costs, are projected to be approximately $18 million, of which approximately $4.5 million is expected to be earned in the three-county area including Skamania, Klickitat, and Hood River Counties.

An analysis of the primary and secondary effects of these construction spending streams within the three-county area reveals that indirect and induced value added from construction would be $3.9 million, and that 71 indirect and induced jobs would be attributable to construction. The total economic impact (direct, indirect, and induced) is expected to be $8.5 million in value added and

[2] Local procurements are procurements that would occur with the three-county area including Skamania, Klickitat, and Hood River Counties.

107 jobs (IMPLAN 2008). Project construction would create a total of 107 jobs in the three-county area, which would continue throughout the construction period.

The total cost of construction is estimated to be approximately $150 million. In addition to the local area procurements mentioned above, the Applicant would purchase large amounts of wind power generation equipment from various domestic and foreign suppliers. Depending on legislation currently under consideration in the state legislature, state sales and use tax may be levied only on procurements that are not directly related to electricity generation. Should the state sales tax exemption for wind power be extended, capital equipment such as turbines, transformers, transmission cables, and substation equipment would not be taxable.

The local procurements are estimated to be 10 percent of total procurements (approximately $13.2 million). The majority (estimated at 90 percent) of local procurements would be directly related to electricity generation. Taxable sales due to project construction would therefore be approximately $1.32 million, resulting in $92,400 in sales and use tax revenue for Washington State and Skamania County taxing districts.

The Skamania County sales and use tax rate for the unincorporated area is 7.0 percent, meaning that after the state government's share of 6.5 percent, a remaining 0.5 percent goes to the County. Due to the project's location within the unincorporated area of Skamania County, Skamania County would receive $6,600 of the $92,400 in sales and use tax revenues related to project construction. This one-time influx of revenue ($6,600) would represent an increase of one percent when compared to the sales and use tax collected in Skamania County during calendar year 2007 ($630,515) (WDOR 2008). These positive fiscal impacts to the County and the State would be a one-time occurrence resulting from project construction activities.

Modest increases in sales of goods and services would occur during construction, such as local purchases by construction workers. Sales tax revenues resulting from these types of purchases would be beneficial and small within the context of the Skamania County economy.

Operation

The estimated gross payroll (including fringe benefits and other payroll overheads) for the operational workforce is $1.5 million, or an average annual labor cost of $167,000 to $188,000 per employee. This is approximately 25 percent higher than the standard industrial wage for this industry in Skamania County (IMPLAN 2008). In addition to the regular operational workforce, a temporary workforce with appropriate skills would be utilized during major maintenance or other non-routine operational work.

Using IMPLAN regional economic modeling software for the power generation and supply industry in the three-county area including Skamania, Klickitat, and Hood River Counties, a wind power facility employing nine full-time workers would have a gross annual operating cost valued at approximately $3.75 million, which would include direct purchases from suppliers (including fuels, maintenance supplies and services, retail goods and professional services). Sales, use and other indirect business taxes on that level of spending are estimated at $200,000 (IMPLAN 2008) per year, which would accrue to state and local government jurisdictions. Employee spending from salaries and wages is estimated at around $900,000 per year, assuming an average local expenditure rate of

70 percent of compensation.

An increase in the tax base equal to the numbers of turbines multiplied by an estimated value of $1.75 million per turbine ($87.5 million) would represent an increase of 6.5 percent in assessed value in the County. Using the average property tax rate for Skamania County of $8.36/$1,000 assessed value (WDOR 2009), the increase in property tax revenue to the County would be $731,500 and would represent a permanent, annual increase of 7.6 percent compared to the amount of property tax collected (current and delinquent) in calendar year 2007 ($9.6 million) (WDOR 2008). Property tax revenues would be higher to the extent that increased wages and economic activity in the County results in higher valued properties.

These additional and permanent annual revenues could help satisfy the need for alternate funds to replace decreasing federal funding. Assuming that the annual tax revenue of $731,500 would be distributed among funds, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road fund ($115,035), and the Current Expense fund ($111,086). A portion of the State School Fund would be returned to Skamania County for Skamania County schools (L. Moore, personal communication).

I.5.13 Housing

The approximately 15 percent of the construction work force that would be specialized craftsmen originating outside of Washington and Oregon would likely have relatively short assignments, so few are expected to bring their families with them when they arrive to work on the project. The population increase in the project area and elsewhere in the three-county area would therefore be limited mainly to these workers for a temporary period of time, plus, during the work week, the non-local workers who would temporarily commute on a weekly basis from the Portland-Vancouver area.

The total estimated number of workers requiring transient housing would be 52 (average) and 97 (peak) over the 12-month construction period, assuming that one-third of the workers from the Portland-Vancouver metropolitan area would commute on a weekly basis and the specialized, temporary staff also would require lodging. These construction workers are expected to seek temporary accommodation in the general vicinity of the project site, and to use motels, trailers, campers, and other forms of transient housing. Approximately 1,082 hotel rooms or RV campsites exist within 25 miles of the project site. Assuming 70 percent occupancy, approximately 325 of these units (313 hotel rooms) would be available at any one time. Assuming a worst-case scenario that workers would want hotel or motel lodging, the peak demand of 97 rooms (assuming, again a worst-case scenario that no workers would share rooms) would represent approximately 31 percent of the available rooms and would therefore not stress the lodging facilities within 25 miles. Construction of the proposed project is not expected to result in a significant impact on transient accommodation availability in the project vicinity, nor is the project expected to affect median housing values, median gross rents, or new housing construction. The applicant has no plans to provide on-site temporary housing for workers or shuttle to or from hotels or other temporary lodging facilities.

I.5.14 Public Services

The influx of construction workers into project area communities on a daily and weekly basis could result in a minor and temporary increase in the demand placed on public service providers. This increase in demand could have a minor and temporary effect on local police departments, providers of emergency medical services, and local fire departments. The contractor would develop emergency plans for project construction.

The impact of project construction on local schools would be at most minor and temporary, as few out-of-state construction workers are likely to be accompanied by families. Construction-related impacts to local utilities also are expected to be minor and temporary.

Response times in the project vicinity are not expected to change due to project construction. Construction trucks would represent additional volume on area roads, but would not deter any emergency vehicles from travel. The project would be constructed entirely within land managed for commercial forestry by the Applicant.

Anticipated water uses during construction include spraying roads for dust control, construction support (such as concrete curing and hydrostatic testing of equipment), and restroom facilities for construction and support workers (estimated average of 143 and peak of 265 workers). Water needed for construction will be purchased by the contractor from an off-site vendor with a valid water right and transported to the project site in water-tanker trucks.

The needs of public service providers are considered in Section 4.3 Transportation. Section 4.2.4 Recreation addresses the potential for impacts on parks and other recreational facilities.

I.6 AGENCY CONTACTS MADE TO DATE

The Applicant has been actively involved in meeting and consulting with local and state agency personnel and with Tribal leaders during the preparation of studies supporting this Application. A summary of the key contacts made to date are listed in this section.

I.6.1 Local Government

- ***City of Bingen (January 2009).*** Consulted with city administrator to obtain information stating that there are currently no load restrictions in place for Maple Street in the City of Bingen, Washington. Additional information was provided stating that there is a significant increase in traffic volumes during the summer months due to recreational activities in the local area.

- ***Klickitat County Public Works Department (January 2009).*** Obtained the county "Resolution to Designate Haul Routes" document that could be used as a haul route agreement template for the project by Skamania County. The document was forwarded to Skamania County for review.

- ***Skamania County Planning Department.*** Three pre-application conferences were held between 2004 and 2008 with Karen Witherspoon and staff (including meetings on March 24, 2006 and August 22, 2007).

- ***Skamania County Public Works Department.*** Pre-application meetings with County Road Engineer and Building Inspector took place (also present in meeting with Planning Department on August 22, 2007). In addition, the Skamania County Public Works Department Manager, the County Engineer, and the Maintenance Superintendent were consulted to better understand existing roadway conditions, the proposed haul route, and traffic patterns. Information obtained included:

  - Contacting Skamania County Public Utility District and Embarq, the local telephone service provider

  - Contacting the Burlington Northern Santa Fe Railroad to get a determination on weight restrictions for the tracks that cross Maple Street in the City of Bingen, Washington

  - Average daily traffic on Cook-Underwood Road at approximately milepost 12. They also stated that the intersection of Cook-Underwood Road and Kollock-Knapp Road is located at approximately milepost 10 to 10.5

  - Recommendation that right of way ownership and easements be determined early on in the planning process

  - Requirement that both pre and post construction roadway inspections would need to be conducted along the haul route and that one additional roadway inspection would be required at one year post construction

- ***Skamania County Assessor.*** Phone and office discussions regarding tax benefits to Skamania County from a potential wind energy project.

- ***Skamania Economic Development Council.*** Various meetings and discussions regarding economic development and wind energy.

- ***Skamania Public Utility District.*** Meeting with Commissioners and General Manager (Bob Wittenberg) regarding Skamania Public Utility District system vulnerability to interruption by BPA and benefits to be realized by a potential wind energy project in Skamania County.

- ***Underwood Fire District.*** Meeting with Fire Commissioners to discuss service agreement for potential wind energy project.

- ***Mill A Volunteers.*** Meeting with members to discuss possible formation of Fire District and inclusion of potential wind energy project.

I.6.2 State Government

- ***Washington Department of Archeology and Historic Preservation***. File search for historic and cultural properties within or near the project site.

- ***WDFW.*** Meetings with WDFW included:

  - Meeting February 26, 2004 with Bill Weiler, Habitat Biologist and Liane Wedemeter of US Fish and Wildlife Service to discuss survey methods and results of wildlife surveys completed to date, and to discuss future surveys

  - Meeting and site tour November 16, 2007 to discuss survey methods and results of additional wildlife surveys completed to date.

  - Several information exchanges with Area Habitat Biologist (Bill Weiler) to discuss project impacts, review survey results, and discuss survey protocols.

  - Several follow-up meetings with Travis Nelson and Greg Huckel of WDFW during June, July and August of 2009 to continue the discussion and consultation on wildlife.

- ***Washington State Department of Natural Resources.*** Meeting and discussions with staff regarding application to lease adjoining Department of Natural Resources property for wind energy purposes.

- ***Washington State Department of Transportation, Goldendale Office.*** Discussed information relating to over-size and over-weight vehicles traveling on SR 14. They stated that the current prohibition for loads in excess of 125 feet including the trailer and load between mileposts 19.00 and 83.53 could be over-ruled for trucks traveling between the SDS Lumber Company facility and the junction of SR 14 and Cook-Underwood Road. The Goldendale office must be contacted prior to any over-size hauls. Pilot cars would be required and Washington State Patrol involvement may be required.

- ***Washington State Department of Transportation, Southwest Region Office.*** Discussed information relating to Road and bridge restrictions for over-size and over-weight motor vehicles traveling on SR 14 and over-size and over-weight load permit requirements.

I.6.3 Federal Government

- ***Bonneville Dam Project Office (January 2009).*** Obtained information on lockage length and width parameters as well as average daily usage numbers for the months of May through October.

- ***Bonneville Power Administration.*** Meetings with BPA included:

  - Meeting on August 22, 2007 as part of pre-application conference with Skamania County Planning Department.

- Meeting on September 30, 2008 with Rick Yarde to discuss National Environmental Policy Act process and Tribal consultation.

- ***US Fish and Wildlife Service.*** Meetings with USFWS included:

  - Meeting February 26, 2004 with Bill Weiler, Habitat Biologist and Liane Wedemeter, US Fish and Wildlife to discuss survey methods and results of wildlife surveys completed to date, and to discuss future surveys.

  - Ongoing consultation with Ken Berg, Jim Michaels and Mark Ostwald of USFWS to discuss survey work and results.

I.6.4 Tribal Government

- Letter sent to Yakama Nation Cultural Resources Department.

- Site tour and consultation with local Tribes of Yakama Nation (see Appendix F).

- Communication with Yakama Nation Cultural Resources Program concerning consultation and survey assistance.

I.6.5 Railroad

- ***Burlington Northern Santa Fe Railroad.*** Transportation Technology Services provided rail car length, width, and weight parameters as well as transport restrictions between the Port of Longview and the SDS Lumber facility.

SECTION 1.1 DESCRIPTION OF APPLICANT (WAC 463-60-015)

1.1.1 APPLICANT

This application for a Site Certification Agreement is made for the construction and operation of the Whistling Ridge Energy Project. The Applicant is Whistling Ridge Energy LLC.

This application for a Site Certification Agreement was professionally prepared by URS Corporation under the direction of S.D.S Co., LLC and SDS Lumber Company. These parties believe that the application is substantially complete and meets the requirements established in Chapter 80.50 Revised Code of Washington (RCW) and Title 463 Washington Administrative Code (WAC).

1.1.2 WHISTLING RIDGE ENERGY LLC

Whistling Ridge Energy LLC was incorporated in the state of Washington in February 2009. Whistling Ridge Energy LLC is a special purpose corporation formed to develop, permit, finance, construct, own and operate the Whistling Ridge Energy Project. Whistling Ridge Energy LLC is a Washington corporation formed under Title 23B of the RCW. It is wholly-owned by S.D.S Co., LLC.

Whistling Ridge Energy LLC would own and operate the Whistling Ridge Energy Project and would manage all of the affairs of the project, including activities related to obtaining permits and other approvals required for development of the project. It is anticipated that one or more additional equity participants may join with Whistling Ridge Energy LLC in connection with obtaining permanent financing for the project.

Whistling Ridge Energy LLC has elected to be treated for federal income tax purposes as an S-Corporation. It has no employees. Pursuant to an agreement between Whistling Ridge Energy LLC and S.D.S Co., LLC, staffing is provided by S.D.S Co., LLC, who hires third party consultants and contracts for other goods and services as necessary. Whistling Ridge Energy LLC may reimburse S.D.S Co., LLC for services rendered.

1.1.3 SDS LUMBER COMPANY AND S.D.S CO., LLC

SDS Lumber Company and S.D.S Co., LLC are privately-held corporations, incorporated in the state of Washington. SDS Lumber Company has owned and operated a wood products manufacturing facility in Bingen, Washington continuously since 1946. SDS Lumber Company's operations include lumber and plywood manufacturing, log handling and transportation, marine transportation and construction, log chipping for the pulp and paper industry, biomass energy generation, and other land development and land use ventures in the Skamania and Klickitat County area. SDS Lumber Company is an affiliated entity of S.D.S Co., LLC. S.D.S Co., LLC owns forest lands in the states of Oregon and Washington. Some of these lands would be utilized for the Whistling Ridge Energy Project in Skamania County.

1.1.4 BROUGHTON LUMBER COMPANY

Broughton Lumber Company is a privately-held corporation incorporated in the state of Washington. Broughton Lumber Company operated a sawmill in Skamania County from the early 1930s until 1988. Broughton Lumber Company currently manages its forest lands to produce logs for sale to various parties. Broughton Lumber owns forest lands in the state of Washington. Some of these lands would be utilized for the Whistling Ridge Energy Project in Skamania County.

SECTION 1.2 DESIGNATION OF AGENT (WAC 463-60-025)

All official communications concerning this Application during the application review process should be directed to Mr. Jason Spadaro, President, Whistling Ridge Energy LLC. He is the designated agent for the project and may be contacted as cited below:

Mr. Jason S. Spadaro
President, Whistling Ridge Energy LLC
P.O. Box 266
Bingen, WA 98605
(509) 493-6103 (phone)
(541) 490-5013 (cell)
(509) 493-2535 (fax)
jasons@sdslumber.com

Mr. Allen Barkley will serve as a secondary contact. Mr. Barkley's contact information is as follows:

Mr. Allen Barkley
Wind Power Associates
PO Box 1267
931 Pine St.
Goldendale, WA 98620
541 993 1707 (phone)
509 773 5187 (fax)
abark@gorge.net

SECTION 1.3 ASSURANCES (WAC 463-60-075)

1.3.1 INSURANCE

Whistling Ridge Energy LLC would establish and maintain, or cause to be established and maintained, several forms of insurance during the construction and operation of the Whistling Ridge Energy Project. Insurance would be maintained as required by law, customary business practice, and to satisfy third-party participants and lenders. The following coverages would be included:

- Commercial General Liability Insurance:

  The construction contractor and subcontractors would be required to carry commercial general liability insurance, including products and completed operations in amounts sufficient to respond to liability and property damage risks arising during the construction and startup phase of the Whistling Ridge Energy Project.

  Whistling Ridge Energy LLC would obtain and maintain in full force and effect, commercial general liability insurance against claims for liability and property damage arising out of the use and occupancy of the premises.

  Whistling Ridge Energy LLC would purchase insurance policies to cover liabilities arising from environmental, casualty, and other major incidents. The insurance industry views facilities such as the Whistling Ridge Energy Project as low to moderate risk. Therefore, high coverage limits are available at reasonable costs.

- Automobile Insurance

  The construction contractor and subcontractors would be required to carry automobile liability insurance covering all owned, leased, non-owned, and hired automobiles used during the construction and startup phase of the project.

  Whistling Ridge Energy LLC would obtain and maintain in full force and effect automobile liability insurance covering owned, non-owned, and hired autos.

- Property Insurance

  Whistling Ridge Energy LLC would obtain and maintain at all times during the term of construction and operation of the facility, physical damage insurance on the buildings and all improvements that are to be erected on the premises on an "all risk" basis, including coverage against damage or loss caused by earth movement and flood in an amount sufficient to cover any expected losses or damages.

  The potential for damages can be defined. Damages would occur only if engineered safeguards would fail. In many cases, more than one simultaneous failure would be required to produce significant damages. Upon completion of project design,

insurance underwriters would evaluate the design and estimate maximum potential damages due to failure. In some cases design changes may be implemented to reduce the damages. Insurance would then be purchased to cover the maximum expected damages.

- Worker's Compensation and Washington Stop Gap Liability

  Whistling Ridge Energy LLC would fully comply with the statutory requirements for worker's compensation as required with respect to any employees performing work on the subject property and premises. Whistling Ridge Energy LLC also would insure for their exposure with Employer's Liability insurance (Washington Stop Gap Liability).

  Whistling Ridge Energy LLC would require of the construction contractor and subcontractors working on the project similar compliance with the statutory requirements for worker's compensation with respect to their employees performing work on the subject property and premises. Whistling Ridge Energy LLC also would require Employer's Liability insurance for exposure under Washington Stop Gap Liability.

1.3.2 ENVIRONMENTAL IMPAIRMENT

Whistling Ridge Energy LLC and its operator(s) would be responsible, as required by law, for acts of environmental impairment related to the ownership and operation of the Whistling Ridge Energy Project. Such losses may, in some circumstances, be covered by general liability insurance, which Whistling Ridge Energy LLC and the construction contractor would carry. In addition, Whistling Ridge Energy LLC and/or its contracted operator(s) would obtain environmental impairment liability insurance to the extent such coverage is available on a commercially viable basis. This insurance would cover the acts of Whistling Ridge Energy LLC and its operator(s) at the site, consistent with or in excess of then-prevailing industry standards for such insurance in the wind power generating industry. Commercial viability would be determined by reference to the norm of the industry.

1.3.3 SITE CLOSURE BOND

No set-aside from operating funds is anticipated for site abandonment, but Whistling Ridge Energy LLC would obtain a site closure bond in an amount to be determined by Washington State Energy Facility Site Evaluation Council (EFSEC) upon approval of an initial site restoration plan. To the extent site facilities are not otherwise removed, recycled, or salvaged, Whistling Ridge Energy LLC would maintain ongoing responsibility for site facilities and site integrity as the site owner.

SECTION 1.4 MITIGATION MEASURES (WAC 463-60-085)

1.4.1 MITIGATION MEASURES

The following summarizes the mitigation measures in Part 3.0 – Natural Environment and Part 4.0 – Built Environment of this application.

1.4.1.1 Section 2.15, Protection from Natural Hazards

Earthquake Hazards

All structures on the site would be built in accordance with the seismic design provisions presented in the 2006 version of the International Building Code (IBC), and the American Society of Civil Engineers 07-05 standard. The site soil is best represented as Stiff Soil (Soil Site Class D). Based on the site location and site conditions described above, we recommend that the values listed in the following chart be used for seismic design of the project in accordance with Section 1613.5.3 of the 2006 IBC. The occupancy category of the proposed structure is assumed III as per Section 1613.5.6 of the 2006 IBC.

2006 IBC Seismic Design Values

Parameter	Value	2006 IBC/ASCE 7-05 Reference
Soil Profile Site Class	C	Table 1613.5.2
0.2 Second Spectral Acceleration S_s	0.60 g	Figure 1613.5 (1)
1.0 Second Spectral Acceleration S_1	0.20 g	Figure 1613.5 (2)
Peak Ground Acceleration ($0.4S_{Ds}$)	0.186 g	ASCE 7-05 equation 11.4-5
Site Coefficient F_a	1.16	Table 1613.5.3 (1)
Site Coefficient F_v	1.6	Table 1613.5.3 (2)
Seismic Design Category[a]	D	Tables 1613.5.6 (1) & (2)

a. Assumes Seismic Use Group III

A visual inspection would be conducted following abnormal seismic activity. These inspections would look for signs of incipient mass movement in those areas identified as potentially susceptible to such failures.

Slope Failure and Mass Wasting

No mitigation measures are required.

1.4.1.2 Section 3.1, Earth

Seismicity

No mitigation measures are proposed beyond adhering to local building codes and standard turbine and foundation design. The proposed facility would comply with the state building code provisions for seismic hazards applicable to the proposed location.

Soils

Site-specific geotechnical engineering evaluations would be conducted prior to design of the project to identify design methods to address the potential impacts presented above. Mitigation of soil impacts at the site would be incorporated into the final design of the foundations and roadways. A SWPPP would be developed prior to construction or modification of any roads or facilities. The SWPPP would be submitted for approval to EFSEC and followed throughout construction at the site.

Topography

No mitigation measures for topography are anticipated at this time.

Unique Physical Features

At this time, no mitigation measures are anticipated. Additional geotechnical investigations for tower foundation design would provide deeper (> 16 feet) subsurface data. If the additional data indicates potential for slope instability, mitigation would be accomplished through engineering or avoidance.

Erosion/Enlargement of Land Area (Accretion)

BMPs and other measures would be taken to mitigate the erosion hazard at the project site.

Erosion control measures for construction at the site are outlined in Sections 2.10.2 and 2.14.1. The sequences and methods of construction activities would be controlled to limit erosion and are summarized below:

- Construction activities would be controlled to help limit erosion. Clearing, excavation and grading would be limited to those areas of the project absolutely necessary for construction of the project. Areas outside the construction limits would be marked in the field and equipment would not be allowed to enter these areas or to disturb existing vegetation.

- The construction contractors would implement the EFSEC-approved Erosion and Sedimentation Control Plan during construction to minimize soil loss due to surface water flows.

- The EFSEC-approved Environmental Protection Control Plan would be implemented to provide adequate maintenance and inspection of the erosion and sediment control

system. The plan specifies that control structures would be inspected at a frequency sufficient to provide adequate environmental protection. Such inspections would increase in frequency during rainfall periods. In addition, supplies including sandbags and channel-lining materials would be stored on site for emergency use.

- Surface runoff would be diverted around and away from cut and fill slopes and conveyed in pipes or protected channels. If the runoff is from disturbed areas, it would be directed to a sediment trap prior to discharge.

1.4.1.3 Section 3.2, Air

The following mitigation measures for construction-related air emissions and dust are proposed:

- All vehicles used during construction would comply with applicable Federal and state air quality regulations
- Operational measures would be implemented, such as limiting engine idling time and shutting down equipment when not in use
- Active dust suppression would be implemented on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations
- Traffic speeds on unpaved access roads would be kept to 25 mph to minimize dust generation
- Carpooling among construction workers would be encouraged to minimize construction-related traffic and associated emissions
- Disturbed areas would be replanted or graveled to reduce wind-blown dust
- Erosion control measures would be implemented to limit deposition of silt to roadways

No mitigation is proposed for project operations, as there would be no air or odor emissions.

1.4.1.4 Section 3.3, Water

Surface Water Resources (Movement/Quality/Quantity)

Permanent BMPs would be designed and incorporated into the final construction plans and specifications prepared by the site civil design engineer. These permanent BMPs would include erosion and sediment control through site landscaping, grass, and other vegetative cover. All final designs would conform to the applicable Stormwater Management Manual. Non-structural BMPs also would be incorporated into the operations manual including good housekeeping, preventative and corrective maintenance procedures, steps for spill prevention and response, employee training, and inspection and record-keeping procedures.

Runoff/Absorption

The required BMPs are expected to: minimize erosion, control sedimentation, prevent run-on of stormwater onto disturbed areas, and prevent runoff from disturbed areas. One measure may be treatment of stormwater exiting disturbed areas. Construction-phase erosion and sedimentation control BMPs, as described in Section 2.10, Surface Water Runoff, would be implemented to mitigate the expected impacts of soil disturbance. These may include chemical source control, silt fencing, stabilized construction entrances, street sweeping, straw bale check dams, and rock check dams. With implementation of BMPs, no negligible impacts on runoff or on adjacent surrounding properties are anticipated during construction activities. Construction BMPs are described in further detail in Section 2.10, Surface Water Runoff.

Permanent, operations-phase runoff control and water quality enhancement BMPs, also described in Section 2.10, Surface Water Runoff would be implemented to mitigate the expected impacts of increased runoff rate and pollution from vehicle traffic. These BMPs would include stabilized landscaped areas and vegetated ditches or swales, and would provide the necessary control of stormwater runoff.

Groundwater Resources

No impacts have been identified regarding the quantity of water infiltrating the site following construction. BMPs that are recommended for site development include stabilized landscaped areas and vegetated ditches or swales.

Storage of chemicals onsite is minimal; however, the site development plan would require an SPCC Plan that would protect groundwater (See Section 2.9, Spillage Prevention and Control). Therefore, mitigation for groundwater quality impacts is not necessary.

Public and Private Water Supplies

No impacts to public water supplies and no adverse impacts to private water supplies (water wells) are expected. Therefore, no mitigation measures are required.

1.4.1.5 Section 3.4, Habitat, Vegetation, Fish and Wildlife

Habitat and Vegetation

Mitigation for potential impacts resulting from the proposed project includes the following:

- The applicant has commissioned extensive studies by qualified biologists of rare plants and habitats at the project site to avoid impacts to sensitive populations. The results and recommendations of these studies have been incorporated into the proposed design, construction, and operation of the project. In the event that the final project layout includes areas that contain suitable habitat for rare plants which have not previously been surveyed, an additional rare plant survey would be conducted at the appropriate time of year.

- The turbine strings have avoided sensitive riparian areas.

- Locating wind turbines in an actively-managed commercial forest avoids impacts to higher quality habitats.

- To the extent possible, new road construction and associated habitat impacts have been minimized by improving and using existing roads instead of constructing new roads.

- Use of certified "weed free" straw bales during construction to avoid introduction of noxious weeds

- All temporarily disturbed areas would be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to avoid the establishment and spread of noxious weed species.

- Implementation of a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species.

Fish

Section 3.3, Water, lists the project BMPs that would be incorporated to protect water quality and quantity. Pursuant to an erosion control plan for the project and an NPDES permit, drainage improvements would be made as needed. All temporarily disturbed areas would be regraded and reseeded with an appropriate mix of native plant species to restore vegetation after the construction phase is completed.

Wildlife

The primary mitigation goal for the Whistling Ridge Energy facility is to avoid sensitive wildlife resources when siting turbines and access roads. Because of the relatively small footprint of wind energy facilities and the flexibility of the process, it is likely that avoidance can be achieved. Wind turbines would also be sited in areas already actively managed for timber harvest. New road construction would be minimized by improving and using existing roadways. All temporarily disturbed areas would be regraded and reseeded with an appropriate mix of native plant species to restore vegetation after the construction phase is over.

Mitigation for potential impacts resulting for the proposed project includes the following sequentially-performed actions:

- Rectify the impact by repairing, rehabilitating, or restoring the affected environment in consultation with relevant wildlife agencies.

- Conduct thorough analysis of sensitive natural resources to avoid impacts and increase avoidance during micrositing.

- Implement a two year minimum post-construction mortality study

- The Applicant plans to convene a Technical Advisory Committee to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The Technical Advisory Committee would be composed of representatives from WDFW, USFWS, Skamania County, and the Applicant. The role of the Technical Advisory Committee would be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the project. The post-construction monitoring plan would be developed in coordination with the Technical Advisory Committee.

- Implement project design features that would minimize project impacts, including:

    - Installing tubular steel turbine towers to eliminate perching opportunities provided by lattice towers

    - Burying electrical lines between turbines and from turbine strings to substation

    - Using the minimum amount of turbine lighting required by the FAA

    - Installing newer generation up-wind turbines

1.4.1.6 Section 3.5, Wetlands and Jurisdictional Waters

No impacts to wetlands are expected to occur and therefore no mitigation measures would be required.

1.4.1.7 Section 3.6, Energy and Natural Resources

No impacts to energy and natural resources are expected to occur and therefore no mitigation measures would be required.

1.4.1.8 Section 4.1, Environmental Health

Noise

Construction

Construction would generally occur only during daytime hours to reduce the potential for noise impacts from this activity. Construction noise is exempt from Washington noise limits during daytime hours. To ensure that construction noise emission assumptions relied upon herein are valid and acoustical design goals are met by the project during construction, the following mitigation measures are proposed:

- All noise-producing project equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.

- All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by a local, state, or federal agency, would comply with such regulation while in the course of project activity.

- The use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, would be for safety warning purposes only. Unless required for such safety purposes, and as allowable by applicable regulations, no construction-related public address, loudspeaker, or music system would be audible at any adjacent noise-sensitive land use.

- The EPC Contractor would implement a noise complaint process and hotline number for the surrounding community. Whistling Ridge Energy LLC would have the responsibility and authority to receive and resolve noise complaints.

Operation

The noise modeling analysis indicated that the noise levels at the three closest residences (located 0.38, 0.48 and 0.8 mile away) would be 37 to 42 dBA for the 9 m/sec wind speed case, at and above which the wind turbine generators are expected to produce the most noise. With averaged measured existing sound levels reasonably representing ambient noise levels at these nearest noise-sensitive receivers, the cumulative increase over ambient for most operating cases would remain below applicable thresholds, and less than or equal to 5 dBA, and would result in no need for operation noise mitigation.

Risk of Fire or Explosion

The construction manager would be responsible for staying abreast of fire conditions in the project area by contacting WDNR and implementing any necessary fire precautions. A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. The following chart lists sources of potential fire and explosion along with measures to mitigate the risk of either occurring.

Fire and Explosion Risk Mitigation Plan

C / O[a]	Potential Fire or Explosion Source	Mitigation Measures
C & O	General Fire Protection	• All on-site service vehicles fitted with fire extinguishers • Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on site along roadways during summer fire season • Minimum of one water truck with sprayers must be present on each turbine string road with construction activities during fire season
C & O	Dry vegetation in contact with hot exhaust catalytic converters under vehicles	• No gas powered vehicles allowed outside of graveled areas • Mainly diesel vehicles (i.e. w/o catalytic converters) used on site • Use of high clearance vehicles on site if used off-road
C & O	Smoking	• Restricted to designated areas (outdoor gravel covered areas)
C & O	Explosives used during blasting for excavation work	• Only state licensed explosive specialist contractors are allowed to perform this work – explosives require special detonation equipment with safety lockouts • Clear vegetation from the general footprint area surrounding the excavation zone to be blasted • Standby water spray trucks and fire suppression equipment to be present during blasting activities
C & O	Electrical Fires	• Use of generally high clearance vehicles on site • No gas powered vehicles allowed outside of graveled areas • All major construction equipment used is to be diesel powered (i.e. w/o catalytic converters)
C & O	Lightning	• Specially engineered lightning protection and grounding systems used at wind turbines and at substation • Footprint areas around turbines and substation are graveled with no vegetation
C	Portable Generators – hot exhaust	• Generators not allowed to operate on open grass areas • All portable generators to be fitted with spark arrestors on exhaust system
C	Torches or field welding on-site	• Immediate surrounding area would be wetted with water sprayer • Fire suppression equipment to be present at location of welder/torch activity
C & O	Electrical Arcing	• Electrical designs and construction specifications meet or exceed requirements of the National Electric Code and National Fire Protection Agency

a. Indicated risk during construction (C) and/or operations (O)

Lightning-induced fires are rare in the project area and both the wind turbine generators and the substation are equipped with specially engineered lightning protection systems. With the types of modern wind turbines proposed for the project, however, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central SCADA system, which would notify operators of the alarm by cell phone or pager.

The potential fire risks are similar in nature but lower for project decommissioning. Fire prevention measures during decommissioning would be similar to those for project construction.

1.4.1.9 Section 4.2, Land and Shoreline Use

Land Use

No impacts to land use are anticipated, and no mitigation measures are required.

Light and Glare

Mitigation measures for light and glare would be as follows:

- Most construction would occur during daylight hours, minimizing construction lighting at during hours of darkness
- Turbines and blades would be painted with a non-reflective gray finish to blend in with the background, and to eliminate the need for white daytime aviation warning lights
- To prevent glare, non-reflective earth-tone/light paint colors would be used on exterior surfaces of buildings or other facilities
- The facility lights outside the Operations and Maintenance area and the substation sites would be hooded and directed downward to minimize backscatter and illumination of off-site areas
- Lights would be the minimum wattage required for safety
- Sensors and switches would be used to keep lights turned off when lighting is not required

Aesthetics

Because the turbines are most frequently seen against the sky, particularly in close-range views where visual concerns are the greatest, a non-reflective flat neutral gray or light color is recommended to minimize aesthetic impacts.

Recreation

Impacts to recreation users during the construction phase would primarily result from dust and noise from construction equipment. While the project would not affect any trails or pathways in the Scenic Area, there may be some distant views of wind turbines from trails during operations. Because they are high on the ridge, no mitigation measures are proposed other than painting the turbines a flat gray.

Historic and Cultural Preservation

Because no cultural resources (archaeological sites or historic properties) were identified in the project area, no mitigation actions are required. If cultural resources are inadvertently discovered during project construction and operations, assessment of the find would be

necessary. If such cultural resources are found to be significant, mitigation measures would need to be devised and implemented.

Agricultural Crops/Animals

There would be no impacts to agricultural crops and animals, therefore mitigation measures are not proposed.

1.4.1.10 Section 4.3, Transportation

Construction Traffic Control

The following mitigation measures are proposed to reduce impacts from project construction on roadway traffic in the region:

- A Transportation Management Plan (TMP) would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval that would direct and obligate the contractor to implement procedures to minimize traffic impacts

- The TMP would include requirements for coordination of project-related construction traffic and WSDOT planned construction projects

- The TMP would include requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic

- Whistling Ridge Energy LLC and its contractors would be required to comply with State and County permitting requirements for over-size and over-weight vehicles

- Whistling Ridge Energy LLC would be required to notify land owners in the project vicinity prior to construction of transportation routes that would be used for construction equipment and labor

- Approved State and/or County advanced warning construction signs would be placed prior to and during construction

- Certified flaggers would be used when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents

- Pilot cars would be used both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways

- Traffic flow would not be restricted for more than 20 minutes during the construction phase

Access Roadway Construction

All sections of the access roadway system that would require improvements or new construction would be designed and built according to WSDOT and Washington State access management standards.

Hazardous Materials Transport

Transport of hazardous materials would be conducted in a manner that would protect both human health and the environment and would be in accordance with applicable Federal and WSDOT requirements.

Roadway Maintenance

- Pre- and post-haul construction visual assessments of roadway surface conditions would be conducted identifying weak or deteriorated areas along the haul route that may require mitigation

- Should mitigation be required, a mitigation design program would be developed to repair all pavement sections to pre-construction conditions or better

- Whistling Ridge Energy LLC would be responsible for maintaining turbine string access roads, access ways, and other roads built to construct and operate the proposed project

- All snow removal would be performed in a safe manner that would not degrade roadway conditions

1.4.1.11 Section 4.4, Socioeconomic Impact

Socioeconomic impacts are expected to be beneficial in the form of additional jobs, increased sales, and increased tax revenues. Temporary increases in population due to worker relocation during construction are likely to be less than significant in view of the availability of housing, transient accommodations, and other public services in the region. Specific mitigation measures to lessen the impacts of the construction phase on public service providers in the Whistling Ridge Energy Project vicinity include:

- Construction activities would be coordinated with local police and fire departments, as well as emergency medical service providers, to ensure access to all locations in the project site vicinity in the case of an emergency.

- To help mitigate loss of access and other traffic-related impacts, adequate traffic control and signage, indicating closures and alternate routes, would be provided where needed.

- Construction vehicle trips in and out of the immediate construction zone would be coordinated and scheduled away from peak travel periods as much as possible, to minimize general traffic disruption.

- Noise and dust problems generated by construction would be mitigated through the use of properly muffled construction equipment, and by the use of approved dust control methods.

For related discussions of impacts and mitigation, see Section 3.2 Air, Section 4.1 Environmental Health, and Section 4.3 Transportation.

1.4.2 FAIR TREATMENT

No social or environmental justice impacts are anticipated to result from the construction and operation of the Whistling Ridge Energy Project. There will be no land use displacements or relocations as a result of project, nor will the developed area for the project extend beyond the private forestry land owned by S.D.S. Co., LLC and Broughton Lumber Companies. The construction and operation of the project is not predicted to result in potential disproportionately high and adverse effects to minority or low income populations.

The project would not displace any minority or low-income populations. The project would be constructed on private land not occupied by residents or businesses owned by anyone other than the Applicant. As discussed in Section 4.4.1.1, the area near the project does not have a substantially higher minority or low-income population when compared to larger reference populations. Section 4.1, Environmental Health, states that infrasound (noise) potential impacts are considered to be either non-existent or less than significant during operation. Permanent visual changes due to project operation would be low to moderate. Therefore, this analysis finds that high and disproportionate impacts upon minority and low-income populations would not occur.

The demographics of the project study area have been identified and a public involvement effort undertaken to reach all of the surrounding residents, including minority and low-income populations.

The overall population and minority population data for year 2008 for Skamania County are shown in Table 1.4-1, followed by Table 1.4-2 showing population living under the poverty level.

The race and ethnicity composition of the project area is estimated by analyzing the three census block groups that most closely match an area defined by a three-mile radius around the project site. When combined, the population in these three census blocks is approximately 12 percent minority. The second most common race and ethnicity category for residents in this area is (1) Hispanic/Latino, and (2) Some Other Race or Two or More Races.

The population living within three miles of the project site has a lower minority percentage than the two nearest cities (White Salmon and Hood River), Klickitat County, Hood River County, Washington State, and Oregon State. The population within three miles of the project site has a

higher minority percentage (12 percent) compared to the same measure for Skamania County as a whole (11 percent). Although minority residents do exist near the project site, the area near the project does not have a substantially higher minority population when compared to larger reference populations.

Table 1.4-1
Race and Sex Composition in the Project Vicinity, 2008

Jurisdiction	Population 2008	Sex (%)		Race (%)									
				Hispanic					Non Hispanic				
		M	F	W	B	AIAN	API	SOR	W	B	AIAN	API	SOR
City of White Salmon	2,205	48	52	4	0	0	0	13	79	0	1	1	2
City of Hood River	6,865	47	53	8	0	0	0	15	73	0	1	1	2
Skamania Co.	10,700	51	49	4	0	0	0	0	90	0	2	0	2
Klickitat Co.	20,100	50	50	9	0	0	0	0	83	0	3	1	2
Hood River Co.	21,625	49	51	15	0	3	0	7	69	0	1	2	2
Washington St.	6,587,600	50	50	8	0	0	0	0	76	3	1	7	3
Oregon State	3,791,075	50	50	5	0	1	0	4	81	2	1	4	3

Source: Claritas (2009).
For the purpose of this analysis, minority includes those residents identified as Black or African American, American Indian or Alaskan Native, Asian Pacific Islander, Some Other Race, Two or More Races, or Hispanic/Latino.
Percentages may not total 100 percent due to decimal places not expressed in this table.
AIAN = American Indian or Alaskan Native
API = Asian Pacific Islander
B = Black
CBG = Census Block Group
CT = Census Tract
SOR = Some Other Race or Two or More Races
W = White

Poverty status in 2000 is available for all areas studied. More current poverty statistics (for the period 2005 to 2007 as an annual average) are only available for the areas with relatively larger populations (Klickitat County, Hood River County, Washington, and Oregon). Table 1.4-2 shows 2000 poverty statistics for all areas (for comparison purposes), and also shows more current poverty statistics where available. Poverty estimates for 2008 were not available.

In 2000, 17 percent of the populations of the cities of White Salmon and Hood River were living below the poverty level. This same measure was 13 percent for Skamania County, 17 percent for Klickitat County, and 14 percent for Hood River County the same year. The cities and counties near the project site had relatively more residents living below the poverty level compared to Washington as a whole, and Oregon as a whole in 2000.

Approximately nine percent of the population living within approximately three miles of the project site lived below the poverty level in 2000, indicating fewer people living in poverty compared to the cities and counties near the project site. The geographic areas for which more recent (2005–2007 annual average) poverty statistics are available have all increased in percentage of persons living below the poverty level, as shown in Table 1.4-2.

Table 1.4-2
Population Living Below the Poverty Level

Jurisdiction[a]	Population For Whom Poverty Status is Determined[b]	Number of Persons Living Below Poverty Level	Percentage of Persons Living Below Poverty Level
Combined Census Block Groups Within Approx. 3 Miles of Project Site (2000)	3,191	299	9
Individual Census Tract 9503 Block Group 2 (2000)	1,467	193	13
Individual Census Tract 9503 Block Group 3 (2000)	685	69	10
Individual Census Tract 9504 Block Group 2 (2000)	1,039	37	4
City of White Salmon (2000)	2,144	357	17
City of Hood River (2000)	5,801	1,004	17
Skamania County (2000)	9,763	1,281	13
Klickitat County (2000/annual 2005-2007)	18,983/19,540	3,236/3,779	17/19
Hood River County (2000/annual 2005-2007)	19,986/21,061	2,845/3,044	14/14
Washington State (2000/annual 2005-2007)	5,765,201/ 6,237,571	612,370/ 737,254	11/12
Oregon State (2000/annual 2005-2007)	3,347,667/ 3,611,297	388,740/ 488,896	12/14

Source: US Census (2008a and 2008b).

a. Estimates of this type of data for the areas with smaller populations (census block groups, cities, and Skamania County) were not available for more recent years from the US Census or from Claritas.

b. Poverty status was determined by dividing the population living below poverty by the population for whom poverty status is determined, which excludes those living in institutional housing.

Operation of the project would result in a positive economic impact to Skamania County and the state due to increased tax revenues, employment, and local expenditures. Operation of the project would require 8 to 9 full-time employees. These new jobs will increase the opportunities for all Skamania County residents, including minority and low-income populations.

SECTION 1.5 SOURCES OF INFORMATION (WAC 463-60-095)

1.5.1 INTRODUCTION

American Wind Energy Association (AWEA). 2007. Wind Power Today. Available at: http://www.awea.org/pubs/factsheets/windpowertoday_2007.pdf

Anchor Environmental, L.L.C. 2003. Klickitat County Energy Overlay Draft Environmental Impact Statement.

Baerwald et al. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. *Current Biology* 18:695–696.

Bureau of Economic Analysis (BEA). 2008. Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce. Table CA05 Personal income and detailed earnings by industry; Table CA25 Total employment by industry; Table CA1-3 Personal income, population, per capita personal income. Accessed December 12, 2008 and January 23, 2009 at http://www.bea.gov/regional/reis/default.cfm#step3.

IMPLAN. 2008. IMPLAN Regional Economic Input/Output Modeling Software. www.implan.com. Modeling completed December 20, 2008.

Kennedy/Jenks Consultants. 2003. Klickitat County Energy Overlay Draft Environmental Impact Statement. August.

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M.D. Strickland, and J.M. Szewczak. 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. *Journal of Wildlife Management* 71: 2449–4486.

Moore, Leslie. Skamania County Assessor's Office. Phone and email communication with Katie Carroz, Carroz Consulting LLC. February 5, 2009.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas. Work performed by BioSystems Analysis, Inc., Tiburon, CA. Sacramento, CA: California Energy Commission.

Ryan, L. A. and A.B. Carey. 1995. Distribution and Habitat of the Western Gray Squirrel (*Sciurus griseus*) on Fort Lewis, Washington. *Northwest Science* 69(3):204-216.

Washington Department of Community, Trade and Economic Development (Washington CTED). 2005. 2005 Biennial Energy Report - Issues and Analysis for the Washington State Legislature and Governor. January.

Washington State Department of Revenue (WDOR). 2008. Website, Reports: Table 24: Property Tax Levies by County, Due in Calendar Years 2006 – 2008; Table 28: Property Tax Collections by County for Calendar Year 2007; Table: Local Taxable Retail Sales. Accessed December 30, 2008 at http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/.

———. 2009. Website: Reports, Table 2: Local Tax Distributions; Taxable Retail Sales Report; Tables 25 and 26: Property Tax Levy Rates by County. Accessed January 26, 2009, and February 4, 2009 at http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/.

Washington Employment Security Department (WESD). 2008. Labor Market and Economic Analysis. Resident Labor Force and Employment in Washington State and Labor Market Areas. Accessed January 25, 2009 at http://www.workforceexplorer.com/cgi/dataanalysis/?PAGEID=94&SUBID=149.

Washington State Office of Financial Management (WOFM). 2008. Median Household Income Estimates by County: 1989 to 2007 and Projection for 2008; October 2008. Accessed January 23, 2009 at http://www.ofm.wa.gov/economy/hhinc/default.asp.

1.5.2 SECTION 2.1, SITE DESCRIPTION

Haagen, Edward. 1990. *Soil Survey of Skamania County Area, Washington*. US Department of Agriculture, Natural Resources Conservation Service, Washington Soil Survey Program.

Northwest Sustainable Energy for Economic Development (NWSEED). 2002a. Washington State Wind Speed at 50 Meters. Available at: http://www.windpowermaps.org/default.asp. Seattle, Washington.

———. 2002b. Clark, Skamania, and Klickitat County Wind Resources Map—Wind Power at 50 Meters. Available at: http://www.windpowermaps.org/default.asp. Seattle, Washington.

United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2008. *Skamania County, Washington WETS Table - Climate Data Set.* National Water and Climate Center. Portland, Oregon. Available at: http://www.wcc.nrcs.usda.gov/climate/clim-data.html.

1.5.3 SECTION 2.3, CONSTRUCTION ON SITE

American Association of State Highway and Transportation Officials (AASHTO). 2004. *A Policy on Geometric Design of Highways and Streets.* 5th Edition.

Washington State Department of Transportation (WSDOT). 2007. *Design Manual*. Publication M 22-01.02. November.

1.5.4 SECTION 2.14, CONSTRUCTION METHODOLOGY

United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 2003. *Skamania County Area, Washington, Soil Survey - WA659.*

1.5.5 SECTION 2.15, PROTECTION FROM NATURAL HAZARDS

Geomatrix Consultants (Geomatrix). 1995. Seismic design mapping for the State of Oregon. Unpublished final report prepared for the Oregon Department of Transportation.

Harris, S.L. 1988 *Fire and Ice: The Cascade Volcanoes.* The Mountaineers and Pacific Search Press. Seattle, Washington.

Lidke, D.J., S.Y. Johnson, P.A. McCrory, S.F. Personius, A.R. Nelson, R.L. Dart, L. Bradley, K.M. Haller, and M.N. Machette. 2003. Map and data for Quaternary faults and folds in Washington. *USGS Open-File Report* 03-428.

McCrumb, D.R., D.O. West, and W.A. Kiel. 1989. Geology and Seismic Considerations of the Satsop Nuclear Power Plant Site. *Engineering Geology in Washington* 1: 589–606.

Noson, L.L., A. Qamar, and G.W. Thorsen. 1988. Washington State Earthquake Hazards. *DGER Information Circular* 85.

Petersen, M.D., A.D. Frankel, S.C. Harmsen, C.S. Mueller, K.M. Haller, R.L. Wheeler, R.L. Wesson, Y. Zeng, O.S. Boyd, D.M. Perkins, N. Luco, E.H. Field, C.J. Wills, and K.S. Rukstales. 2008. Documentation for the 2008 Update of the United States National Seismic Hazard Maps. *USGS Open-File Report* 2008-1128.

Pezzopane, S.K. 1993. Active faults and earthquake ground motions in Oregon. Ph.D. Thesis, University of Oregon, 208 p.

Rogers, A.M., T.J. Walsh, W.J. Kockelman, and G.R. Priest. 1996. "Map showing known or suspected faults quaternary displacement in the Pacific Northwest," Plate 1 in Assessing Earthquake Hazards and Reducing Risk in Pacific Northwest. *USGS Professional Paper* 1560.

Walsh, T.J., M.A. Korosec, W.M. Phillips, R.L. Logan, and H.W. Schasse. 1987. Geologic Map of Washington – Southwest Quadrant.

Wolfe, E.W. and T.C. Pierson. 1995. Volcanic-Hazard Zonation for Mount St. Helens, Washington. *USGS Open-File Report* 95-497.

Wong, I.G. and J.D.J. Bott. 1995. A look back at Oregon's earthquake history, 1981-1994. *Oregon Geology* 57: 125–139.

Wong, I.G. and W.J. Silva. 1998. "Earthquake ground shaking hazards in the Portland and Seattle metropolitan areas." In *Geotechnical Earthquake Engineering and Soil Dynamics III*, P. Dakoulas, M. Yegian, and R.D. Holtz (eds.): American Society of Civil Engineers, Geotechnical Special Publication No. 75, 1, 66-78.

1.5.6 SECTION 2.19, ANALYSIS OF ALTERNATIVES

Northwest Power and Conservation Council (NWPCC). 2005. The Fifth Northwest Electric Power and Conservation Plan. May 2005.

Skamania County. 2007. Skamania County 2007 Comprehensive Plan.

Western Electricity Coordinating Council (WECC). 2005. WECC 2005 Power Supply Assessment. May 31.

1.5.7 SECTION 3.1, EARTH

Adams, J. 1996. "Great Earthquakes Recorded by Turbidities of the Oregon-Washington Coast," in Assessing Earthquake Hazards and Reducing Risk in Pacific Northwest. *USGS Professional Paper* 1560: 147–160.

Atwater, B.F. 1987a. A Periodic Holocene Recurrence of Widespread, Probably Coseismic Subsidence in Southwestern Washington. *EOS* 68, no.44.

———. 1987b. Evidence for great Holocene earthquakes along the outer coast of Washington State. *Science* 236, no. 4804: 942–944.

———. 1992. Geologic Evidence for Earthquakes during the Past 2000 Years along the Copalis River, Southern Coast of Washington. *Journal of Geophysical Research* 97: 1901–1919.

Atwater, B.F., S. Musumi-Rokkaku, K. Satake, Y. Tsuji, K. Uedaand, D.K. Yamagushi. 2005. The Orphan Tsunami of 1700 – Japanese Clues to a Parent Earthquake in North America, *USGS Professional Paper* 1707.

Atwater, B.F., A.R. Nelson, J.J. Clague, G.A. Carver, D.K. Yamaguchi, P.T. Bobrowsky, J. Bourgeois, M.E. Darienzo, W.C. Grant, E. Hemphill-Haley, H.M. Kelsey, G.C. Jacoby, S.P. Nishenko, S.P. Palmer, C.D. Peterson, and M. A. Renhart. 1995. Summary of Coastal Geologic Evidence for Past Great Earthquakes at the Cascadia Subduction Zone. *Earthquake Spectra* 11, no.1: 1–18.

Bakun, W.H., R.A. Haugerud, M.G. Hopper, and R.S. Ludwin. 2002. The December 1872 Washington State earthquake. *Bulletin of the Seismological Society of America* 92, no. 8: 3239–3258.

Carver, G.A. and R.M. Burke. 1987. Late Holocene paleoseismicity of the southern end of the Cascadia subduction zone (abs). *EOS* 68, no.44: 1240.

Darienzo, M.E. and C.D. Peterson. 1987. Episodic Tectonic Subsidence Recorded in Late Holocene Salt Marshes, Northwest Oregon (abs). *EOS* 68, no. 44: 1469.

———. 1990. Episodic Tectonic Subsidence Recorded in Late Holocene Salt Marshes, Northern Oregon Central Cascadia Margin. *Tectonics* 9, no.1: 1–25.

Dewberry, S. and R. Crosson. 1996. The M^D 5.0 Earthquake of 29 January 1995 in the Puget Lowland of Western Washington: An Event on the Seattle Fault. *Bulletin of the Seismological Society of America* 86, no. 4: 1167–1172.

Geomatrix Consultants (Geomatrix). 1995. Seismic design mapping for the State of Oregon. Unpublished final report prepared for the Oregon Department of Transportation.

Grant, W.C. and D.D. McLaren. 1987. Evidence for Holocene subduction earthquakes along the northern Oregon coast (abs). *EOS* 68, no.44: 1239.

Heaton, T.H. and S.H. Hartzel. 1986. Source Characteristics of hypothetical subduction earthquakes in the Northwestern United States. *Seismological Society of America Bulletin* 76, no.3: 675–708.

Kelsey, H.M., R.C. Witter and E. Hemphill-Haley. 2002. Plate-boundary earthquakes and tsunamis of the past 5500 years, Sixes River estuary, Southern Oregon. *Geol. Soc. Am. Bull.* 114, no.3: 298–314.

Kelsey, H.M., A.R. Nelson, E. Hemphill-Haley, and R. C. Witter. 2005. Tsunami history of an Oregon coastal lake reveals a 4600 yr record of great earthquakes on the Cascadia subduction zone. *Geol. Soc. Am. Bull.* 117: 1009–1032

Korosec, M. 1987. Geologic Map of the Hood River Quadrangle, Washington and Oregon. Washington Division of Geology and Earth Resources *Open File Report* 87-6.

Lidke, D.J., S.Y. Johnson, P.A. McCrory, S.F. Personius, A.R. Nelson, R.L. Dart, L. Bradley, K.M. Haller, and M.N. Machette. 2003. Map and data for Quaternary faults and folds in Washington. *USGS Open-File Report* 03-428.

McCaffrey, R., A.I. Qamar, R.W. King, R. Wells, G. Khazaradze, C.A. Williams, C.W. Stevens, J.J. Vollick, and P.C. Zwick. 2007. Fault locking, block rotation and crustal deformation in the Pacific Northwest. *Geophysical Journal International*.

Nelson, A.R., B.F. Atwater, T. Bobrowsky, L.A. Bradley, J.J. Clague, G.A. Carver, M.E. Darienzo, W.C. Grant, H.W. Krueger, R. Sparks, T.W., Stafford Jr., and M. Stuiver. 1995. Radiocarbon evidence for extensive plate-boundary rupture about 300 years ago at the Cascadia subduction zone. *Nature* 378: 371–374.

Nelson, A.R. and S.F. Personius. 1996. "Holocene ruptures, Central Cascadia Rupture Zone," in Assessing Earthquake Hazards and Reducing Risk in Pacific Northwest, *USGS Professional Paper 1560*: 91–114.

Noson, L.L., A. Qamar, and G.W. Thorsen. 1988. Washington State Earthquake Hazards. *DGER Information Circular* 85.

Personius, S.F., R.L. Dart, L. Bradley, and K.M. Haller. 2003. Map and data for Quaternary faults and folds in Oregon. *USGS Open-File Report* 03-095.

Peterson, C.D. and M.E. Darienzo. 1996. "Discrimination of Climatic, Oceanic, and Tectonic Mechanisms of Cyclic Marsh Burial, Alsea Bay, Oregon," in Assessing Earthquake Hazards and Reducing Risk in Pacific Northwest. *USGS Professional Paper* 1560: 115–146.

Petersen, M.D., A.D. Frankel, S.C. Harmsen, C.S. Mueller, K.M. Haller, R.L. Wheeler, R.L. Wesson, Y. Zeng, O.S. Boyd, D.M. Perkins, N. Luco, E.H. Field, C.J. Wills, and K.S. Rukstales. 2008. Documentation for the 2008 Update of the United States National Seismic Hazard Maps. *USGS Open-File Report* 2008-1128.

Pezzopane, S.K. 1993. Active faults and earthquake ground motions in Oregon. Ph.D. Thesis, University of Oregon, 208 p.

Rogers, G.C. 1988. An Assessment of the Megathrust Earthquake Potential of the Cascadia Subduction Zone. *Can. J. Earth Sci.* 25: 844–852.

Satake, K. and Y. Tanioka. 1996. Tsunami Heights along the Pacific Northwest Computed from the M_w=9 Earthquake of January 1700. *Geological Society of America* 28, no.5: 108.

Satake, K., K. Wang, and B.F. Atwater. 2003. Fault slip and seismic moment of the 1700 Cascadia earthquake inferred from Japanese tsunami descriptions. *Journal of Geophysical Research* 108, no. B11: 2535.

Savage, J.C. and M. Lisowski. 1991. Strain Measurements and the Potential for a Great Subduction Earthquake off the Coast of Washington. *Science* 252, no.5002: 101–103.

Shennan, I., A.J. Long, M.M. Rutherford, F.M. Green, J.B. Innes, J.M. Lloyd, Y. Zong, K.J. Walker. 1996. Tidal marsh stratigraphy, sea-level change and large earthquakes: I. A 5,000-year record in Washington, USA. *Quaternary Science Reviews* 15: 1023–1059.

Toppozada, T.R. 1975. Earthquake intensity as a function of intensity data in California and western Nevada. *Bulletin of the Seismological Society of America*. 65, no. 5: 1223–1238.

United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS). 1988. *Soil Survey of Cowlitz County, Washington.*

———. 2003. *Skamania County Area, Washington, Soil Survey - WA659.*

Weaver, C. S. and K. M. Shedlock. 1996. "Estimates of Seismic Source Regions from the Earthquake distribution and regional tectonics in the Pacific Northwest," in Assessing Earthquake Hazards and Reducing Risk in Pacific Northwest. *USGS Professional Paper 1560*: 285–306.

Witter, R.C., H.M. Kelsey, and E. Hemphill-Haley. 2003. Great Cascadia earthquakes and tsunamis of the past 6700 years, Coquille River estuary, southern coastal Oregon. *Geological Society of America Bulletin* 115: 1289–1306.

Wong, I.G. and J.D.J. Bott. 1995. A look back at Oregon's earthquake history, 1981-1994. *Oregon Geology* 57: 125–139.

Wong, I.G., S.K. Pezzopane, and R. Blakely. 1999. A characterization of seismic sources in western Washington and northwestern Oregon (abs). *Seismological Research Letters* 70: 221.

Yamaguchi, D.K., B.F. Atwater, D.E. Bunker, B.E. Benson, and M. Reid. 1997. Tree-ring dating the 1700 Cascadia earthquake. *Nature* 389: 922–923.

1.5.8 SECTION 3.2, AIR

United States Environmental Protection Agency (EPA). 2008. *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006*. April.

1.5.9 SECTION 3.3, WATER

Haagen, Edward. 1990. *Soil Survey of Skamania County Area, Washington*. US Department of Agriculture, Natural Resources Conservation Service, Washington Soil Survey Program.

1.5.10 SECTION 3.4, HABITAT, VEGETATION, FISH AND WILDLIFE

Anchor Environmental, L.L.C. 2003. Klickitat County Energy Overlay Draft Environmental Impact Statement.

———. 2004. Klickitat County Energy Overlay Final Environmental Impact Statement. September.

Arnett, E.B., K. Brown, W.P. Erickson, J. Fielder, T.H. Henry, G.D. Johnson, J. Kerns, R.R. Kolford, T. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersly. 2008. Patterns of fatality of bats at wind energy facilities in North America. *Journal of Wildlife Management* 72: 61–78.

Carraway, L. N. and B. J. Verts. 1994. Sciurus griseus. *Mammalian Species*, No. 474: 1–7.

Baerwald et al. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. *Current Biology* 18:695–696.

Dalquest, W. W. 1948. Mammals of Washington. *University of Kansas Publications, Museum of Natural History*, 2:1–444.

Fiedler, J. K. 2004. Assessment of bat mortality and activity at Buffalo Mountain Windfarm, eastern Tennessee. Thesis, University of Tennessee, Knoxville, USA.

Franklin, Jerry F. and C.T. Dyrness. 1988. *Natural Vegetation of Oregon and Washington.* Oregon State University Press.

Gruver, J. C. 2002. Assessment of bat community structure and roosting habitat preferences for the hoary bat (Lasiurus cinereus) near Foote Creek Rim, Wyoming. Thesis, University of Wyoming, Laramie, USA.

Hayes, JP. 1997. Temporal variation in activity of bats and the design of echolocation-monitoring studies. *J Mammal* 78: 514–524.

Howe, R. W., W. Evans, and A. T. Wolf. 2002. Effects of wind turbines on birds and bats in northeastern Wisconsin. Wisconsin Public Service Corporation, Green Bay, USA.

Johnson, G. D. 2005. A review of bat mortality at wind-energy developments in the United States. *Bat Research News* 46:45–49.

Johnson, G. D., M. K. Perlik, W. P. Erickson, and M. D. Strickland. 2004. Bat activity, composition and collision mortality at a large wind plant in Minnesota. *Wildlife Society Bulletin* 32:1278–1288.

Kennedy/Jenks Consultants. 2003. Klickitat County Energy Overlay Draft Environmental Impact Statement. August.

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M.D. Strickland, and J.M. Szewczak. 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. *Journal of Wildlife Management* 71: 2449–4486.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas. Work performed by BioSystems Analysis, Inc., Tiburon, CA. Sacramento, CA: California Energy Commission.

Reynolds, R. T., J. M. Scott, and R. A. Nussbaum. 1980. A variable circular-plot method for estimating bird numbers. *Condor* 82:309–313.

Ryan, L. A. and A.B. Carey. 1995. Distribution and Habitat of the Western Gray Squirrel (*Sciurus griseus*) on Fort Lewis, Washington. *Northwest Science* 69(3):204-216.

Schmidt, E., A.J. Piaggio, C.E. Bock, and D.M. Armstrong. 2003. National Wind Technology Center Site Environmental Assessment: Bird and Bat Use and Fatalities – Final Report. NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, Colorado.

US Fish and Wildlife Service (USFWS). 1992. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls, 1992 Revised Version.

———. 2009. Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Skamania County (Revised November 1, 2007). Available at: http://www.fws.gov/westwafwo/speciesmap/SKAMAN.html.

US Forest Service (USFS). 1985. *Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington.* Pacific Northwest Region. E.R. Brown, technical editor.

———. 2006. Northern Goshawk Inventory and Monitoring Technical Guide. Gen. Tech. Report WO-71. July.

Van der Haegen, M., S. Van Leuven, and D. Anderson. 2004. Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance. *Wildlife Research Report*. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Washington Department of Wildlife (WDW). 1993. Status of the Western Gray Squirrel (*Sciurus griseus*) in Washington. Olympia, WA. Final status report.

Washington Natural Heritage Program (WNHP). 2003a. Special Status Plants Species and Habitats Data Search. Washington Natural Heritage Information System.

———. 2003b. *Rare Plant List for Skamania County*. Washington Natural Heritage Program. http://www.dnr.wa.gov/nhp/refdesk/lists/plantsxco/skamania.html.

———. 2009. Special Status Plants Species and Habitats Data Search. Washington Natural Heritage Information System.

Weiler, Bill. Washington Department of Fish and Wildlife. Telephone conversation with Greg Johnson, Western Ecosystems Technology, Inc. 2003.

Whiteacre, L., J. Henderson, R. Holmes, L. Hoover, R. Lesher, J. Lippert, E. Olson, L. Potash, J. Seevers, M. Stein, and N. Wogen. 1998. *Survey Protocols for Survey & Manage Strategy 2 Vascular Plants, Version 2.0.* Bureau of Land Management. December. Available at: http://www.blm.gov/or/plans/surveyandmanage/SP/VascularPlants/cover.htm.

Woodbridge, B. and C.D. Hargis. 2006. Northern goshawk inventory and monitoring technical guide. *Gen. Tech. Rep. WO-71.* Washington, DC: US Forest Service.

1.5.11 SECTION 3.5, WETLANDS AND OTHER JURISDICTIONAL WATERS

CH2M Hill. 2007. Wetland Delineation Report, Saddleback Wind Energy Project, Skamania County, Washington. Prepared for Horizon Wind Energy LLC. Portland, Oregon.

1.5.12 SECTION 3.6, ENERGY AND NATURAL RESOURCES

American Wind Energy Association (AWEA). 2008. *The Difference Wind Makes*. http://www.awea.org/pubs/factsheets/The_Difference_Wind_Makes.pdf

1.5.13 SECTION 4.1, ENVIRONMENTAL HEALTH

American Wind Energy Association (AWEA). 2008. *Wind Energy Siting Handbook.* February.

Caithness Windfarm Information Forum. 2006. Summary of Wind Turbine Accident data to November 1st 2006. Available at www.caithnesswindfarms.co.uk.

California Department of Transportation (CDOT). 1998. Technical Noise Supplement. October.

Hill, Gail Kinsey. 2008. Siemens fined $10,500 for wind turbine tower collapse that killed worker. *The Oregonian*. February 26.

Holltitz, Nikki. Skamania County Department of Planning. Telephone conversation Tyrone Hunter, URS Corporation, December 22, 2008.

International Organization for Standardization (ISO). 1996a. Acoustics – description and measurement of environmental noise – Part 1: Basic quantities and procedures. Ref. No. ISO 1996/1-1982 (E).

———. 1996b. Acoustics – description and measurement of environmental noise – Part 2: Acquisition of data pertinent to land use. Ref. No. ISO 1996-2:1987 (E).

———. 1996c. Acoustics – description and measurement of environmental noise – Part 3: Application to noise limits. Ref. No. ISO 1996-3:1987 (E).

Jakobsen, Jorgen. 2005. Infrasound Emission from Wind Turbines. *Journal of Low Frequency Noise, Vibration and Active Control* 24, no. 3: 145–155.

Mills, Thomas. Vestas Wind Systems. Email to Mark Storm, URS Corporation, October 19, 2007.

Morgan, Colin, Ervin Bossanyi, and Henry Seifert. 1998. Assessment of Safety Risks Arising from Wind Turbine Icing. April.

Van den Berg, Godefridus Petrus. 2006. The sounds of high winds: the effect of atmospheric stability on wind turbine sound and microphone noise.

1.5.14 SECTION 4.2, LAND AND SHORELINE USE

Beckham, S.D., R. Minor, K.A. Toepel, and J. Reese. 1988. Prehistory and History of the Columbia River Gorge National Scenic Area, Oregon and Washington. Heritage Research Associates *Report* No. 75. Heritage Research Associates, Inc. Eugene, Oregon.

Buhyoff, G.J., P.A. Miller, J.W. Roach, D. Zhou, and L.G. Fuller. 1994. An AI Methodology for Landscape Visual Assessments. *AI Applications* 8, no. 1: 1-13.

Columbia River Gorge National Scenic Area. 1992. Recreation Development Proposals List. September.

Federal Highway Administration (FHWA). 1988. *Visual Impact Assessment for Highway Projects*. FHWA-HI-88-054.

Griffin, D. and T.E. Churchill. 2001. Cultural Resource Survey and Traditional Cultural Property Study of the Lower White Salmon River, Klickitat/Skamania Counties, Washington. Archaeological Frontiers, Eugene, Oregon. Manuscript on file at the Washington State Office of Archaeology and Historic Preservation, Olympia, Washington.

Masten, Ruth A. and Jerry R. Galm. 1989. An Overview of Cultural Resources within the Wild and Scenic Areas of the White Salmon and Klickitat Rivers, Klickitat and Skamania Counties, Washington. Vols 1 and 2. Eastern Washington University Reports in Archaeology and History 100-69. Archaeological and Historical Services, Cheney, Washington.

Patterson, James W., Jr. 2005. Development of Obstruction Lighting Standards for Wind Turbin Farms. Federal Aviation Administration. November.

Thayer, R.L. and C.M. Freeman. 1987. Altamont, Public Perceptions of a Wind Energy Landscape. *Landscape and Urban Planning* 14: 379–398.

US Forest Service (USFS). 1995. *Landscape Aesthetics, A Handbook for Scenery Management*.

1.5.15 SECTION 4.3, TRANSPORTATION

American Association of State Highway and Transportation Officials (AASHTO). 2004. *A Policy on Geometric Design of Highways and Streets.* 5th Edition.

Skamania County. 2007. Skamania County 2007 Comprehensive Plan.

———. 2008. Skamania County Private Road Guidelines and Development Assistance Manual.

Transportation Research Board (TRB). 2000. *Highway Capacity Manual*.

Washington State Department of Transportation (WSDOT). 2006. *Annual Traffic Report*.

———. 2007. *Design Manual*. Publication M 22-01.02. November.

1.5.16 SECTION 4.4, SOCIOECONOMIC IMPACT

Barkley, Allen. Secondary contact for the Applicant. Email communication with Katie Carroz, Carroz Consulting LLC. December 8, 2008.

Bureau of Economic Analysis (BEA). 2008. Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce. Table CA05 Personal income and detailed earnings by industry; Table CA25 Total employment by industry; Table CA1-3 Personal income, population, per capita personal income. Accessed December 12, 2008 and January 23, 2009 at http://www.bea.gov/regional/reis/default.cfm#step3.

Carlson, John. Skamania County Emergency Management. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

Claritas. 2009. Claritas Marketplace 2008 Population, Race/Ethnicity, Age, Sex, and Housing data for counties, states, places, and census block groups. Accessed January 26, 2009, and February 4, 2009 at www.clartiasmarketplace.com.

Cox, Dave. Undersheriff, Skamania County Sheriff's Office. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 17, 2008.

ECONorthwest. 2002. Economic Impacts of Wind Power in Kittitas County.

———. 2006. Economic Impacts of the Kittitas Valley Wind Project. Available at http://www.econw.com/consulting/subtopics?topic=energy&subtopic=renewable_energy).

Educational Service District 112 (ESD). 2008. School Districts, Skamania County. accessed December 15 and 17, 2008 at http://www.esd112.org/schooldistricts/skamania_county.html.

Energy Facility Site Evaluation Council (EFSEC). 2006. In the Matter of Application No. 2003-01: Sagebrush Power Partners, LLC; Kittitas Valley Wind Power Project, Exhibit 80 SUP (SG-T SUP), Economic Development Group of Kittitas County. Prefiled Supplemental Testimony, Witness #1: Stephen Grover.

Fullerton, Gail A. and Ole Helgerson. 2008. Underwood Community Wildfire Protection Plan Accessed December 12, 2008 at http://www.skamaniacounty.org/Wildfire/UnderwoodCWPP/Underwood%20CWPP%20Draft.pdf.

Hovey, Russ. Department of Natural Resources. Phone conversation with Katie Carroz, Carroz Consulting LLC. January 13, 2009.

IMPLAN. 2008. IMPLAN Regional Economic Input/Output Modeling Software. www.implan.com. Modeling completed December 20, 2008.

Klickitat County Public Economic Development Authority (Klickitat County PEDA). 2008. Personal communication with Michael Canon, Executive Director, and Katie Carroz, Carroz Consulting LLC. December 19, 2008.

Mill A Community Action Committee. 2008. Website. Accessed December 30, 2008 at http://community.gorge.net/mill-a/.

Mill A School District. 2008. Website. accessed December 17, 2008 at http://www.milla.k12.wa.us/Index.htm.

Moore, Leslie. Skamania County Assessor's Office. Phone and email communication with Katie Carroz, Carroz Consulting LLC. February 5, 2009.

Municipal Research and Services Center of Washington (MSRC). 2008. MSRC Website. Accessed December 17, 2008 at http://www.mrsc.org/Subjects/PubSafe/Fire/fireservice.aspx#Skamania.

National Wind Coordinating Committee (NWCC). 2009. Wind Energy Series, January 1997. Accessed January 25, 2009 at http://www.nationalwind.org/publications/wes/wes05.htm.

Oregon Employment Department (OED). 2009. Oregon Labor Market Information Service (OLMIS) Unemployment Rates. Accessed January 25, 2009 at http://www.qualityinfo.org/olmisj/AllRates.

Oregon Office of Economic Analysis (Oregon OEA). 2008. State and County Population Forecasts and Components of Change, 2000 to 2040. Accessed December 9, 2008 at http://www.oregon.gov/DAS/OEA/demographic.shtml#Short_Term_State_Forecast.

Portland State University Population Research Center (PSU Research Center). 2008a. Preliminary 2008 Population Estimates as of July 1, 2008. Accessed December 6, 2008 at http://www.pdx.edu/prc/.

———. 2008b. 2007 Oregon Population Report, Table 9: Population by Age and Sex for Oregon and Its Counties: July 1, 2007. Accessed December 6, 2008 at http://www.pdx.edu/prc/.

Real Estate.com. 2008. RealEstate.com, Hood River, OR Homes for Sale and Real Estate Data. Accessed December 12, 2008 at http://www.realestate.com/OR/Hood-River/Hood-River.aspx.

Renewable Energy Policy Project (REPP). 2003. The Effect of Wind Development on Local Property Values. May. Accessed December 28, 2008 at http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf.

———. 2009. Website: Wind Energy and the Economy. Accessed February 3, 2009 at http://www.awea.org/faq/wwt_economy.html.

Skamania County Chamber of Commerce (SCCC). 2008. Industry; Schools. Accessed December 12, 2008 at http://www.skamania.org/industry.cfm.

Skamania County Emergency Medical Service (EMS). 2008. Website. Accessed December 19, 2008 at http://www.skamaniaems.com/index.html.

Skamania County Public Utility District Office Staff. Phone conversation with Katie Carroz, Carroz Consulting LLC. December 30, 2008.

Skinner, Tracy. Washington Survey and Ratings Bureau. Email communications with Katie Carroz, Carroz Consulting LLC, December 12 through December 23, 2008. Accessed December 17, 2008 at www.wsrb.com.

Skyline Hospital. 2008. Skyline Hospital Website. Accessed December 19, 2008 at http://www.skylinehospital.com/index.html.

TravelWashington. 2008. Accessed December 12, 2008 at http://www.travel-in-wa.com/.

US Census. 2008a. American Community Survey, Race and Sex, Three-year (2005-2007) Annual Average Housing Estimates, Median Gross Rent, Median Value of Owner-Occupied Housing Units. Accessed December 9 and 11, 2008 at www.census.gov.

———. 2008b. Census 2000, Summary File 1: Table P8 Race, Table P12 Sex, Table QT-H1 Housing Information, and Table P17 Housing Information; Summary File 3: Table 87 Poverty Level, Table QT-H12 Contract Rent and Gross Rent, and Table QT-H14 Value, Mortgage Status, and Selected Conditions. Accessed December 9 and 11, 2008; and January 26, 2009 at www.census.gov.

US Department of Agriculture (USDA). 2007. Economic Research Service; The Economics of Food, Farming, Natural Resources, and Rural America. Accessed January 25, 2009 at http://www.ers.usda.gov/data/unemployment/RDList2.asp?ST=OR.

US Forest Service (USFS). 2008. Website. Accessed December 23, 2008 at http://www.fs.fed.us/srs/county.shtml and http://www.fs.fed.us/news/2008/releases/10/srs.shtml.

Washington Association of Sheriffs and Police Chiefs (WASPC). 2008. Criminal Justice Information: Crime in Washington. Accessed December 19, 2008 at http://www.waspc.org/index.php?c=Criminal%20Justice%20Information%20Support.

Washington Employment Security Department (WESD). 2008. Labor Market and Economic Analysis. Resident Labor Force and Employment in Washington State and Labor Market Areas. Accessed January 25, 2009 at http://www.workforceexplorer.com/cgi/dataanalysis/?PAGEID=94&SUBID=149.

Washington State Auditor. 2009. Washington State Auditor, Local Government Financial Reporting System. Accessed February 3, 2009 at http://www.sao.wa.gov/applications/lgfrs/.

Washington State Department of Revenue (WDOR). 2008. Website, Reports: Table 24: Property Tax Levies by County, Due in Calendar Years 2006 – 2008; Table 28: Property Tax Collections by County for Calendar Year 2007; Table: Local Taxable Retail Sales. Accessed December 30, 2008 at http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/.

———. 2009a. Website: Statistics and Reports, 2007 Comparison to County Assessor Statistics Reports. Accessed January 25, 2009 at http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/stats_proptaxstats_Assessor.aspx.

———. 2009b. Website: Reports, Table 2: Local Tax Distributions; Taxable Retail Sales Report; Tables 25 and 26: Property Tax Levy Rates by County. Accessed January 26, 2009, and February 4, 2009 at http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/.

Washington State Office of Financial Management (WOFM). 2008a. Washington State Office of Financial Management Official April 1, 2008 Population Estimates. Accessed December 6, 2008 at http://www.ofm.wa.gov/pop/april1/default.asp.

———. 2008b. April 1 Population Estimates by Age and Sex, 1980-2008: Washington State. , Accessed December 8, 2008 at http://www.ofm.wa.gov/pop/coagemf/default.asp.

———. 2008c. Washington State County Growth Management Population Projections: 2000 to 2030. 2007 County Projections by Five-Year Intervals. Medium Series. http://www.ofm.wa.gov/pop/gma/projections07.asp, accessed December 9, 2008.

———. 2008d. WOFM Housing and Housing Change by Structure Type by County, 2000-2008, 2008 Housing Unit Inventory by County. Accessed December 10 and 11, 2008 at www.census.gov.

———. 2008e. Median Household Income Estimates by County: 1989 to 2007 and Projection for 2008; October 2008. Accessed January 23, 2009 at http://www.ofm.wa.gov/economy/hhinc/default.asp.

Washington State Office of the Superintendent of Public Instruction (OSPI). 2008. Data and Reports. Accessed December 15, 2008 at http://www.k12.wa.us/dataadmin/default.aspx.

Washington State Patrol. District 5 Public Information Contact, Phone conversation with Katie Carroz, Carroz Consulting LLC. January 26, 2009.

Weeks, Joe. Southeast (Ellensburg) Region of the Washington State Department of Natural Resources Fire Service. Phone conversation and email with Katie Carroz, Carroz Consulting LLC. February 5, 2009.

Woodall. 2008. Woodall's Camping Directory Website. Accessed December 12, 2008 at http://www.woodalls.com/.

SECTION 2.1 SITE DESCRIPTION (WAC 463-60-125)

2.1.1 LOCATION OF WHISTLING RIDGE ENERGY PROJECT

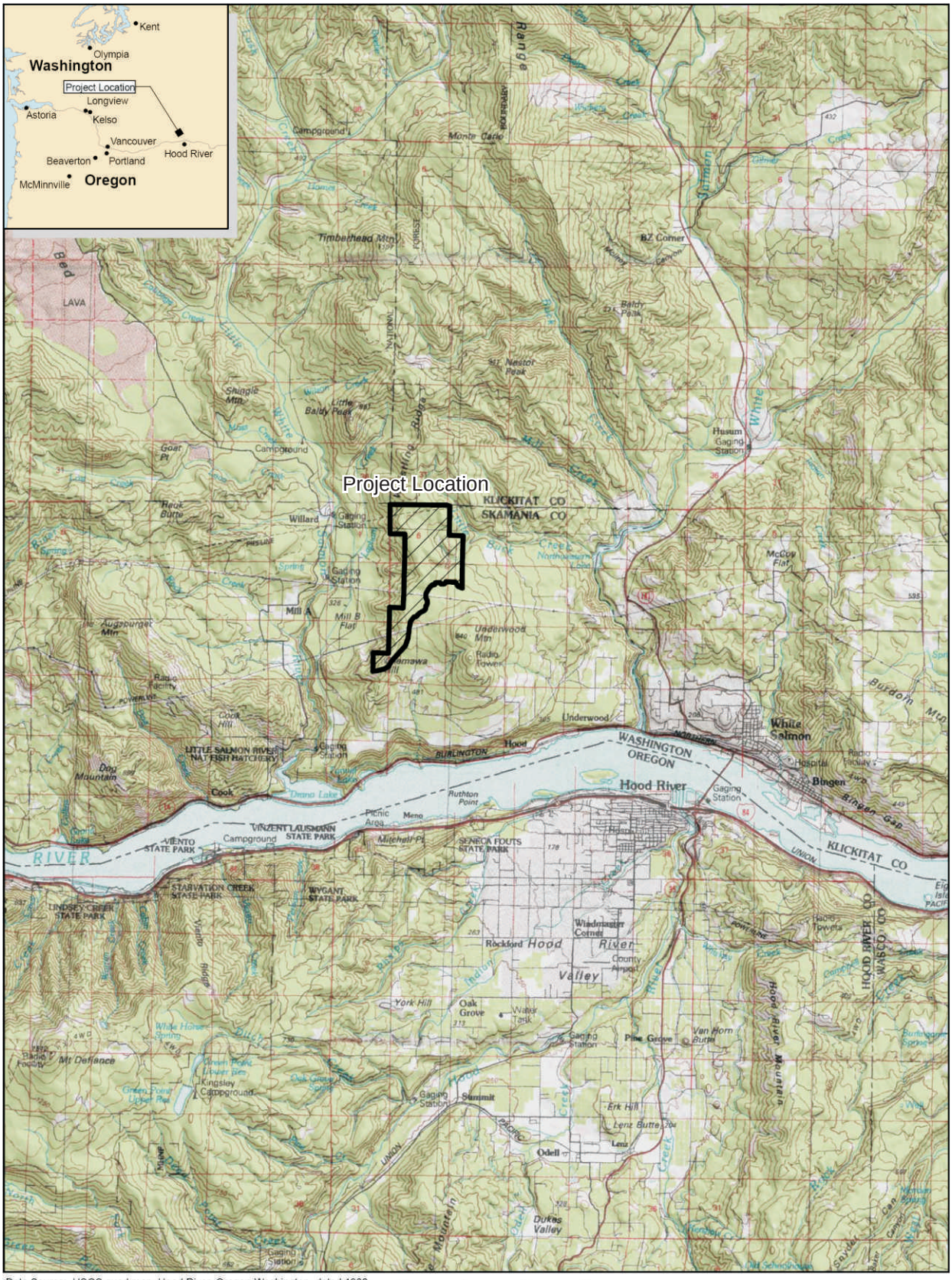
The proposed Whistling Ridge Energy Project would be located on private land located approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington (Figure 2.1-1, Location of Proposed Whistling Ridge Energy Project). The project would be located on commercial forestland owned by S.D.S. Co., LLC and Broughton Lumber Company in an unincorporated area of Skamania County, outside of the Columbia Gorge National Scenic Area.

The project site encompasses approximately 1,152 acres in Sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in Section 13 of Township 3 North, Range 9 East.

The Applicant seeks approval of construction of wind turbine generators, roads, and electrical collection cables and transmission lines within corridors that will be described and analyzed in the environmental impact statement (EIS). Actual final locations of wind turbine generators and other related and supporting facilities would be established during the micrositing process. During the micrositing process (when the final, exact locations of the turbines and other project elements and equipment are determined), the Applicant must balance a number of technical and engineering factors, including limitations posed by the terrain, wind data (speed, wind sheer, etc.), wake effects of turbines, location of roadways and transportation systems, and feasibility of access, setbacks (internally established or permit requirements), geotechnical considerations (subsurface conditions), environmental restrictions (avoidance of sensitive habitat), cultural/archeological restrictions (avoidance of cultural resource sites), telecommunications constraints (line of sight microwave paths), Federal Aviation Administration (FAA) lighting requirements, and other site-specific criteria that are not fully resolved until final engineering is completed.

Access to the project area is provided by county and private logging roads that extend north from State Route (SR) 14. From SR 14, access would be provided via County roads (Cook-Underwood Road to ~~Kollack-Knapp~~Willard Road~~ onto Scoggins Road~~) and then via a new connection direct to West Pit Road, an existing private logging road. West Pit Road connects~~and then~~ to a network of existing private logging roads. The private logging roads are on S.D.S. Co., LLC and Broughton Lumber Company property, and provide access to most areas where project facilities would be located.

33758687_101.cdr



Revised Figure 2.1-1

Location of Proposed Whistling Ridge Energy Project

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

As shown on Table 2.1-1, approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines.

Table 2.1-1
Area of Development
(acres)

Project Element	Area Proposed for EFSEC Certification and Micrositing	Permanent Impact	Temporary Impact	Total Temporary and Permanent Impact
Project Site[a]	1,152			
Area to be Developed				
Windfarm Footprint[b]	384	NA	NA	
Turbine String Corridor[c]	318	25.4	36.4	61.8
Roadway Corridor within Project Site[d]	48.4	15.2	13.3	28.5
Overhead Transmission Line Corridor within Project Site[e]	6.9	3.45	0	3.45
Underground Transmission Line Corridor within Project Site[f]	8.9	0.0	2.4	2.4
Operation and Maintenance Yard & Storage Area[g]	~~3.1~~5.0	~~3.1~~5.0	0.0	~~3.1~~5.0
Substation Plot & Study Area[h]	7.1	7.1	0.0	7.2
Total Area to be Developed Within Project Site	**NA**	**54.25**	**52.1**	**106.6**
Impact Area Outside of Project Area				
Roadway Corridor Outside Project Site[i] (based on ~~2.1~~2.5 miles of improved road)	~~11.0~~12.1	~~2.1~~6.1	~~5.5~~0	~~7.7~~6.1

a. Project site is the area shown on Figure 2.1-1 bordered in black, encompassing approximately 1,152 acres in Sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in Section 13 of Township 3 North, Range 9 East.
b. Windfarm footprint is the total area of all corridors and development study areas in the project boundary with overlapping areas removed, in which development potentially will take place.
c. Total area of 650-foot corridor measured on either side of an imaginary line connecting each turbine in a string. Permanent impacts based on turbine clearance zone and permanent infrastructure in corridor but outside of clearance zone. Temporary impacts based on infrastructure in corridor but outside clearance zone, as described in Section 2.3 and shown on Figure 2.3-4.
d. Area encompassed by a 100-foot corridor along all roads within the project area minus any area that overlaps with 650-foot-wide turbine corridor, based on a roadway length of 7.5 miles.
e. Total area encompassed by a 200-foot corridor on the overhead transmission lines minus any area that overlaps with roadway or turbine string corridors.
f. Total area encompassed by a 100-foot corridor on the overhead or underground transmission lines minus any area that overlaps with roadway, overhead or turbine string corridors.
g. Area includes the 2-acre Operations and Maintenance site plus a 50-foot area around the perimeter.
h. Area includes the 5-acre substation site plus a 50-foot area around the perimeter.
i. Area based on 40-foot corridor (20-foot roadway: 12-foot existing, widened to 20 feet with 10 feet on either side) from project site boundary to ~~intersection of Scoggins and CG2930~~ an intersect point with Willard Road, based on a length of ~~2.1~~2.5 miles.

Because the project site already has a network of logging roads, relatively few new roads would have to be constructed. Approximately ~~7.2~~7.9 miles of existing private logging roads located on land owned by SDS Co., LLC and Broughton Lumber Company would be improved. In areas where there are no existing logging roads near proposed wind turbine strings, approximately 2.4 miles of new gravel access roads would be constructed. All of these construction roads would continue to be used during the project's operational phase.

Of the total ~~9.6~~10.3 miles of access roads, approximately ~~7.5~~7.8 miles would be located within the project area. The remaining approximately ~~2.1~~2.5 miles would be located outside of the

project area ~~within~~ and outside of the Columbia River Gorge National Scenic Area. All new road construction would occur within the project area (Table 2.1-2).

Table 2.1-2
Summary of Access Roadway Improvements and Construction
(acres)

Roadway	Within Project Area	~~Within Columbia River Gorge National Scenic Area~~ Outside of Project Area	Total
Improved roadway	~~5.1~~5.4	~~2.1~~2.5	~~7.2~~7.9
New roadway	2.4	0	2.4
Total	~~7.5~~7.8	~~2.1~~2.5	~~9.6~~10.3

Existing logging roads are constructed, and are regularly improved and maintained to enable large trucks and logging equipment to access the project site for ongoing commercial logging purposes. These roads are generally 8 to 12 feet wide, although some are currently as wide as 20 feet. Improvements to allow use by construction vehicles generally would involve widening and providing a gravel all-weather surface. Most of the roads used to provide access to the site by construction vehicles would be widened to approximately 25 feet (width of finished road), with an additional 5 feet of shoulder on either side.

The project proponent has requested to integrate power from the Whistling Ridge Energy Project into the Federal Columbia River Transmission System (FCRTS) that exists within the project area.

2.1.2 PROMINENT GEOGRAPHIC FEATURES

The project site is located on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet above mean sea level (msl). The land west of the proposed project site drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. The topography northeast of the site drops gradually toward the White Salmon River or climbs gently up the northeast flank of Underwood Mountain (2,728 feet above msl). To the south, the topography drops to a terrace of largely agricultural use, then toward the Coumbia River.

2.1.3 TYPICAL GEOLOGICAL AND CLIMATOLOGICAL CHARACTERISTICS

The following summarizes the geological and climatological characteristics of the site. For a more complete discussion of site geology, please see Section 3.1, Earth.

2.1.3.1 Geology

The White Salmon, Washington area is located within the Cascade Range and the Columbia Intermontane Physiographic Province. The project area is located just within the western boundary of the Columbia Plateau, which is located at the western edge of the Columbia Intermontane Physiographic Province (Freeman et al. 1945). This lowland province is surrounded on all sides by mountain ranges and highlands, and covers a vast area of eastern Washington and parts of northeastern Oregon and western Idaho.

A variety of younger volcanic rocks and sedimentary materials that range from Pliocene (1.8 to 5.3 million years before the present [BP]) to Holocene (less than 10,000 years BP in age) overlie the Columbia River Basalt Group (CRBG) in the project area. Sedimentary rocks are generally thought to underlie the basalts in the project area.

The proposed project site is located within the northern boundary of the structural Hood River Valley, which extends a few miles into southern Washington. In general, the geology of the area consists of basalt flows extruded from local vents, layered with conglomerate, tuff, tuff breccias, and other volcanoclastic deposits. These formations are typically overlain by silt and clay soil of varying thickness in the project vicinity. The bedrock underlying the proposed project site consists of Grande Ronde Basalt of the CRBG and Quaternary basalt of Underwood Mountain—a shield volcano that lies approximately midway between the lower reaches of the Little White Salmon and White Salmon Rivers. Its southern slopes drain to the Columbia River.

No faults are mapped within the footprint of the proposed Whistling Ridge Energy Project area. However, faults are mapped approximately 1.5 miles southwest and northeast of the proposed project area. Many of these faults are inferred and shown as dotted lines buried by younger surficial deposits. The activity of the area faults is unknown. However, a review of aerial photography shows no indication of recent movement along the trace of the inferred faults.

During the current subsurface exploration, groundwater was not encountered in the site up to a depth of 16 feet below ground surface (bgs). It should be noted that these observations reflect groundwater levels at the time of the field investigation. Actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors not observed during this investigation. There may be regional or perched water tables at greater depth. Prior to final design of the tower foundations, additional subsurface investigations (boreholes) would be required to provide geotechnical data at foundation and anchor depths. Future deep foundation investigations will include observation of groundwater, if encountered.

2.1.3.2 Climate

Skamania County's location, sheltered by the Cascade Mountains in the Columbia River Gorge, provides for a moderating climate between the storms rolling in from the Pacific Ocean and the extreme seasonal temperature shifts that occur in eastern Washington. Winters may be near freezing, depending on location, while summers are usually mild. Frequent strong winds and precipitation dominate the weather pattern within the Gorge throughout the year (Haagen 1990).

Temperature and precipitation data was recorded at Wind River, Washington and Bonneville, Oregon from 1951 to 1978 (Haagen 1990). Wind River is at about 1,100 feet above msl and about 15 miles northwest of the Whistling Ridge Energy Project site. Bonneville, Oregon is situated around 80 feet above msl and lies about 19 miles southwest of the project site. Average winter temperatures were 38 and 39 degrees Fahrenheit (°F), respectively, with average daily minimums of 33 and 28°F. The average summer temperatures are 63°F (Wind River, WA) and 65°F (Bonneville, OR) with an average daily maximum of 76°F.

Carson Fish Hatchery, located at 1,130 feet above msl and about 19 miles northwest of the project site, recorded slightly cooler winter and similar summer temperatures from 1977 to 2000 (USDA NRCS 2008). Average December and February temperatures settled around 34°F with average daily minimums around 28°F. Summer temperatures averaged 61°F with daily maximums averaging 80°F.

The average total annual precipitation from 1951 through 1978 is 77 inches at Bonneville, Oregon and 102 inches at Wind River, Washington. Twenty percent of the total precipitation for both areas falls between April and September. The average seasonal snowfalls are 13 and 109 inches, respectively (Haagen 1990). Carson Fish Hatchery received an average annual total precipitation of 88 inches from 1977 through 2000. Average seasonal snowfall during the same period at the fish hatchery totaled 77 inches (USDA NRCS 2008).

The prevailing winds though the Columbia Gorge shift seasonally. Gale force winds are not uncommon. Westerly winds prevail during the summer months. Cold easterly winds usually blow through the Gorge during winter months. These winter winds occasionally collide with the moist Pacific air masses leading to severe ice storms, locally described as silver thaws (Haagen 1990).

Wind power and wind speed maps published by the Northwestern U.S. Wind Mapping Project and verified by the U.S. Department of Energy's National Renewable Energy Laboratory identify the ridge line where the Whistling Ridge Energy Project would be constructed as a viable wind energy resource. Models indicate that winds passing 50 meters above the ground surface in this vicinity reach sustained speeds of between 15.7 and 17.9 miles per hour depending upon location (NWSEED 2002a). Such wind speeds rate this area as wind power potential of good (Class 4) to Outstanding (Class 5) (NWSEED 2002b). One concentrated area within the project area is identified as having outstanding (Class 6) wind power potential with sustained wind speeds of 17.9 to 19.7 miles per hour.

2.1.4 LAND USE PLANS AND ZONING ORDINANCES

A description of the applicable comprehensive plans, zoning, and development regulations and other land use programs relevant to the Whistling Ridge Energy Project is included in Section 4.2.1, Land Use.

The site is located entirely within unincorporated areas of Skamania County. Portions of the land are designated as Conservancy in the Skamania County Comprehensive Plan. The majority of the land is currently zoned as Unmapped, except for a small part of the southwest portion of the project area where seven turbines are proposed, and the alternative site for the maintenance and operations facility located along West Pit Road. Pursuant to the locally adopted land use plans and ordinances in effect at the time of this application, wind energy facilities are an outright permitted use in the Unmapped (UNM) area of the project. In the southwest portion of the property where approximately seven proposed turbines would be located, ~~approximately three to four turbines would be located on~~the property is zoned Resource Protection (For/Ag-20)~~ and three to four turbines would be located on property zoned Residential 10, a transitional zone~~. The site proposed for the alternative Operations and Maintenance facility along West Pit Road, to the west of the project site,

is on land zoned Residential 5. A conditional use permit would be required only for these two areas of the project.

~~Skamania County is in the process of considering amendments to its zoning code. In the current draft ordinance, the entire project area is proposed for Forest Land 20 (FL-20) zoning. This proposed zoning code amendment is being challenged by a variety of parties., including a pending appeal of the County's State Environmental Policy Act (SEPA) determination related to the proposed zoning code. Under the proposed FL-20 zoning, the code would allow "Large-Scale Wind Energy Facilities," subject to conditional use approval.~~

SECTION 2.2 LEGAL DESCRIPTIONS AND OWNERSHIP INTERESTS (WAC 463-60-135)

2.2.1 INTRODUCTION

The proposed Whistling Ridge Energy Project would be located on private land approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington. The project would be located on commercial forestland owned by S.D.S. Co., LLC and Broughton Lumber Company in an unincorporated area of Skamania County, outside of the Columbia River Gorge National Scenic Area.

An alternative site is proposed for a maintenance and operations facility, located outside of and to the west of the project site along West Pit Road. This land is owned by the Broughton Lumber Company.

Whistling Ridge Energy LLC, a special purpose corporation operating in the State of Washington, is developing and would own the project.

The total project area encompasses approximately 1,152 acres in Sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in Section 13 of Township 3 North, Range 9 East.

The alternative operations and maintenance yard along West Pit Road would encompass approximately 5 acres in Section 1 of Township 3 North, Range 9 East.

2.2.2 LEGAL DESCRIPTION OF PROPERTY

Real property situated in the County of Skamania, State of Washington, hereby described as follows:

Township 3 North, Range 10 East of the Willamette Meridian:

Section 5: The West Half of the Southwest Quarter.
Section 6: All except for the West Half of the Southwest Quarter.
Section 7: The South Half of the Southwest Quarter, the Northeast Quarter of the Southwest Quarter, the West Half of the Southeast Quarter, the East Half of the Northwest Quarter and the Northeast Quarter excluding lands within the Columbia River Gorge National Scenic Area
Section 8: The West Half of the Northwest Quarter excluding lands within the Columbia River Gorge National Scenic Area
Section 18: The Northwest Quarter, and the Northwest Quarter of the Southwest Quarter excluding lands within the Columbia River Gorge National Scenic Area

Township 3 North, Range 9 East of the Willamette Meridian:

Section 13: The East Half of the Southeast Quarter excluding lands within the Columbia River Gorge National Scenic Area.

2.2.3 LEGAL DESCRIPTION OF ALTERNATIVE MAINTENANCE AND OPERATION FACILITY

Township 3 North, Range 9 East of the Willamette Meridian:

Section 1: Portions of The Southeast Quarter of the Southeast Quarter, and the Southwest Quarter

SECTION 2.3 CONSTRUCTION ON SITE (WAC 463-60-145)

2.3.1 WHISTLING RIDGE ENERGY PROJECT SUMMARY

The Whistling Ridge Energy Project would be constructed in south-central Washington on an approximately 1,152-acre site approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington. The project would be located on commercial forestland owned by S.D.S. Co., LLC and Broughton Lumber Company in an unincorporated area of Skamania County, outside of the Columbia River Gorge National Scenic Area. See Figure 2.1-1, Location of Proposed Whistling Ridge Energy Project.

Turbines would be located on the forested ridges of Saddleback Mountain. The final locations of wind turbine generators and other related and supporting facilities would be established during the final design process (see Section 2.1, Site Description for more information).

The planned facility would have an installed capacity of up to 75 megawatts (MW) of electricity.

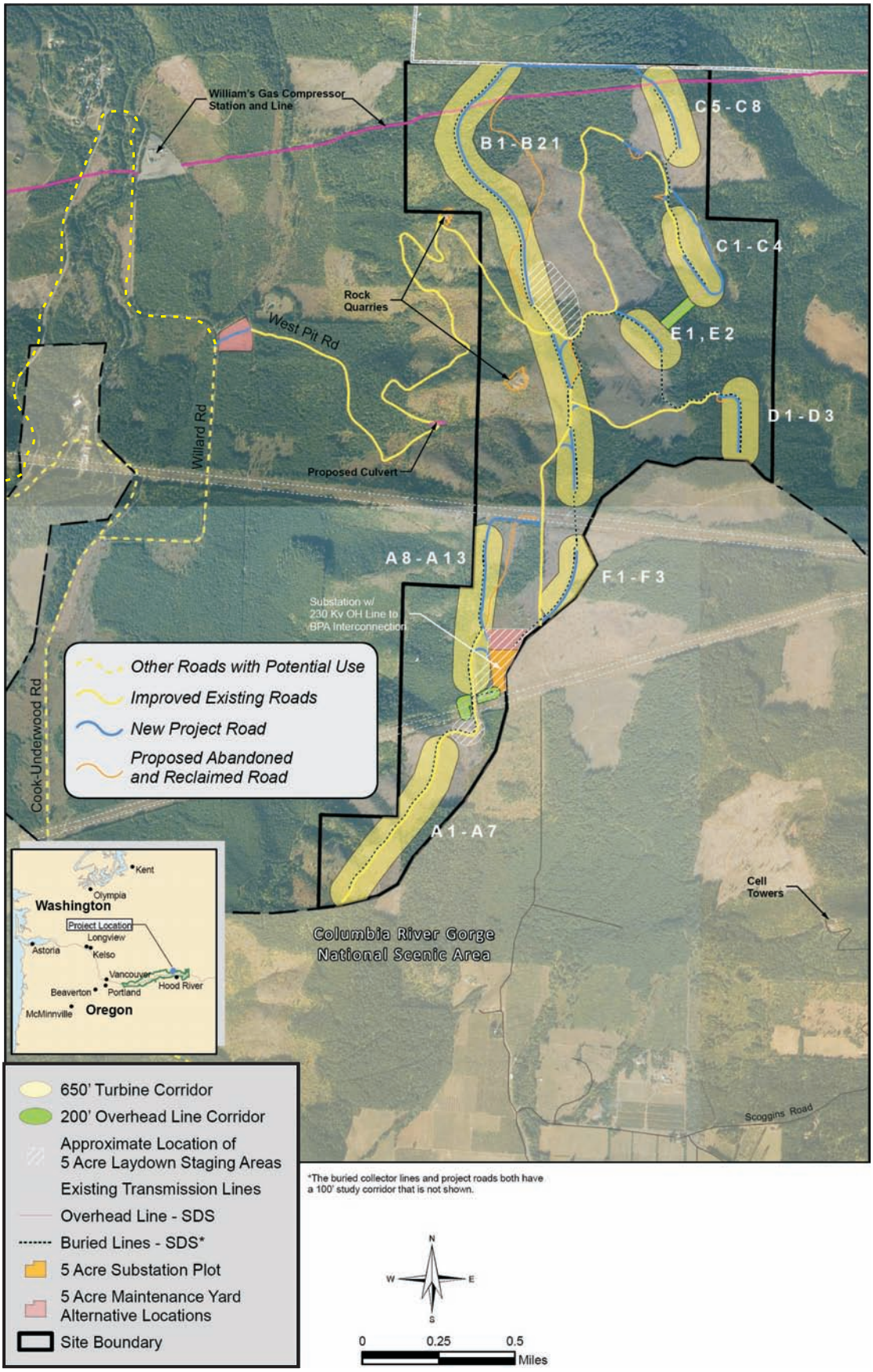
2.3.2 PROJECT OVERVIEW

The planned facility is shown on Figure 2.3-1, and would have:

- An installed capacity of up to 75 MW of electricity
- Up to fifty 1.2- to 2.5-MW wind turbines
- Electrical transformers
- 34.5 kilovolt (kV) collector lines and systems (primarily underground)
- Permanent meteorological towers
- Two alternative locations for an ~~An~~ Operations and Maintenance facility
- A substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line
- Approximately 2.4 miles of newly-constructed and ~~7.2~~7.9 miles of improved roads to provide access to the wind turbine locations during construction and for Operations and Maintenance

The project substation would be built on the project site adjacent to BPA's North Bonneville to Midway 230-kV transmission line, facilitating interconnection with the BPA grid. The proposed electrical interconnection to BPA would provide the access to the regional transmission grid for sales to the wholesale electric market. The development of the proposed interconnection requires a federal action, limited exclusively to the interconnection with the BPA grid.

33758687_17.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 2.3-1

Proposed Project Elements

URS

Whistling Ridge Energy Project
Skamania County, Washington

The construction phase is anticipated to last approximately one year, during which a total of approximately 330 workers would be employed. Eight to nine permanent full- or part-time Operations and Maintenance staff would be required once the project is operational. See Section 2.12, Construction and Operation Activities for more information.

The Whistling Ridge Energy Project is expected to function for at least 30 years.

2.3.3 PROJECT COMPONENTS

2.3.3.1 Wind Turbines

The project would consist of up to 50 wind turbines. Because of the heightened activity in the wind energy industry, pricing and availability of turbines are highly variable. Consequently, the specific turbine type and manufacturer has not been selected. However, it is likely that the turbines would be in the 1.2- to 2.5-MW range, and the range of key parameters (such as turbine height and diameter) can be anticipated, even if the turbine manufacturer is not yet known.

Each turbine would be up to approximately 426 feet tall (262-foot hub height and 164-foot radius blades, measured from the ground to the turbine blade tip), and would be mounted on a concrete foundation. Wind turbines would be grouped in "strings," each spaced approximately 350 to 800 feet from the next (or approximately 1.5 to 2.5 times the diameter of the turbine rotor). The electrical output of each string would be connected to the project substation by underground 34.5-kV collector cables, and from there would be directly interconnected with the adjacent BPA transmission system. The project would be monitored and controlled from an Operations and Maintenance building centrally located on the project site.

Wind turbines consist of four main aboveground components: the turbine tower (described below), the nacelle, the rotor hub, and the blades. The nacelle is encased in fiberglass, and is mounted at the top of the tower to house the gearbox, the generator, and the control system. The rotor hub is attached to the nacelle, and holds the blades in place. Each turbine has three laminated fiberglass blades, each approximately 129 to 164 feet long, depending on which turbine is selected. The diameter of the circle swept by the rotors would be approximately 264 to 320 feet, depending on which turbine is selected. Together, each turbine's blades, hub, and nacelle would weigh between 95 and 150 tons, depending on the turbine size and model selected.

The wind turbines would operate at wind speeds from 9 to 56 miles per hour (mph), with a rotor speed range of 10 to 20 revolutions per minute (rpm). The turbines operate on a variable pitch principal in which the rotor blades rotate to keep them at the optimum angle to maximize output for all wind speeds. At speeds exceeding 56 mph, the blades feather on their axis and the rotor stops turning. Each turbine is equipped with a wind vane that signals wind direction changes to the turbine's electronic controller. The electronic controller operates electric motors (the yaw mechanism), which turn the nacelle and rotor so that each turbine faces into the wind.

2.3.3.2 Turbine Towers

Depending on which manufacturer is selected, each turbine would be approximately 221 to 262 feet tall at the turbine hub, and with the nacelle and blades mounted, the total height of each wind turbine (to the turbine blade tip) would be up to approximately 426 feet. The towers would be tapered, hollow tubular structures, approximately 14 feet in diameter at the base and weighing approximately 30 tons each. The towers would likely be painted a flat neutral gray or white color. A controller cabinet would be located at the base inside each tower. Cables and a ladder would ascend to the nacelle to provide access for turbine maintenance. A locked door would provide access to the base of the tower. Some of the towers would be furnished with blinking lights visible to aircraft. The need for turbine lights and the type of lighting would be determined in consultation with the FAA.

Each tower would be mounted on a concrete foundation with a diameter up to approximately 60 feet. Tower foundations would be spread footing or pier-type footings.

2.3.3.3 Electrical System

The project's electrical system would consist of two key elements: (1) a collector system, which would collect energy generated at approximately 575 volts from each wind turbine, transform the voltage to 34.5 kV using a pad-mounted transformer, and deliver the energy via underground cables to (2) the project substation, which would further transform the energy delivered by the underground collector system from 34.5 kV to 230 kV and deliver it to the adjacent BPA transmission line and into the regional transmission system.

2.3.3.4 Collector System

Each turbine's 575V/34.5kV transformer adjacent to each tower would be located on a transformer pad, or enclosed in the nacelle, depending on the turbine model. If required, the transformer pad would be approximately 9 feet by 9 feet square and 12 inches thick, constructed approximately 5 feet away from the tower pad. From there, power would be transmitted via underground 34.5-kV electric cables, buried directly in the soil approximately 3 to 4 feet bgs, in a trench up to 5 feet wide. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the substation), multiple sets of cables would be installed within each trench where possible. A disturbed area approximately 30 feet in width is anticipated; however, impacts would be temporary, and the areas outside of roadways would be revegetated after the cable installation is completed. There would be approximately 8.5 miles of underground collector cable trenches. In areas where environmental constraints, geologic features, or cultural features necessitate, minor aboveground placement of collector cables may occur.

2.3.3.5 Substation

The substation site would occupy a portion of a fenced 5-acre area at the southwest end of the project site, immediately adjacent to the BPA 230-kV transmission line. A 50-foot cleared area would be maintained around substation. The substation site would be a graveled, fenced area

with transformer and switching equipment and an area to park utility vehicles. Transformers would be non-polychlorinated biphenyl oil-filled types.

2.3.3.6 Operations and Maintenance Facility

A permanent Operations and Maintenance facility would be constructed on an approximately ~~2~~5-acre area located at one of the following two alternative locations: (1) adjacent to the substation; or (2) to the west of the project site along West Pit Road. It would have approximately 3,000 square feet of enclosed space, including office and workshop areas, a kitchen, bathroom, shower, and utility sink. It would be constructed of sheet metal, and would be approximately 16 feet tall (to the roof peak). Water for the bathroom and kitchen would come from a new on-site well. Water use would be less than 5,000 gallons per day. The bathroom and kitchen would drain into an on-site septic system. A graveled parking area for employees, visitors, and equipment would be located adjacent to the building. The entire area would be fenced and have a locked gate.

2.3.3.7 Access Roads

Access to the project site is provided by county and private logging roads that extend north from State Highway 14. From Highway 14, access would be provided via County roads (Cook-Underwood Road to ~~Kollack-Knapp~~Willard Road~~ onto Scoggins Road~~) and then via a new connection to West Pit Road, an existing private logging road. West Pit Road connects to a network of existing private logging roads (Figure 2.3-1, Proposed Project Elements). The private logging roads are on S.D.S. Co., LLC and Broughton Lumber Company property, and provide access to most areas where project facilities would be located.

Because the project site already has a network of logging roads, relatively few new roads would have to be constructed. Approximately ~~7.2~~7.9 miles of existing private logging roads would be improved. In areas where there are no existing logging roads near proposed wind turbine strings, approximately 2.4 miles of new gravel access roads would be constructed. All new roadway construction would occur on private lands owned by S.D.S. Co., LLC and Broughton Lumber Company. Approximately ~~2.1~~2.5 miles of roadway improvements would occur on West Pit Road, a ~~gravel~~ dirt road covered in light pit run, that connects the project site via Willard Road to the Cook-Underwood Road. West Pit Road is located entirel~~y~~y outside of~~traversing~~ the Columbia River Gorge National Scenic Area. West Pit Road currently varies in width between 20 and 26 feet. To create a drivable surface of 25 feet with 5 feet of of clearing on each side, some widening would be required for the roadway, the existing culvert and some corners. ~~Some of these construction roads~~West Pit Road would continue to be used during the project's operational phase.

Existing logging roads were originally built to enable large trucks and logging equipment to access the project site for ongoing commercial logging purposes. These roads are generally 8 to 12 feet wide, although some are currently as wide as 20 feet. Improvements to allow use by construction vehicles generally would involve widening and providing a gravel all-weather surface. Most of the roads used to provide access to the site by construction vehicles would be widened to approximately 25 feet (width of finished road), with an additional 5 feet of shoulder on either side.

Once assembled, the construction cranes required to erect turbine and tower sections require a ~~40~~35-foot-wide road (of which 25 feet needs to be graveled). Therefore, the roads that run adjacent to turbine strings and roads that connect turbine strings to a central staging area would be approximately 35 feet wide (25 feet plus 5 feet of shoulder on either side). Because cranes might be needed to maintain turbines over their operational life, the 35-foot-wide roads would be kept as maintenance access roads for the expected 30-year life of the project.

All private roadway improvements required prior to hauling and new private roadway construction at the proposed project site would be designed and constructed under the direction of a licensed engineer, in accordance with the standards for the applicable road classifications as set forth in the Skamania County Private Road Guidelines and Development Assistance Manual, as adopted by the County Resolution in 2008. All existing county roadways requiring improvements prior to hauling would be designed and constructed in accordance with the WSDOT *Design Manual* (WSDOT 2007) and *A Policy on Geometric Design of Highways and Street*s (AASHTO 2004). A gravel surface would be installed, compacted to meet all equipment load requirements, and maintained to reduce wind erosion and dust. Existing culverts across intermittent streams would be replaced with wider or stronger culverts as necessary, and drainage improvements would be made (pursuant to a Project Erosion Control Plan and National Pollutant Discharge Elimination System [NPDES] permit) as necessary to control runoff.

In addition to the permanent access roads described above, temporary access may be required for constructing some facilities. For example, constructing the underground collector cables would require that heavy equipment be able to access trench locations where they are not directly adjacent to roads. Generally, equipment would be driven across open ground to accomplish this construction; in some locations minor grading may be required to allow safe access to construction locations (that would be determined only after final pole locations have been selected). These temporary access roads would be regraded and reseeded as necessary to restore vegetation after the construction phase is over.

After the project is constructed, use of the improved and new access roads on private lands would be limited to the landowner and to project maintenance staff.

2.3.4 TRANSMISSION INTERCONNECTION

Power generation resources typically require interconnection with a high-voltage electrical transmission system for delivery to purchasing retail utilities. BPA owns and operates the FCRTS, which includes more than three-fourths of the high-voltage transmission grid in the Pacific Northwest and includes extra-regional transmission facilities. BPA operates the FCRTS, in part, to integrate and transmit "electric power from existing or additional Federal or non-Federal generating units" (16 United States Code [USC] 838b). Interconnection with the FCRTS is essential to deliver power from many generation facilities to loads both within and outside the Pacific Northwest.

In summary, electrical consumers served by the Northwest Power Pool and in other western states need increased power production to serve increasing demand, and high-voltage transmission services to deliver that power. The project proponent has requested to integrate

power from the Whistling Ridge Energy Project into the FCRTS that exists within the project area.

2.3.5 CONSTRUCTION

Construction is expected to take approximately one year, and would likely occur from early spring through late fall. Construction of the project would involve the following tasks:

- Harvesting trees in areas that are not already cleared
- Constructing roads and turbine crane pads
- Constructing foundations for turbine and meteorological towers
- Trenching for underground utilities
- Placing underground electrical and communications cables in trenches
- Constructing the substation
- Constructing interconnections between the substation and the existing BPA transmission line
- Constructing the Operations and Maintenance building
- Transporting tower sections to the site and assembling towers
- Transporting nacelle, rotor, and other turbine equipment to the site and installing the equipment on the assembled towers
- Final testing
- Final road grading, final erosion control, and site cleanup

After the project has been constructed, trees on most of the site would be allowed to mature on a normal forest management schedule (according to the SDS Lumber Company staff, trees in the project area grow about 2 foot per year on average). Figure 2.3-2, Forest Management, shows the current forest types in the project area.

The exception would be in an area immediately surrounding the turbines and the access roads to the turbines. To allow for safe access to each tower for maintenance, to eliminate the potential for trees falling against the towers during storms, and for fire protection, an area extending approximately 150 feet from the center of each tower would be managed to maintain vegetation below approximately 15 feet in height. These dimensions may be adjusted during the final micrositing process to best balance the interest of maximizing electrical generation, along with maximizing replanting of all trees to ensure the best possible operation of the site for ongoing commercial forestry purposes.

33758687_98.cdr



Conifer Forest, Saw Timber 50+ft
Conifer Forest, Pole, 20-50ft
Brush/Sapling/Shrub, 4-20ft
Grass-Forb, 0-4ft.
Riparian
650' Turbine Corridor
Site Boundary
Columbia River Gorge National Scenic Area
Exisiting Roads

0 0.25 0.5 Miles

N

Aerial Photo: 2006 USDA NAIP Imagery
Forest Cover Source: SDS Lumber Company

Source: GeoDataScape.

Job No. 33758687

Revised Figure 2.3-2

Current Forest Types

URS

Whistling Ridge Energy Project
Skamania County, Washington

2.3.6 FOREST HARVEST

The project site is on land managed for commercial forestry by S.D.S. Co., LLC and Broughton Lumber Company. All of the parcels on which the project is located are managed for a continual cycle of growth, harvest, and replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the project is proposed. Many of the remaining stands of trees on the sections of land that would have turbines on them are near maturity and S.D.S. Co., LLC and Broughton Lumber Company implemented timber harvest plans on portions recently. Harvests have occurred in the project area over time, pursuant to long-established harvesting schedules (Figure 2.3-3, Harvesting Schedule).

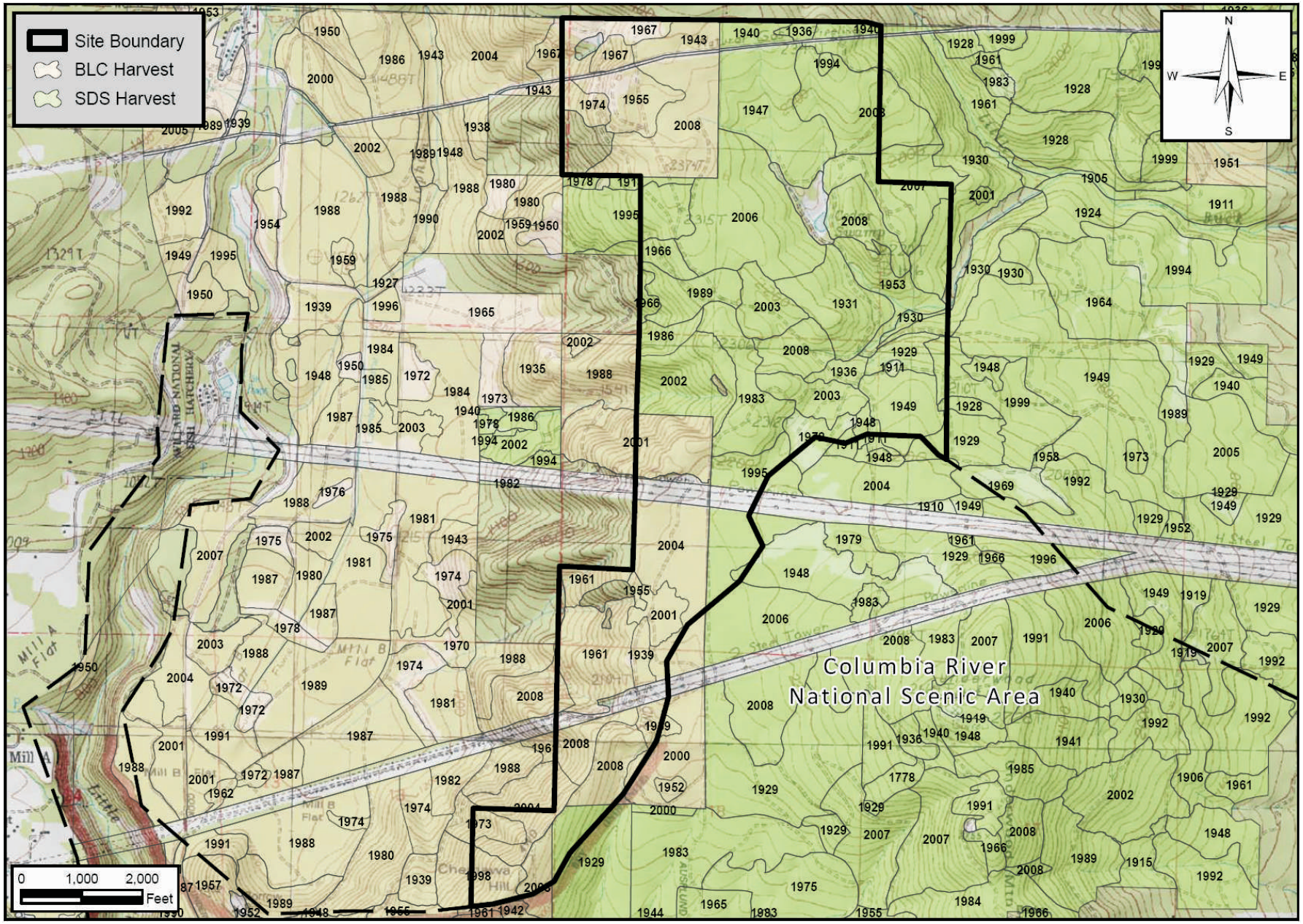
Harvests have typically occurred approximately every 50 years; however, the harvest periods vary depending on the market and the demand for the type of timber. As a result, some harvests have occurred as frequently as 40 years, and some have been up to 65 to 70 years. Additional harvests are planned, subject to requirements of a Forest Practice Application.

In areas surrounding the proposed wind turbines that have not been recently harvested or that are not planned to be harvested before project construction, trees would be harvested and the land would be replanted with seedlings. This clearing would allow for safe construction, and would reduce the potential for tree growth to interfere with the wind resource on the site during the commercial life of the project (that is, during the 30-year commercial life of the project, trees that are planted at the time of construction in the cleared area would regrow at a rate that would not interfere with wind energy production). Typically, the cleared area would extend approximately 50 feet in all directions from each turbine. From a distance of approximately 50 feet to 150 feet from the base of the turbines, tree heights would be limited to a height of approximately 15 feet above the elevation of the base of the turbine. Extending from approximately 150 feet to 500 feet from the base of the turbines, there would be a restriction of approximately 50 feet in height above turbine foundation level for trees located within an area formed by a 90-degree angle centered on the prevailing wind direction and on the downwind side of the prevailing wind direction. Final locations and dimensions would be determined during the final design, micrositing and construction process (Figure 2.3-4, Turbine Timber Buffer)

In addition to the clearing around turbines, there would be an approximately 100-horizontal-foot limitation placed on trees along any overhead electrical cable corridors, or such standards as are determined by the project engineers in consultation with BPA or others, as applicable.

The permanently disturbed, cleared area described above would be considered a “forest conversion” under the Washington Forest Practices Act (WFPA) because it is being implemented for the purpose of the project. However, to the extent feasible for the project, cleared areas would be reforested in accordance with typical commercial forestry management practices.

33758687_104.cdr



Source: SDS Lumber

Job No. 33758687

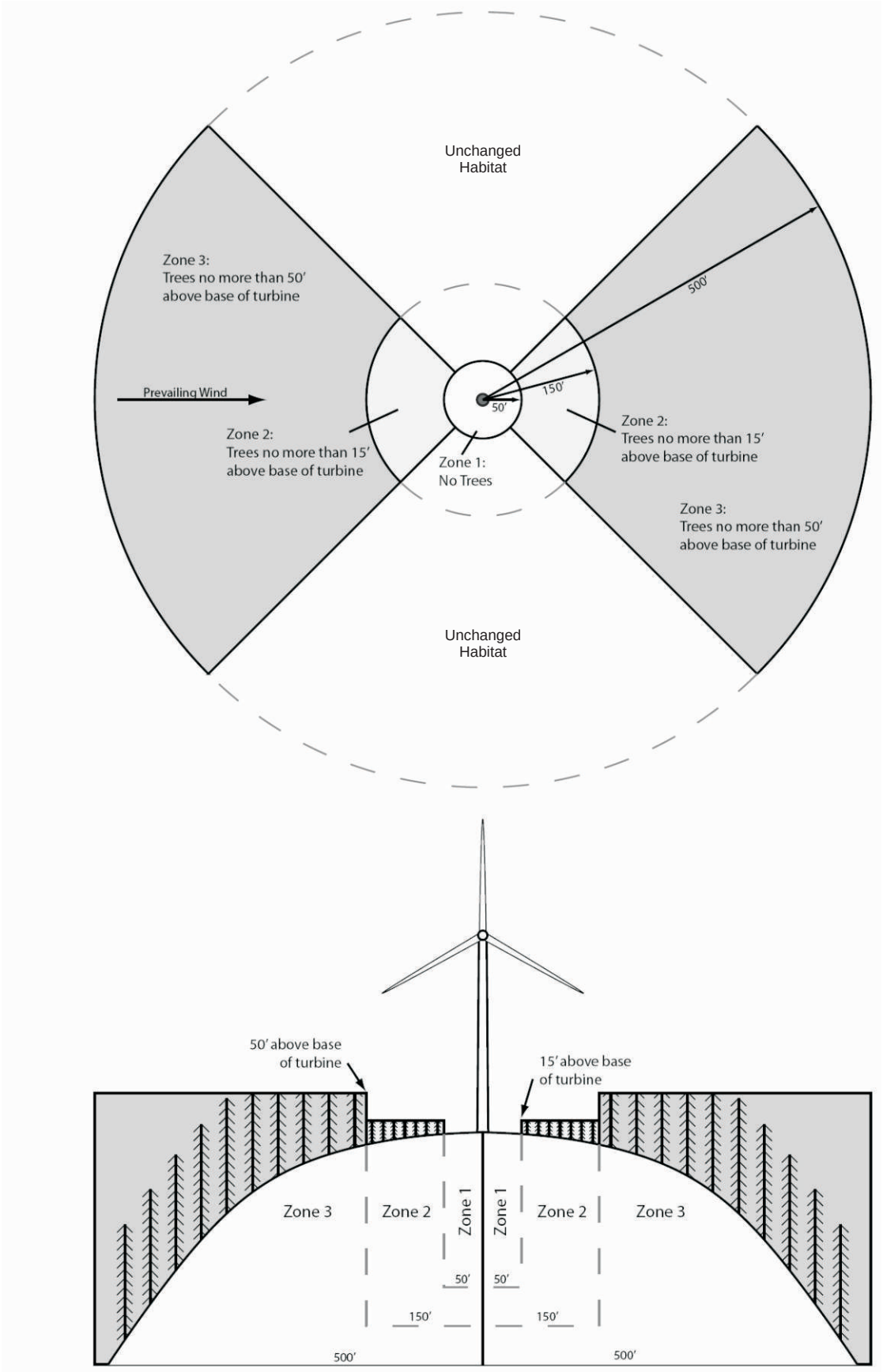
Figure 2.3-3

Harvesting Schedule

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_74.cdr



Source: GeoDataScape.

Job No. 33758687

Figure 2.3-4

Turbine Timber Buffer

URS

Whistling Ridge Energy Project
Skamania County, Washington

The areas where tree clearing is required would be clear-cut using crawler tractors, rubber-tired skidders, and mobile feller-bunchers, as has been done on other stands on the property. Logs would be transported by truck to SDS Lumber Company facilities in Bingen, Washington. Except for areas to be maintained and permanently cleared for the construction of permanent improvements and ongoing maintenance and operation access needs (which would be replanted with appropriate native grasses and low-growing shrubs), cleared areas would be replanted with trees within one year after completion of construction (note: tree planting is done in the spring of each year).

2.3.7 DECOMMISSIONING

For financial evaluation and contractual purposes, the Whistling Ridge Energy Project is expected to have a useful life of at least 30 years. The trend in the wind energy industry has been to "repower" older wind energy projects by upgrading equipment with more efficient turbines. It is likely that the project would be upgraded with more efficient equipment, and therefore have a useful life longer than 30 years. However, if the project were terminated, the necessary authorization from the appropriate regulatory agencies would be obtained to decommission the facilities. All aboveground facilities would be removed from the site, and unsalvageable material would be disposed of at authorized sites. To avoid unnecessary future ground disturbance and related environmental impacts, the turbine foundations would likely be removed to a depth of three to four feet bgs, and underground electrical cables would likely be abandoned in place. The soil surface would be restored as close as reasonably possible to its original condition. Reclamation procedures would be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and would include regrading, adding topsoil, and replanting of all disturbed areas. Decommissioned roads would be reclaimed or left in place based on landowner preference, and right of way would be surrendered to the landowner.

2.3.8 CAPITAL AND OPERATING COSTS

The total estimated cost of the Whistling Ridge Energy Project at the completion of construction would be over $150 million, which includes the wind turbines and associated equipment.

Whistling Ridge Energy LLC estimates that the annual operating and maintenance costs would be approximately $3.75 million, including the following:

- Wages and salaries of operation, maintenance, and administrative personnel
- Procurement of goods and services
- Insurance
- Sales and other state and local taxes

SECTION 2.4 ENERGY TRANSMISSION SYSTEMS (WAC 463-60-155)

The project's electrical system would consist of two key elements: (1) a collector system, which would collect energy generated at 575 volts from each wind turbine, transform the voltage to 34.5 kV using a pad-mounted transformer, and deliver the energy via underground cables to (2) the project substation, which would further transform the energy delivered by the underground collector system from 34.5 kV to 230 kV and deliver it, via new interconnection facilities to be built by BPA, to the adjacent existing BPA transmission line and into the regional transmission system. The BPA transmission lines are outside the scope of this application. Please see Section 2.3.3.4 for a more detailed description of the collector system.

No transmission facilities would be constructed by Whistling Ridge Energy LLC.

SECTION 2.5 WATER SUPPLY SYSTEM (WAC 463-60-165)

2.5.1 WATER INTAKE AND CONVEYANCE FACILITIES

Project operations would not require the use of any water for cooling or any other use aside from the limited needs of the Operations and Maintenance facilities. There would be no industrial wastewater stream from the project. Wastewater discharge would come from the Operations and Maintenance building discharging to an on-site septic system. The anticipated use is expected to be less then 5,000 gallons per day for kitchen and bathroom use. Potable water intake would be in the form of a well accommodating the Operations and Maintenance facilities' needs. Whistling Ridge Energy LLC would seek and obtain approval for the new well from EFSEC, in consultation with Skamania County Environmental Health Department and the Washington State Department of Ecology (Ecology). No wastewater would be used, discharged or recycled for wind turbine operations.

2.5.2 WATER SUPPLY AND USAGE ALTERNATIVES

2.5.2.1 Water Supply Alternatives

Due to the low volume of water that would be required for operational use (approximately 5,000 gallons/day), Whistling Ridge Energy LLC did not consider alternatives to reclaim water or other water reuse projects.

2.5.2.2 Water Conservation Methods

The project would not generate process water or any point source discharge to surface waters or ground waters beyond the Operations and Maintenance facilities. The potable water well and septic system provide bathroom and shower facilities to the maintenance personnel. Additional water for daily operational use is minimal and would not result in a long-term increase on current demands. Where appropriate, water use for Operations and Maintenance, and daily operational needs would be minimized.

2.5.3 WATER RIGHTS AND AUTHORIZATIONS

Whistling Ridge Energy LLC is not requesting any new water rights or authorizations beyond the well for the Operations and Maintenance building described above. Operational daily water needs would be acquired from the well, and water needs related to construction would be purchased by the contractor from an off-site vendor with a valid water right and transported to the site in water-tanker trucks. This would be a short-term construction related impact on water use.

2.5.4 PROCESS WATER

No process water would be required for the project beyond daily water needs for the Operations and Maintenance building.

2.5.5 POTABLE WATER

Potable water would be supplied by the well that would be drilled for the Operations and Maintenance facilities.

2.5.6 MITIGATION MEASURES

Mitigation measures and best management practices (BMPs) have been incorporated in the project design features. These measures include avoidance of stream crossings to the maximum extent feasible; complying with federal, state, and local ordinances; and implementing a Stormwater Pollution Prevention Plan (SWPPP) and BMPs during and after construction.

SECTION 2.6 SYSTEM OF HEAT DISSIPATION (WAC 463-60-175)

Pursuant to WAC 463-60-115, Whistling Ridge Energy LLC requests a waiver of the information required by WAC 463-60-175, which calls for a description of the heat dissipation systems.

The heat dissipation from a wind turbine is minimal. Air cooling would be used to cool the operating machinery, such as the generator and gearbox inside the wind turbines, and no water resources would be used.

SECTION 2.7 CHARACTERISTICS OF AQUATIC DISCHARGE SYSTEMS (WAC 463-60-185)

Pursuant to WAC 463-60-115, Whistling Ridge Energy LLC requests a waiver of the information required by WAC 463-60-185, which calls for a description of the discharge to a watercourse. The project would use wind as its source of energy production only. There would be no discharge to a watercourse.

The water use of the proposed facility would be from a small well at the Operations and Maintenance building. This well would provide water for bathroom and kitchen use, as well as for some minor normal maintenance use, and would be expected to consume less then 5,000 gallons per day. Wastewater from the Operations and Maintenance facility would be discharged to a septic tank permitted and installed according to Skamania County Community Development Department standards.

SECTION 2.8 WASTEWATER TREATMENT (WAC 463-60-195)

Pursuant to WAC 463-60-115, Whistling Ridge Energy LLC requests a waiver of the information required by WAC 463-60-195, which calls for a description of wastewater treatment. The project would use wind as its source of energy production only and no water or wastewater would be used or discharged in that process. There would be no wastewater treatment or discharge to a watercourse.

The water use and disposal of the proposed facility would be from a small well at the Operations and Maintenance building. This well would provide water for bathroom and kitchen use, as well as for some minor normal maintenance use, and would be expected to consume less then 5,000 gallons per day. Wastewater from the Operations and Maintenance facility would be discharged to a septic tank permitted and installed according to Skamania County Community Development Department standards.

SECTION 2.9 SPILLAGE PREVENTION AND CONTROL (WAC 463-60-205)

2.9.1 PURPOSE AND SCOPE

This section establishes requirements for a construction spill prevention, control, and countermeasure plan (SPCCP) for activities at the Whistling Ridge Energy Project, as required by the State of Washington Site Certification Agreement, and by state and federal requirements. A revised procedure would be issued as the project moves to operation, or if new requirements or organizational changes require revision. The procedure would be reviewed annually at a minimum, and updates made as needed.

2.9.2 SPILL PREVENTION PLAN

Responsibilities would be established for the construction period, in which the construction contractors would have primary responsibility for overseeing compliance with state and federal environmental regulations and compliance with environmental commitments made to EFSEC. Construction contractor personnel would oversee field activities; coordinate resolution of deviations from BMPs, commitments and regulations; and identify any process changes that could require revision to the environmental procedures.

Whistling Ridge Energy LLC shall have the overall responsibility to ensure compliance with state and federal environmental regulations and compliance with environmental commitments made to EFSEC.

2.9.2.1 Construction Spill Prevention

Fuel and lubricating oils from construction vehicles and equipment and the mineral oil used to fill the transformers are the only potential sources for a spill prevention control program during construction activities. The contractor would be responsible for training its personnel in spill prevention and control and, if an incident occurs, would be responsible for containment and cleanup.

During construction, the contractor would utilize fuel trucks for refueling of construction vehicles and equipment at existing licensed gas stations in nearby communities. There would be no fuel storage tanks used at the project site; instead, fuel trucks would refuel vehicles and equipment. The fuel trucks would be properly licensed.

The project would have up to 50 pad-mounted transformers (one at the base of each wind turbine) which arrive on site pre-filled with mineral oil. As part of the commissioning process of the main substation transformers, they would be filled and tested. The fuel and oil trucks would incorporate features in equipment and operation, such as automatic shut-off devices, to prevent accidental spills. Lubricating oils used during construction would mostly be contained in the vehicles and equipment for which they are used.

A Construction SPCCP would be submitted and approved by EFSEC prior to construction.

2.9.2.2 Operations Spill Prevention

Project operations would not require the use of a permanent fuel storage tank, as fuel use during operations is limited to maintenance vehicle fueling, which would be done at existing licensed gas stations in nearby communities (White Salmon and Hood River). The potential for accidental spills during operation is minimal, as the only materials used during project operations that present any potential for accidental spills are lubricating oils and hydraulic fluids used in the wind turbine generators and transformers.

Table 2.9-1 lists the fluids contained on site, including fluids for the turbines.

Table 2.9-1
Oils, Fuels and Hazardous Materials Anticipated to be Stored at the Whistling Ridge Energy Project Site

Oil (e.g., transformer, lubricating)
Solvents and thinners
Paints
Coatings and sealants
Corrosion inhibitors
Pesticides (herbicides, rodenticides, insecticides, etc.)
Batteries

It is anticipated that an Operation SPCCP would be submitted and approved by EFSEC prior to operation.

Wind Turbine Generator Fluids

Each turbine model has different specification for lubricating oil and hydraulic fluid quantities. There are three main types of fluid in a wind turbine generator: cooling fluid for the generator (a mix of glycol and water, similar to that used in automobile radiators), lubricating oil for the gearbox (typically a synthetic lubricating oil), and hydraulic oil for operating the blade pitch system, yaw mechanism, and brakes.

All of the wind turbine generators being considered for the project are equipped with sensors to automatically detect loss in fluid pressure and/or increases in temperature that enable them to be shut down in case of a fluid leak, as well as fluid catch basins and containment systems to prevent any accidental released from leaving the nacelle. Based on the limited quantities of fluids contained in the wind turbine generators and the leak detection and containment systems engineered into their design, the potential for an accidental spill from wind turbine generator malfunction is extremely limited. Furthermore, any accidental gear oil or other fluid leaks from the wind turbines would be contained inside the turbine towers, which are sealed around the base.

The fluids within the turbines are checked by staff periodically and must be replenished or replaced on an infrequent basis (generally less than once per year and sometimes only once every five years). When replacing these fluids, the typical current practice is for staff to climb up to the nacelle and remove the fluids in small (typically five-gallon) containers and lower them to the ground using a small maintenance crane built into the nacelle itself. The containers would then be transferred to a pickup truck for transport to the Operations and Maintenance facility for

temporary storage (typically less than one month) before being picked up by a licensed transporter for recycling. Replacement fluids are added in the same method, only in reverse. Small quantities of replacement fluids, typically no more than a few 50-gallon drums, of lubricating oil and hydraulic oil may be stored at the Operations and Maintenance facility for replenishing and replacing spent fluids. These fluids would be stored in appropriate containers. All operations staff would be trained in appropriate handling and spill prevention techniques to avoid any accidental spills. Because only small quantities of fluids are transported, added, or removed at any one time and are stored for short periods of time, the potential for an accidental spill during routine maintenance is extremely limited.

Transformer Mineral Oil Coolant

Pad Mounted Transformers. As described in Section 2.3, Construction on Site, each wind turbine generator has a pad mounted transformer located at its base. These transformers contain mineral oil which acts as a coolant. Each pad mounted transformer contains up to 500 gallons of mineral oil. The transformer is designed to meet stringent electrical industry standards, including containment tank weldment and corrosion protection specifications.

Substation Transformer(s). As described in Section 2.4, Energy Transmission Systems, the entire project would be electrically connected to the grid at the BPA substation, which would be equipped with either one or two transformers. Each substation transformer contains up to 12,000 gallons of mineral oil for cooling. The transformer is designed to meet stringent electrical industry standards, including containment tank weldment and corrosion protection specifications. The substation transformers are equipped with an oil level sensor that detects any sudden drop in the oil levels, and sends an alarm message to the central supervisory control and data acquisition (SCADA) system. Finally, the substation transformers are supported by a concrete vault to ensure that any accidental fluid leak does not result in any discharge to the environment.

2.9.2.3 Spill Procedures

Procedures for what to do in the event of a spill shall be developed. These would include actions needed to contain the material in accordance with training received:

- Absorbent booms would be placed around the area of a spill if it is believed that the spill could travel outside immediate area. For spills to the ground, if appropriate for the material spilled, turn soil and use absorbent materials to collect additional spilled material. Contaminated absorbent materials shall be collected and disposed of in accordance with the SPCCP.

- If the spill is large enough to require a cleanup company's assistance, or cleanup requires training beyond level provided to site personnel, a contractor for cleanup services would be hired to perform the work at the responsible party's expense.

- Spills would be reported as required by the SPCCP

- All spills would be reported to EFSEC and Ecology using the guidance provided in the SPCCP.

2.9.2.4 Record Retention

All records pertaining to SPCCP shall be retained on site for a minimum of five years.

SECTION 2.10 SURFACE WATER RUNOFF (WAC 463-60-215)

Surface water runoff without regulated controls can cause the erosion of topsoil, increase sediment load of surface water bodies, and increase the temperature and deteriorate the water quality of receiving creeks. These impacts are mitigated by the requirements of stormwater control programs.

The discharge of stormwater runoff from the Whistling Ridge Energy Project would be regulated by EFSEC based on Ecology's stormwater pollution control program. This program is based on federal regulations adopted to implement Section 402(p) of the Federal Clean Water Act and Chapter 90.48 RCW, the state of Washington's Water Pollution Control Act. The goal of the stormwater program is to reduce or eliminate stormwater pollution from municipal and industrial point sources, by requiring the implementation of a technology-based SWPPP and to eliminate violations of surface water quality standards caused by stormwater.

Whistling Ridge Energy LLC may be required by EFSEC to obtain coverage under the Construction Stormwater General Permit because it would disturb more than one acre of land. Unless if is instructed by EFSEC that it is not necessary to do so, Whistling Ridge Energy LLC would file a notice of intent (NOI) to obtain coverage under the Construction Stormwater General Permit and the Industrial Stormwater General Permit. Even if coverage under this general permit is not required, the Applicant proposes to design and implement the same BMPs to prevent and minimize the discharge of pollutants in its stormwater runoff, and to prepare SWPPPs for the construction and operation of the Whistling Ridge Energy Project in substantially the same form and content.

The final design would conform to the applicable Ecology Stormwater Management Manual in effect at the time or as instructed by EFSEC.

The NOI for construction activities would be filed with EFSEC prior to the start of construction. A SWPPP meeting the conditions of the Stormwater General Permit for Construction Activities also must be prepared and implemented prior to the start of construction activities. The content of the SWPPP for construction activities is addressed in Section 2.10.1.

The NOI for Industrial Activities would be filed with EFSEC if required.

2.10.1 STORMWATER EROSION CONTROL DURING CONSTRUCTION

This section cites specific procedures and requirements that would be implemented at the construction site to reduce the discharge of contaminated stormwater runoff. It includes information on the erosion control practices to be followed during construction at the site (Section 2.10.1.1). Site-specific erosion control plans would be submitted to EFSEC prior to construction.

The main categories of information to be included in the SWPPP are construction BMPs, operating BMPs, construction phase enforcement, and establishment of the Whistling Ridge Energy Project stormwater pollution prevention team.

The SWPPP is most appropriately prepared when design-level topographic surveying and mapping is available, and the final configuration of proposed improvements is overlain on the existing topographic map. The civil site design engineer would establish the locations and types of construction BMPs to be required of the construction contractor, and would include these on an overall map of the site. A narrative section of the SWPPP would describe the intended installation sequence and function of the selected BMPs, and present the sizing calculations. The report also would identify the selected minimum standard to which each of the BMPs are to be constructed or installed. When prepared at this level of detail, the document would meet the requirements of the Stormwater Construction Activity NPDES permit system, and also accurately describe, to the construction contractor, the improvements and actions to be required during construction. The document would be submitted to EFSEC for approval prior to construction. Implementation of the construction BMPs is carried out by the site work contractor, with oversight by environmental monitors.

2.10.1.1 Site Construction

During construction, all new and improved roads would have a 20-foot-wide buffer on one side of the roadway, the maintenance yard and substation plot would have a 50-foot perimeter buffer, turbines would have 300-foot circular buffers, overhead transmission lines would have 50-foot-wide buffers, and underground transmission lines would have 15-foot-wide buffers. Trenches up to 3 feet wide and 3 to 4 feet deep would be dug along access roads for the underground electric cables, with an anticipated 30-foot-wide disturbance area during construction. Trenching would occur simultaneously with roadway construction and improvements to minimize impacts.

Site-specific BMPs for temporary erosion and sedimentation control during construction would be identified on the construction plans submitted to EFSEC, to mitigate impacts associated with construction activities. BMPs would be selected from the applicable Stormwater Management Manual as appropriate for the site slopes, the construction activities, and weather conditions.

The sequence and methods of construction activities would be controlled to limit erosion. Clearing, excavation, and grading would be limited to the minimum areas necessary for construction of the project, and would not be performed far in advance of facility construction. Slopes would be graded to no steeper than 3 feet horizontal (H) to 1 foot vertical (V). Ground surface restoration shall be completed within fourteen days of the area's final disturbance. Interim surface protection measures, such as erosion control blankets or straw matting, also may be required prior to final disturbance and restoration if warranted by the potential for erosion.

Sediment control measures used during construction would be based on a 10-year design storm. Water quality measures (other than sediment removal) would be based on the 6-month, 24-hour design storm.

All construction practices would emphasize erosion control over sediment control through non-quantitative activities such as:

- Straw mulching and vegetating disturbed surfaces
- Retaining original vegetation wherever possible

- Timing grading operations to dry seasons
- Directing surface runoff away from denuded areas
- Keeping runoff velocities low through minimization of slope steepness and length
- Providing and maintaining stabilized construction entrances

In order to prevent erosion and control sediment migration, the following BMPs could be used.

Sediment Traps

Sediment traps are temporary or permanent basins used to intercept stormwater runoff and allow sediment to settle, thereby minimizing the amount of sediment flowing off site. Sizing criteria for the traps include inflow and sediment load. Sediment traps would be sized for the specific disturbed area, for bare soil conditions, and typically for 75 percent sediment removal efficiency.

Silt Fences

Slopes less than 3H:1V would be protected with silt fencing as appropriate. Silt fences would be installed in locations where they would trap silt eroded from slopes during construction and prior to reestablishing vegetation. The maximum flow path to each silt fence would be approximately 100 feet. No concentrated flows greater than 1 cubic foot per second would be directed toward any fence for the 25-year storm. Silt fences would be maintained throughout the construction period, and beyond until disturbed surfaces have been stabilized with vegetation. Silt fence construction specifications including fabric equivalent open size, support spacing, and total length would be determined by local construction conditions during final design of the facilities.

Grade Control Structures and Slope Ditches

Grade control structures such as rock check dams, hay bale check dams, dikes, and swales would be used where appropriate to reduce runoff velocity, as well as to direct surface runoff around and away from cut-and-fill slopes. Swales and dikes also would be used to direct surface water on top of the filled pad toward sediment traps and away from flowing over the bank, which may contribute to sheet and rill erosion.

Matting and Erosion Control Blankets

Depending on weather conditions during the construction period, straw or jute matting or other suitable erosion control blankets would be used on any disturbed slopes to prevent erosion and control sediment migration.

Quarry Spall Construction Entrances

Quarry spall construction entrances would be used to reduce migration of construction dirt to public roads. Placing the construction entrances is one of the first activities required at the site, but the rock bed also must be periodically replenished as it becomes dirty or migrates into the subgrade. All construction traffic would be directed to use the construction entrances.

Chemical Source Control

In addition to erosion and sedimentation control on the site, it is also important to reduce potential for chemical pollution of surface waters during construction. Since source control is the most effective method of preventing chemical water pollution, careful control must be exercised over potentially polluting chemicals used on site during construction. The EPC Contractor with oversight from Whistling Ridge Energy LLC would be responsible for planning, implementing, and maintaining BMPs for:

- Neat and orderly storage of construction chemicals and spent containers in lined, bermed areas
- Prompt cleanup of construction phase spills
- Regular disposal of construction garbage and debris

The SWPPP would identify all areas of potential chemical storage during construction, and provide appropriate control measures.

2.10.2 PERMANENT STORMWATER MANAGEMENT

Vegetation in the project area consists of Grass-forb Stand, Brushfield/Shrub Stand, Conifer-Hardwood Forest, Conifer Forest, and Riparian – Deciduous. The current vegetation conditions are heavily influenced by the commercial forest production activities that occur in the area. The total site area is approximately 1,152 acres; however, stormwater impacts from disturbed areas would be generated from less than 110 acres. Approximately 7.2 miles of gravel roads would be improved, and approximately 2.4 miles of gravel roads would be constructed. During operation, all roads would be maintained to a width of approximately 25 feet, with a 5-foot shoulder on each side, with the exception of roadways adjacent to turbine strings, which would be 40 feet wide with a 25-foot graveled corridor and 5-foot shoulder on each side. The maintenance yard would cover approximately 2 acres, which would include an approximately 3,000-square-foot Operations and Maintenance building and an adjacent gravel parking area for employees, visitors, and equipment. Other additions to the site include a 5-acre gravel substation site, a collector system transformer on a

9'x9' concrete pad, and concrete pads for the approximately 50 wind turbines. These permanently improved areas would cover approximately 55 acres (less than 5% of the total project area).

Permanent stormwater management requires construction of appropriate stormwater hydraulic and treatment facilities, routine maintenance thereof, and prevention of chemical pollution through source control. Whistling Ridge Energy LLC would be responsible for developing, implementing, maintaining, and modifying the SWPPP.

As described above, improvements to the site would cover only a small portion of the project area (less than 5%), most of which would be graveled surfaces. Completely impervious surfaces would be limited to the concrete pads for the turbines and the Operations and Maintenance building, totaling less than one acre. The majority of the improved area is composed of roads or parking surface, which are likely to be compacted over time due to vehicular traffic, causing a decrease in the infiltration capability of those areas. However, some infiltration in those areas is still expected, and they are not classified as impervious. Due to the relatively small areas of impact, site surface water runoff is expected to increase only slightly due to these activities, and considered to be negligible. Vegetated ditches would be installed along roads to provide for hydraulic and treatment facilities. Stormwater would be conveyed via these vegetated roadside ditches and pass through culverts prior to discharging to the natural drainage ways on site. Inlets and outlets of culverts would be stabilized to prevent scour.

Due to the steep nature of the site, some of the improved and constructed roadways would be relatively steep. After construction, until the site has been stabilized, these areas would be most susceptible to erosion and sediment migration. Steep slopes with exposed soil would be seeded with a native mix and protected with mulch or something equivalent until the vegetation is established. Vegetation of disturbed areas and roadside ditches, as well as stabilization of inlets and outlets to culverts, would be the primary permanent stormwater management control measures.

The SWPPP would contain pre-design level of detail for these permanent stormwater BMPs, and would establish the permanent operations stormwater pollution prevention team from appropriate employee categories. Final designs for the permanent BMPs would be incorporated into the final construction plans and specifications prepared by the civil site design engineer. An operations manual for the permanent BMPs would be prepared by the civil site design engineer, if necessary, and the stormwater pollution prevention team members.

The constructed permanent stormwater BMPs would include:

- Vegetated drainage ditches
- Culverts with stabilized inlets and outlets
- Permanent erosion and sedimentation control through site landscaping, grass, and other vegetative cover

Due to the small area of impervious surface in the project area, no detention storage is required.

Runoff treatment BMPs facilities would be designed to conform to the applicable Stormwater Management Manual.

Operational BMPs would be adopted as part of the SWPPP to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices as necessary to prevent stormwater pollution.

Examples of good operational housekeeping practices that would be employed at the Whistling Ridge Energy Project site include:

- Neat and orderly storage of chemicals under cover in the Operations and Maintenance facilities
- Prompt cleanup and removal of spillage
- Regular pickup and disposal of garbage and rubbish
- Prevention of accumulations of liquid or solid chemicals on the ground or the floor

At least annually, facility operators would receive spill response training and training in the applicable pollution control laws and regulations. Additional support staff would be trained in the following spill response procedures:

- Recognizing areas that may be affected by a spill and potential drainage routes
- Reporting spills to appropriate individuals
- Employing appropriate material handling and storage procedures
- Implementing spill response procedures

Whistling Ridge Energy Project site operators must periodically review the SWPPP against actual practice. They must confirm that the controls identified in the plan are adequate, and that employees are following them. They must further test and confirm that non-permitted discharges to the stormwater system are not occurring. A summary of these in-house compliance inspections shall be kept with the SWPPP, along with any notifications of non-compliance and reports on incidents such as spills. If the SWPPP has been followed but still proves inadequate to prevent stormwater pollution, Whistling Ridge Energy LLC would amend the SWPPP and seek EFSEC concurrence with the improvements.

2.10.3 PERMANENT WATERWAYS

No perennial streams are located in or adjacent to the Whistling Ridge Energy Project. Five intermittent drainage ways have been identified on site, ultimately draining to the east of the project site. Runoff is conveyed via these drainage ways, and additional ditches in the southwest portion of the site downslope to perennial streams outside the project site that eventually drain to the Columbia River. Additional details regarding water sources and pathways are identified in Sections 3.3, Water and Section 3.5, Wetlands.

SECTION 2.11 EMISSION CONTROL (WAC 463-60-225)

2.11.1 INTRODUCTION

Pursuant to WAC 463-60-115, Whistling Ridge Energy LLC requests a waiver of the information required by WAC 463-60-225 for operation, which calls for a demonstration that the highest and best practicable treatment for control of emissions would be utilized. The air quality impacts from construction of the project would be temporary and minor, and would be limited to vehicle emissions and fugitive dust emissions. No air emissions would be generated from operation of the Whistling Ridge Energy Project, as the operation of wind turbine generators does not involve the combustion of any fuels. The project site is located outside of any air quality non-attainment areas, according to Ecology.

2.11.2 CONSTRUCTION

During construction of the project, the use and operation of construction equipment and vehicles would result in minor air emissions. The main sources of these emissions are expected to be:

- Earth-moving equipment for road construction and site preparation
- Excavating equipment for turbine foundation excavation
- Transport vehicles for delivery of construction materials and equipment
- Worker vehicles
- Small electric generators for on-site power during construction

Fugitive dust emissions would be caused by disturbing the land for construction of project facilities and construction traffic.

The primary types of air emissions are expected to be those typically associated with internal combustion engines, e.g., carbon dioxide, nitrogen oxides, sulfur oxides, carbon monoxide and particulate matter.

2.11.3 OPERATION

The generation of electricity using wind turbines does not produce air emissions. During project operation, small amounts of fugitive dust emissions would be caused by occasional maintenance vehicles traveling on the gravel access roads. However, the number of vehicle trips associated with ongoing Operations and Maintenance would be minor and it is unlikely that the resulting dust would reach nuisance levels or would be substantially different in quantity or type from dust caused by existing logging operations and related traffic.

Operation of the proposed project would not result in emissions that exceed that significant emission rates and would not contribute to violations of the National Ambient Air Quality Standards (NAAQS). Impacts to air quality from project operation would be insignificant.

2.11.4 MITIGATION

All construction and operations vehicles and equipment would comply with all applicable state and federal emissions standards. Measures to control dust during construction would include the use of a dust control agent such as magnesium chloride, or possibly wetting down roadbeds and controlling construction vehicle speeds. Use of a dust control agent would be the preferred method over the use of water as it would also minimize water truck traffic.

The certificate holder would instruct the contractors to minimize the idling of engines when not in active use to minimize emissions.

SECTION 2.12 CONSTRUCTION AND OPERATION ACTIVITIES (WAC 463-60-235)

Whistling Ridge Energy LLC would be responsible for the construction of the Whistling Ridge Energy Project.

2.12.1 INTRODUCTION

The construction of the Whistling Ridge Energy Project would be performed in several stages and would include the following main elements and activities:

- Grading the field construction office area (also used for Operations and Maintenance facilities)
- Constructing site roads, turn-around areas, and crane pads at each wind turbine location
- Constructing the turbine tower foundations and transformer pads
- Installing the electrical collection system – underground and some overhead lines
- Assembling and erecting the wind turbines
- Constructing and installing the substation
- Plant commissioning and energization

The Applicant intends to enter into two primary agreements for the construction of the project: (1) an agreement for the supply, erection and commissioning of the wind turbines, and (2) an Engineering, Procurement, and Construction (EPC) contract for the construction of the balance of the project, which includes all other project facilities and infrastructure such as the roads, electrical collection system, substation, Operations and Maintenance facility, etc. The turbine supplier and the EPC Contractor would be selected during the EFSEC Application review process.

The construction schedules discussed below are based on obtaining a site certificate from Washington EFSEC by ~~April 1,~~October 2010.

The construction schedule would closely follow the construction methodologies discussed in Section 2.14, Construction Methodology.

2.12.2 CONSTRUCTION SCHEDULE AND MILESTONES

Table 2.12-1 identifies the major schedule milestones, engineering and procurement, construction and start-up. Assuming the Governor's approval of the Site Certification agreement in ~~April~~ October 2010, Whistling Ridge Energy LLC anticipates beginning design and construction in ~~2010~~ 2011 and operation by ~~2011~~2012. The construction schedule would be

revised according to the actual approval of the Site Certification Agreement, and a copy provided to EFSEC at least sixty (60) days prior to the start of construction.

Table 2.12-1
Proposed Project Construction Schedule

Task	Start	Finish	Approximate On-Site Manpower
Site Certification Agreement Approved	Target Date	~~4/1/2010~~10/1/2010	
Engineering/Design/Specifications/Surveys	~~2/1/2010~~8/1/2010	~~4/1/2010~~10/1/2010	15
Order/Fabricate Wind Turbines	~~4/1/2010~~10/1/2010	~~8/15/2010~~1/15/2011	0
Order/Fabricate Substation Transformer	~~4/1/2010~~10/1/2010	~~12/1/2010~~5/1/2011	0
Road Construction	4/1/~~2010~~2011	10/1/~~2010~~2011	50
Foundations Construction	6/1/~~2010~~2011	9/1/~~2010~~2011	50
Electrical Collection System Construction	6/1/~~2010~~2011	11/15/~~2010~~2011	50
Substation Construction	4/1/~~2010~~2011	11/15/~~2010~~2011	40
Wind Turbine Assembly and Erection	8/15/~~2010~~2011	2/15/~~2011~~2012	75
Plant Energization and Commissioning	11/15/~~2010~~2011	4/1/~~2011~~2012	25
Plant Substantial Completion	Target Date	4/1/~~2011~~2012	0
Construction Punchlist Clean-Up	2/15/~~2011~~2012	5/15/~~2011~~2012	25

2.12.3 CONSTRUCTION WORKFORCE

During the estimated one-year construction period, approximately 330 workers would be employed. The typical average workforce headcount and construction skills required for the construction of the project is shown in Table 2.12-2.

Table 2.12-2
Construction Staff Breakdown

Task	Project Management and Engineers	Field Technical Staff	Skilled Labor and Equipment Operators	Unskilled Labor	Total Approximate On-Site Manpower
Engineering/Design/Specifications/Surveys/ QAQC	5	10	0	0	15
Road Construction	5	5	30	10	50
Foundations Construction	5	5	25	15	50
Electrical Collection System Construction	2	2	31	15	50
Substation Construction	5	3	28	4	40
Wind Turbine Assembly and Erection	5	6	44	20	75
Plant Energization and Commissioning	3	5	17	0	25
Construction Punchlist Clean-Up	1	1	10	13	25
TOTAL	31	37	185	77	330

Table 2.12.3-3 presents the estimated total workforce resource loading, by month, for the construction of the project. At peak, it is expected that approximately 265 personnel would be on site at once as multiple disciplines of contractors complete their work simultaneously.

Table 2.12-3
Construction Labor Resource Loading

Month Before Commercial Operation	Project Management and Engineers	Field Technical Staff	Skilled Labor and Equipment Operators	Unskilled Labor	Total Approximate On-Site Manpower
14	5	10	0	0	**15**
13	5	10	0	0	**15**
12	10	8	58	14	**90**
11	10	8	58	14	**90**
10	17	15	114	44	**190**
9	17	15	114	44	**190**
8	22	21	158	64	**265**
7	17	16	133	49	**215**
6	12	11	103	39	**165**
5	15	16	120	39	**190**
4	8	11	61	20	**100**
3	8	11	61	20	**100**
2	8	11	61	20	**100**
1	3	5	17	0	**25**
0	1	1	10	13	**25**
Cleanup	1	1	10	13	**25**

See Section 4.4, Socioeconomic Impact for a discussion of where the construction labor force would likely be hired from.

2.12.4 OPERATION

When the project is operational, there would be eight to nine permanent full-time and/or part-time employees on the Operations and Maintenance staff. Table 2.12-4 provides a breakdown of labor categories.

Table 2.12-4
Operations and Maintenance Staff Breakdown

Staff Positions	Number of Operating Personnel
Plant Site Manager	1
Operations Manager	1
Operating Technicians	4 - 5
Administrative Manager	1
Administration Assistant	1
TOTAL FOR WHISTLING RIDGE ENERGY PROJECT	**8-9**

SECTION 2.13 CONSTRUCTION MANAGEMENT (WAC 463-60-245)

2.13.1 CONSTRUCTION MANAGEMENT ORGANIZATION

Whistling Ridge Energy LLC would enter into two primary agreements for the construction of the project: (1) agreement for the supply, erection and commissioning of the wind turbines, and (2) an EPC contract for the construction of the balance of the project, which includes all other Project facilities and infrastructure such as the roads, electrical collection system, substation, Operations and Maintenance facility, etc.

2.13.1.1 Project Construction Management

The project management organizational structure would include two support groups: an engineering and design specifications team and the field site management team. Figure 2.13-1 illustrates the construction management organizational structure for the project. The Project Manager would handle contractual aspects of the agreements with the project managers of the wind turbine vendor and the EPC contractor. This organization chart represents a typical structure for wind power projects. The exact organization may change after award of the turbine supply contract, EPC contract, or other subcontracts.

2.13.1.2 Engineering and Design Specifications Team

The engineering and design specifications team would be responsible for establishing the design and construction specifications for the various portions of the project. The engineering team acts as a third party verification group in conjunction with the project's field quality assurance/quality control (QA/QC) team. The engineering team would review proposals from the various turbine suppliers and EPC contractors for equipment supply and construction work. The turbine supplier and EPC contractor would be responsible for the detailed design work for the project and for submitting these designs and equipment specifications to the project engineering team for review. Review by the project engineering team would ensure that the detailed construction plans would meet the required design specifications, codes, and standards for the project.

2.13.1.3 Field Site Management Team

The field site management team would oversee construction on site and ensure that construction on site is performed in accordance with the engineering plans and specifications, environmental requirements and good industry practice. The field site team would generally be involved in day-to-day issues that arise throughout the construction phase. The Project Site Manager would have a support team consisting of QA/QC specialists, environmental inspectors, and site safety officers. The site team also would rely on the engineering team for support in the field during critical operations such as energizing of the substation and any technical issues that arise during project construction.

33758687_06.cdr

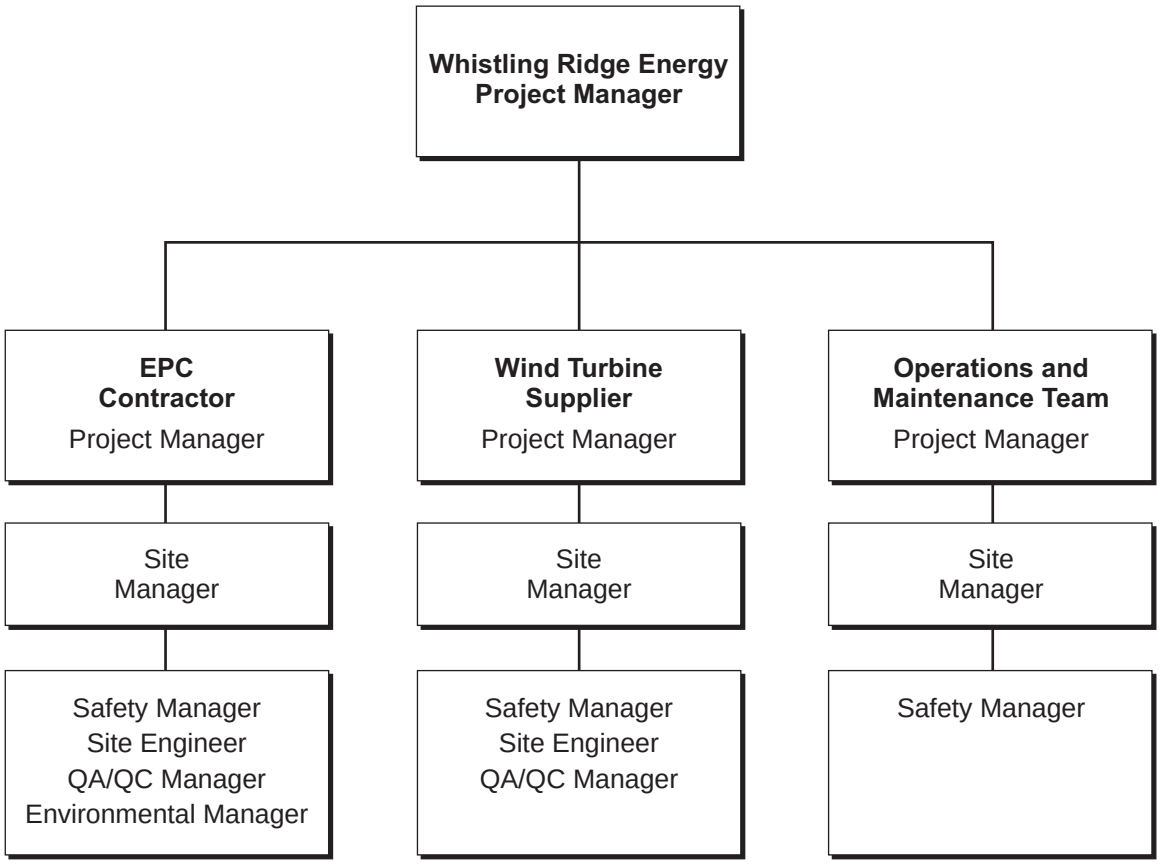


Figure 2.13-1

Project Construction Management Organizational Structure

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

2.13.1.4 EPC Contractor's Construction Management Team

The EPC Contractor would be responsible for managing several construction subcontractors including those for the balance of plant items, such as the roads, electrical and communications system infrastructure, substation and Operations and Maintenance facility. The EPC Contractor would have a lead Project Manager, a Project Engineer, and a Site Manager supported by their field engineering team, QA/QC specialists, environmental monitors, and site safety officers. The EPC Contractor would be required to implement and perform a safety plan, a QA/QC plan and an environmental protection plan, including the SWPPP.

2.13.1.5 Wind Turbine Vendor's Construction Management Team

The wind turbine supplier would be responsible for the supply, delivery, erection and commissioning of the wind turbines. The turbine supplier's construction team would include a lead Project Manager, a Site Manager, transportation specialists, and several lead technicians. The turbine vendor's site team would be supported by their own QA/QC specialists and site safety officers. The EPC Contractor would be required to implement and perform a safety plan, a rigorous QA/QC plan, and a detailed commissioning plan.

2.13.1.6 Project Operations and Maintenance Team

The project Operations and Maintenance group would be on site during the commissioning and start-up phase of construction. Once a turbine is commissioned, it is turned over to the Operations and Maintenance group control. The Operations and Maintenance team generally consists of a Project Site Manager, a team of wind turbine field technician specialists, and an administrative support staff.

2.13.2 SAFETY PROGRAM

Prior to the commencement of any construction work, the EPC Contractor would be required to prepare a safety plan that would apply to EPC Contractor personnel and all subcontractor personnel working at the site. The plan would be designed to ensure compliance with all laws, ordinances, regulations, and standards concerning health and safety. The EPC Contractor would have a safety manager with the authority to issue a "stop work" notice when health and safety issues are violated, including any subcontractor safety issues, and the health and safety of construction personnel are in danger. Upon identification of a health and safety issue, the safety manager would work with the responsible department or subcontractor to correct the issue.

2.13.3 ENVIRONMENTAL PROTECTION PROGRAM

The environmental compliance program would ensure that construction activities meet the conditions, limits, and specifications set in environmental standards established in the Site Certification Agreement and all other environmental regulations.

Copies of all applicable construction permits would be kept on site. The lead project construction personnel and construction Project Managers would be required to read, follow, and

be responsible for all required compliance activities. A project Environmental Monitor would be responsible for ensuring that all construction permit requirements are adhered to, and that any deficiencies are promptly corrected. The Environmental Monitor also would have the authority to stop work. The environmental compliance program would cover avoidance of sensitive areas during construction, waste handling and storage, stormwater management, spill prevention and control, and other components required by State and County regulations.

2.13.4 TRAINING PROGRAMS

Each EPC Contractor would be required to have a training program to ensure that safety and environmental regulations and permits are followed. The program would include training on:

- Drug and alcohol free workplace policy
- Personal health and safety
- Fall safety
- Confined space
- Excavation
- Crane and rigging
- Equipment and operations safety
- Fire prevention
- Electrical safety
- Emergency response
- Hazards communication
- Stormwater pollution prevention
- SPCCP
- Uptower rescue plan

During operations, personnel would receive initial and annual training. In addition to training to support proficiency on the Operations and Maintenance required for the facility, personnel would receive training related to health and safety, hazards communication, stormwater pollution prevention, and SPCCP.

2.13.5 QUALITY CONTROL SYSTEMS AND RECORD KEEPING

A QA/QC program would be implemented during all phases of the project to ensure that the engineering, procurement, construction, and startup of the facility are completed as specified. The elements of the QA/QC program would include:

- A formal QA/QC program would be in place to ensure that the equipment suppliers deliver their components as designed and specified and that the installation of equipment is completed as specified.

- A procedures manual would be developed that describes Whistling Ridge Energy Project activities from the initiation of final design activities through startup of the plant.

- The EPC Contractors would describe the activities and responsibilities within their organizations, and measures taken to assure quality work. Some of the topics would include design control, configuration management, and drawing control.

- Independent QA/QC personnel would review all documentation and witness field activities as a parallel organization to that of the construction organization to assure compliance with the specifications.

- Field inspectors' acceptance would be required for the installation, alignment, and commissioning of all major equipment.

Typical QA/QC checks include:

- Factory QA/QC
  - Inspection of major equipment at manufacturer's facilities
  - Review and inspection of third party test verification reports
  - Review and inspection of manufacturer's QA/QC procedures
  - Manufacturing drawing review and verification
  - Visual inspection
  - Witness and/or review of testing
  - Verification of welding procedure specifications compliance
  - Inspection of flange interface flatness measurements, finishing, and protection
  - Witness or review of turbine run-in load testing
  - Inspection of paint finishing and protection
  - Shipment packaging and handling, tracking, and identification
  - Pre-commissioning field testing and verification

- Field Inspection QA/QC
  - Reviewing equipment and material delivery acceptance inspection procedures
  - Inspection of all critical interfaces
  - Verification of all mechanical assembly work including erection of major components

  - Verification of field wiring and tagging
  - Pre-commissioning field testing and verification

- Concrete/Structural
  - Inspection of forms, structural steel, and rebar prior to backfilling and prior to casting
  - Field engineer's witness of concrete pouring
  - Inspection of concrete testing during pour (slump) and verification of break test results

- Roads
  - Field verification of road locations to site plan and survey markings
  - Review of clearing process (if necessary)
  - Verification of adequate road materials and compaction to engineer's specifications
  - Verification of road grade to plans

- Electrical Collection System
  - Inspection of cables and trenches prior to burial and backfilling
  - Witness of proper backfilling procedures
  - Inspection of terminations and termination hardware
  - Witness and/or review of polarity, cable marking, and phase rotation tests
  - Witness and/or review of grounding system resistance measurements
  - Inspection of all lock-out/tag-out locations and energizing sequences and plan

- Transformers
  - Inspection of transformers at manufacturer's facilities
  - Witness and/or review of winding resistance, polarity and phase displacement tests
  - Witness and/or review of no load losses and excitation current at rated voltage and frequency
  - Witness and/or review of impedance voltage and load losses at rated current and rated frequency
  - Witness and/or review of high potential and induced potential tests
  - Witness and/or review of impulse tests, reduced full wave, chopped wave and full wave tests
  - Witness and/or review of regulation and efficiency calculations
  - Verification of compliance to engineering specifications
  - Inspection of painting/tagging/preparation for shipment
  - Verification of field wiring and tagging

- Breakers
  - Witness and/or review of rated continuous current and short circuit tests
  - Witness and/or review of dielectric withstand tests

- Witness and/or review of switching tests
- Witness and/or review of insulator tests
- Witness and/or review of mechanical life tests
- Witness and/or review of terminal loading tests
- Witness and/or review of partial discharge tests
- Verification of compliance to engineering specifications
- Inspection of painting/tagging/wiring/preparation for shipment
- Verification of field wiring and tagging

Whistling Ridge Energy LLC would periodically audit the EPC Contractor, including reviews of documentation and surveillances of field activities, to ensure compliance with the specifications and with the requirements of the QA/QC plan. Checks may include:

- Verification of drawings
- Verification of materials
- Verify compliance to engineering specifications
- Verify compliance with environmental permits and regulations
- Verify compliance with health and safety program

Records would be maintained at the on-site Operations and Maintenance building in accordance with Whistling Ridge Energy LLC's records management program and state archivist requirements.

SECTION 2.14 CONSTRUCTION METHODOLOGY (WAC 463-60-255)

2.14.1 CONSTRUCTION SUMMARY

The proposed Whistling Ridge Energy Project would be located on private commercial forestland owned by S.D.S Co., LLC and Broughton Lumber Company in an unincorporated area of Skamania County, approximately 7 miles northwest of the City of White Salmon. Several private logging roads exist around the site. The project site is composed of complexes of very deep soils that formed in alluvium, colluvium, and residuum weathered primarily from basalt and mixed with volcanic ash (USDA NRCS 2003). The land is in commercial forest production and has been harvested.

Stormwater pollution prevention activities would occur prior to any clearing and site preparation. Measures would include installation of a stabilized construction entrance, wheel wash, silt fences, hay bales, temporary and/or permanent water conveyance systems, and installation of temporary and/or permanent retention ponds.

Before construction can commence, a site survey would be performed during the micrositing process to stake out the exact location of the wind turbines, the site roads, electrical cables, access entryways from public roads, substation areas, etc.

Once the surveys are complete, a detailed geotechnical investigation would be performed to identify subsurface conditions which would dictate much of the design work of the roads, foundations, underground trenching and electrical grounding systems. Typically, the geotechnical investigation involves a drill rig which bores to the engineer's required depths (typically 8 inch diameter drill to 30-40 feet deep) and a backhoe to identify the subsurface soil and rock types and strength properties by sampling and lab testing. Testing is also done to measure the soil's electrical properties to ensure proper grounding system design. A geotechnical investigation is generally performed at each turbine location, the substation location and at the Operation and Maintenance building location.

During construction, foundations would be installed, followed by installation of the equipment and construction of the Operations and Maintenance building. Approximately 5,000 amperes of 480-volt, three-phase temporary power would be installed within the site boundary to supply construction power. Startup power would be obtained by a step down transformer located adjacent to the high voltage switching station.

Field toilets and temporary holding tanks would be placed on site for use by construction personnel. During construction, potable water would be provided in containers until the potable water supply system is installed.

Construction worker parking would be provided primarily at the Operations and Maintenance/construction office area and throughout the project area where major activities are occurring. Materials to be used during construction are expected to be staged primarily at the

Operations and Maintenance building complex within a fenced storage yard and in two to three other areas to be determined after site surveys are completed.

2.14.2 SITE PREPARATION AND ROAD CONSTRUCTION

Preliminary analysis by URS Corporation indicates that the potential for liquefaction is very low at this site. Based on test pits and field observations, unconsolidated soils extend up to 3 feet below ground surface. The surficial soils are primarily characterized as soft, moist sandy silt, clay and sand. Immediately beneath the unconsolidated soils, rock with variable strength and weathering properties is present. It is anticipated that rock quality of the basalts would improve with depth but that weaker interflow zones consisting of volcaniclastic material and paleosols are possible at any depth. Prior to final design and location of the tower foundations, additional subsurface investigations (boreholes) would be required to provide geotechnical data at foundation and anchor depths. The final determination of foundation type would be determined by the EPC contractor's geotechnical engineer in consultation with the turbine manufacturer.

During site preparation, the contractor would install storm water pollution prevention measures. Dust would be controlled as needed by spraying water on dry, exposed soil. A Certified Erosion and Sediment Control Lead would be responsible for ensuring that storm water pollution prevention measures meet BMPs in accordance with the most recent version of Ecology's applicable Stormwater Management Manual.

Roadway access would be provided using Cook-Underwood Road to Willard Road. A new connection would be made directly from Willard Road to West Pit Road and West Pit Road would be improved. West Pit Road is an existing private logging road of approximately 2.5 miles in length. West Pit Road was originally built to enable large trucks and logging equipment to access the project site for ongoing commercial logging purposes. This road was generally 8 to 12 feet wide, however improvements were made during summer 2009 for logging purposes to widths between 20 and 26 feet. Improvements to allow use by construction vehicles generally would involve additional widening to the roadway and the existing culvert, widening of some corners, and providing a gravel all-weather surface. West Pit Road would be widened to approximately 25 feet (width of finished road), with an additional 5 feet of shoulder on either side to provide access to the site by construction vehicles, and to continue to provide access for logging activities.

The project roads would be gravel surfaced and generally designed with a low profile. Road construction would be performed in multiple passes starting with the rough grading and leveling of the roadway areas, if necessary. Once rough grade is achieved, a fabric layer would be installed, base rock would be trucked in, spread and compacted to create a road base. A capping rock would then be spread over the road base and roll-compacted to finished grade.

There are two existing quarry pits, one located on site and one on the project boundary along West Pit Road (see Figure 2.3-1). Both are under 3 acres in size and were established to support the commercial forestry use. There is a potential that some rock used for roadway surfacing of West Pit Road may come from one or both of these quarry pits. The quarries will remain at or below 3 acres in size, and West Pit Road will continue to be used for forest access. Alternatively, rock would be hauled in from off-site commercial quarries.

Excavated soil and rock that arises through grading would be spread across the site to the natural grade and would be reseeded with native grasses to control erosion by water and wind. Approximately 50 percent of excavated soils are anticipated to be too large for re-use as backfill at foundations. These larger cobbles would be crushed into smaller rock for use as backfill or road material or disposed of off-site. Those materials that cannot be reused on site would be disposed of in accordance with Skamania County and Ecology regulations for clean fill materials.

2.14.3 FOUNDATION CONSTRUCTION

The Project would require several foundations including bases for each turbine and pad transformer, and the Operations and Maintenance facility. Often, separate subcontractors are mobilized for each type of foundation they specialize in constructing.

Foundations and buildings would be designed for Seismic Zone 2. The initial phase of foundation construction would include foundations for all heavy equipment except for transformers and other electrical switchyard foundations, which would be constructed at a later time.

The presence of relatively shallow rock indicates that the proposed structures would be supported on rock anchored mat-slab foundations. Foundation construction would occur in several stages including drilling, blasting and hole excavation, outer form setting, rebar and bolt cage assembly, casting and finishing of the concrete, removal of the forms, backfilling and compacting, construction of the pad transformer foundation, and foundation site area restoration.

Excavation and foundation construction would be conducted in a manner that would minimize the size and duration of excavated areas required to install foundations. Portions of the work may require over excavation and/or shoring. Foundation work for a given excavation would commence after excavation of the area is complete. Backfill for the foundations would be installed immediately after approval by the engineer's field inspectors. The Applicant plans on using on-site excavated materials for backfill to the extent possible.

Based on preliminary calculations and depending on the type of foundation design used, approximately 20 cubic yards of excavated soil would remain from each turbine foundation excavation. The excess soils not used as backfill for the foundations would be used to level out low spots on the crane pads and roads consistent with the surrounding grade and reseeded with a designated mix of grasses and/or seeds around the edges of the disturbed areas. Larger cobbles would be disposed of off-site, or crushed into smaller rock for use as backfill or road material. All excavation and foundation construction work would be done in accordance to a formal SWPPP for the project as outlined in Section 2.10, Surface Water Runoff.

Construction of foundations would require the use of a number of types of heavy equipment, including excavation equipment, concrete-pumping equipment, and concrete finishing equipment. In addition, light and medium duty trucks, air compressors, generators, and other internal combustion engine driven equipment are anticipated.

The EPC contractor, in consultation with the Applicant, would determine the need for an on-site concrete batch plant, rock quarries, and rock crushers.

2.14.4 ELECTRICAL COLLECTION SYSTEM CONSTRUCTION

Once the roads and turbine foundations and transformer pads are complete for a particular row of turbines, underground cables would be installed on the completed road section. If any unanticipated environmental, geological, or historic constraints are discovered, limited portions of above-ground electrical collection lines may be proposed. A trench is cut to the required depth with a rock trencher. Clean fill would be placed above and below the cables for the first several inches of fill to prevent cable pinching. All cables and trenches would be inspected before backfilling. Once the clean fill is covering the cables, the excavated material would then used to complete the backfilling. Blasting would be used in areas where solid rock is encountered close to the surface, or a shallower trench would be cut using rock cutting equipment and the cables may be covered with a concrete slurry mix to protect the cables and comply with code and engineering specifications if site conditions warrant such coverage.

The high voltage underground cables are fed through the trenches and into conduits at the pad transformers at each turbine. The cables run to the pad transformers' high voltage (34.5 kV) compartment and are connected to the terminals. Low voltage cables are fed through another set of underground conduits from the pad transformer to the bus cabinet inside the base of the wind turbine tower. The low voltage cable would be terminated at each end and the whole system would be inspected and tested prior to energization.

For overhead transmission, once the survey and design work are done, the installation of poles and cross-arms to support the conductors can commence. The poles are first assembled and fitted with all of their cross-arms, cable supports and insulator hardware on the ground at each pole location. Holes for each pole would then be excavated or drilled and the poles would be erected and set in place using a small crane or boom truck. Once it is set in place, concrete would be poured in place around the base of the pole, or clean fill would be compacted around the tower base according to the engineer's specifications. The overhead lines would connect to underground cables at each end through a switchable, visible, lockable riser disconnect with fuses.

Excavated soil and rock that arises through grading would be spread across the site to the natural grade and would be reseeded with native grasses to control erosion by water and wind. Approximately 50 percent of excavated soils are anticipated to be too large for re-use as backfill at foundations. These larger cobbles may be crushed into smaller rock for use as backfill or road material or disposed of off-site. Those materials that cannot be reused on site would be disposed of in accordance with Skamania County and Department of Ecology regulations for clean fill materials. All excavation, trenching and electrical system construction work would be done in accordance to a SWPPP for the project as outlined in Section 2.10, Surface Water Runoff.

The electrical construction work would require the use of several pieces of heavy machinery including a track-hoe, a rock trencher, rock cutting equipment, front-end loaders, drill rigs for the pole-line, dump trucks for import of clean back fill, transportation trucks for the materials, small cranes and boom trucks for off-loading and setting of the poles and pad transformers, concrete

trucks, cable spool trucks used to un-spool the cable, man-lift bucket trucks for the pole-line work and a winch truck to pull the cable from the spools onto the poles.

2.14.5 WIND TURBINE ASSEMBLY AND INSTALLATION

The wind turbines consist of three main components: the towers, the nacelles (machine house) and the rotor blades. Other smaller components include hubs, nose cones, cabling, control panels and tower internal facilities such as lighting, ladders, etc. All turbine components would be delivered to the Project site on flatbed transport trucks and main components would be off-loaded at the individual turbine sites.

Turbine erection is performed in multiple stages including: setting of the bus cabinet and ground control panels on the foundation, erection of the tower (usually in 3-4 sections), erection of the nacelle, assembly and erection of the rotor, connection and termination of the internal cables, and inspection and testing of the electrical system prior to energization.

Turbine assembly and erection involves mainly the use of large truck or track mounted cranes, smaller rough terrain cranes, boom trucks, rough terrain fork-lifts for loading and off-loading materials and equipment, and flat bed and low-boy trucks for transporting materials to site.

In sequence with the installation of component equipment, support systems would be installed, including electrical equipment, control equipment, piping installation, wiring cable, and conduits. Typical construction activities would include mechanical fastening, welding, preparation, and painting.

2.14.6 STARTUP TESTING

At the completion of the construction sequence, each system would be energized and operational testing undertaken. This would include testing of each of the major component systems in a predetermined sequence and completion of QA/QC checks to ensure that each system is ready for full operation. At the end of the startup testing phase, each unit would be separately certified for commercial operation.

2.14.7 PROJECT CONSTRUCTION CLEAN-UP

Since project clean-up generally consists of landscaping and earthwork, it is very weather and season sensitive. Landscaping clean-up is generally completed during the first allowable and suitable weather conditions after all of the heavy construction activities have been completed. Disturbed areas outside of the graveled areas would be reseeded to control erosion by water and wind. To the extent feasible for the Project, cleared areas would be reforested in accordance with typical commercial forestry management practices. All construction clean-up work and permanent erosion control measures would be done in accordance to a SWPPP for the Project as outlined in Section 2.10, Surface Water Runoff.

Other project clean-up activities may include interior finishing of the Operations and Maintenance building, landscaping around the substation area, washing of towers, painting of scratches on towers and exposed bolts as well as other miscellaneous tasks that are part of

normal construction clean-up. Construction clean-up would require the use of a motor grader, dump trucks, front-end loaders, and light trucks for transportation of any waste materials, packaging, etc.

SECTION 2.15 PROTECTION FROM NATURAL HAZARDS (WAC 463-60-265)

2.15.1 INTRODUCTION

This section describes conditions that exist on site or measures that are planned as part of the Whistling Ridge Energy Project design to protect the facility from natural hazards.

2.15.2 EARTHQUAKE HAZARD

Earthquake-related damage to industrial facilities, such as the Whistling Ridge Energy Project facility, typically arises from surface fault rupture, liquefaction and lateral spreading of soils, slope failures, or ground shaking. In addition, tsunamis or seiches may impact facilities located near the Pacific Coast or adjacent to other water bodies in seismically active areas. Due to the project site location and elevation, impacts from tsunamis or seiches are not expected to occur.

The Pacific Northwest has four types of seismic sources due to the presence of the Cascadia subduction zone: (1) the subduction zone megathrust, which represents the boundary (interface) between the subducting Juan de Fuca plate and the overriding North American plate; (2) faults located within the Juan de Fuca plate (referred to as the intraplate or intraslab region); (3) crustal faults principally in the North American plate; and (4) volcanic sources beneath the Cascade Range (Wong and Silva 1998). Each of these events has different causes, and therefore produces earthquakes with different characteristics (that is, peak ground accelerations, response spectra, and duration of strong shaking).

Because of their proximity, crustal faults are possibly the most significant seismic sources to inland sites. Studies by Pezzopane (1993) and Geomatrix Consultants (1995) show that at least 70 crustal faults with earthquake potential exist in southwest Washington and northwest Oregon. Many of these faults were unknown or not recognized as being seismogenic a decade ago. Although the largest known crustal earthquake in southwest Washington and western Oregon is only about moment magnitude ($M_{w)}$ 6 (Wong and Bott 1995), potential exists for events of M_w 6.5 or greater along several recognized faults including the Portland Hills and the recently discovered East Bank faults in Portland and the Gales Creek-Mt. Angel fault zone.

2.15.2.1 Surface Fault Rupture

Coseismic surface rupture occurs when a fault breaks to the land surface during an earthquake. Surface rupture is usually associated with moderate to large earthquakes (magnitude 6.5 or greater) or, rarely during smaller, very shallow events. Surface rupture is highly unlikely at the project site because of the absence of known faults beneath the site and the absence of evidence of historical or geologically recent surface rupture in the project site area. No surface fault movement has been recorded in Washington within historic time (McCrumb et al. 1989, Rogers et al. 1996, Lidke et al. 2003). In general, faults that have had a surface rupture during the Holocene epoch (last 10,000 years) or multiple ruptures during the Pleistocene epoch of the Quaternary period (last 10,000 to 1.8 million years) are considered to have a potential for future surface rupture. The known faults with Holocene or late Pleistocene surface displacement within the Puget Sound and Willamette lowlands are distant from the site. No Quaternary faults have

been previously mapped or inferred within the site boundaries (Walsh et al. 1987, Noson et al. 1988, Rogers et al. 1996, Lidke et al. 2003). Due to the lack of recognized Quaternary faults at the project site, the potential for surface fault rupture is considered remote.

2.15.2.2 Strong Ground Motion

The southwestern Washington and northwestern Oregon region, in which the project site is situated, is an area of low to moderate historical seismicity but characterized as one of high seismic hazard due to the potential for strong earthquake ground motion (see Section 3.1.3, Seismicity) from regional potential seismic sources. These sources include the Cascadia Subduction Zone (CSZ) located offshore of the west coast of the US, deep intraplate earthquakes beneath the site vicinity within the subducted plate slab, and shallow crustal faults from the Puget Sound and Willamette lowlands and eastward. According to the US Geological Survey (USGS) probabilistic Seismic Hazard Maps published in 2008 (Peterson et al. 2008 and http://earthquake.usgs.gov/research/hazmaps/), the estimated peak ground acceleration for the site is on the order of 0.18g for a 475-year return period earthquake (10 percent chance of being exceeded in 50 years). For a 2,475-year return period earthquake (2 percent of being exceeded in 50 years), the estimated peak acceleration for the site is on the order of 0.40g. Design of facilities for the USGS estimated levels and potentially higher levels of ground shaking can be accommodated within the current level of earthquake engineering design practice and applicable building codes.

2.15.2.3 Liquefaction and Lateral Spreading

Liquefaction is a phenomenon whereby soils undergo significant loss of strength and stiffness when they are subjected to vibration or large cyclic ground motions produced by earthquakes. Typically, cyclic loading of saturated soils leads to the buildup of excess pore-water pressure as a result of soil particles being rearranged with a tendency toward denser packing. Under undrained conditions (such as during earthquake shaking), loads are transferred from the soil skeleton to the pore-water with consequent reduction in the soils' shear strength.

Saturated granular soils without cohesive fines (i.e., gravels, sands, and silts) are most susceptible to liquefaction. Other factors affecting the potential for liquefaction in soils are density, amplitude of loading, confining pressure, past stress history, age of soil deposit, the size, shape and gradation of particles, and the soil fabric structure. Liquefaction-induced ground settlement and lateral spreading have been the primary cause for extensive damage to aboveground structures, foundations, and pipelines during many earthquakes.

Test pits excavated at the project site encountered shallow bedrock covered with a combination of cohesive and cohesionless soil. No groundwater was observed in any of the test pits. Based on the soils encountered during the field explorations, it is URS's opinion that the potential for liquefaction at this site is very low.

The risk of seismically inducted settlement and lateral spreading is low due to the low liquefaction potential. It is URS's opinion that settlements and lateral spread induced by a seismic event would be minimal. If, during additional subsurface investigations at the site, liquefiable soils and high groundwater are observed, design of the facilities can be

accommodated within the current level of earthquake engineering design practice and applicable building codes.

2.15.2.4 Tsunamis and Seiches

Tsunami waves may enter the Columbia River from distant circum-Pacific earthquakes, local offshore earthquakes on the CSZ, or submarine landslides in the adjacent Pacific Ocean offshore area. The project site is located on a series of north-trending ridges that range in elevation from approximately 2,100 to 2,300 feet above msl and would be above the area potentially affected by a tsunami wave.

Although seiches have been observed in the Pacific Northwest during the 1949 Queen Charlotte Islands, Canada, and the 1964 and 2002 Alaskan earthquake of approximately M_w 8 or greater, seiches have not been reported in the Columbia River, except in the reservoir directly behind the Grand Coulee Dam farther upstream. In our judgment, the seiche potential in this river near the site is minimal, and, due to the elevation of the site, the potential for damage from any seiche that might occur is considered to be remote.

2.15.2.5 Mitigation Measures for Earthquake Hazards

All structures on the site would be built in accordance with the seismic design provisions presented in the 2006 version of the International Building Code (IBC), and the American Society of Civil Engineers 07-05 standard. The site soil is best represented as Stiff Soil (Soil Site Class D). Based on the site location and site conditions described above, we recommend that the values listed in Table 2.15-1 be used for seismic design of the project in accordance with Section 1613.5.3 of the 2006 IBC. The occupancy category of the proposed structure is assumed III as per Section 1613.5.6 of the 2006 IBC.

Table 2.15-1
2006 IBC Seismic Design Values

Parameter	Value	2006 IBC/ASCE 7-05 Reference
Soil Profile Site Class	C	Table 1613.5.2
0.2 Second Spectral Acceleration S_s	0.60 g	Figure 1613.5 (1)
1.0 Second Spectral Acceleration S_l	0.20 g	Figure 1613.5 (2)
Peak Ground Acceleration ($0.4S_{Ds}$)	0.186 g	ASCE 7-05 equation 11.4-5
Site Coefficient F_a	1.16	Table 1613.5.3 (1)
Site Coefficient F_v	1.6	Table 1613.5.3 (2)
Seismic Design Category[a]	D	Tables 1613.5.6 (1) & (2)

a. Assumes Seismic Use Group III

A visual inspection would be conducted following abnormal seismic activity. These inspections would look for signs of incipient mass movement in those areas identified as potentially susceptible to such failures.

2.15.3 SLOPE FAILURE AND MASS WASTING

Pursuant to Skamania County Code (SCC) Title 21A, Chapter 21A.06 - Landslide Hazard Areas, URS has conducted a preliminary landslide hazard evaluation of the proposed Whistling Ridge Energy Project wind turbine site. The project location is shown in Figure 3.1-1, Site Geology.

A URS Licensed Engineering Geologist conducted a site-specific landslide hazard investigation. The investigation consisted of:

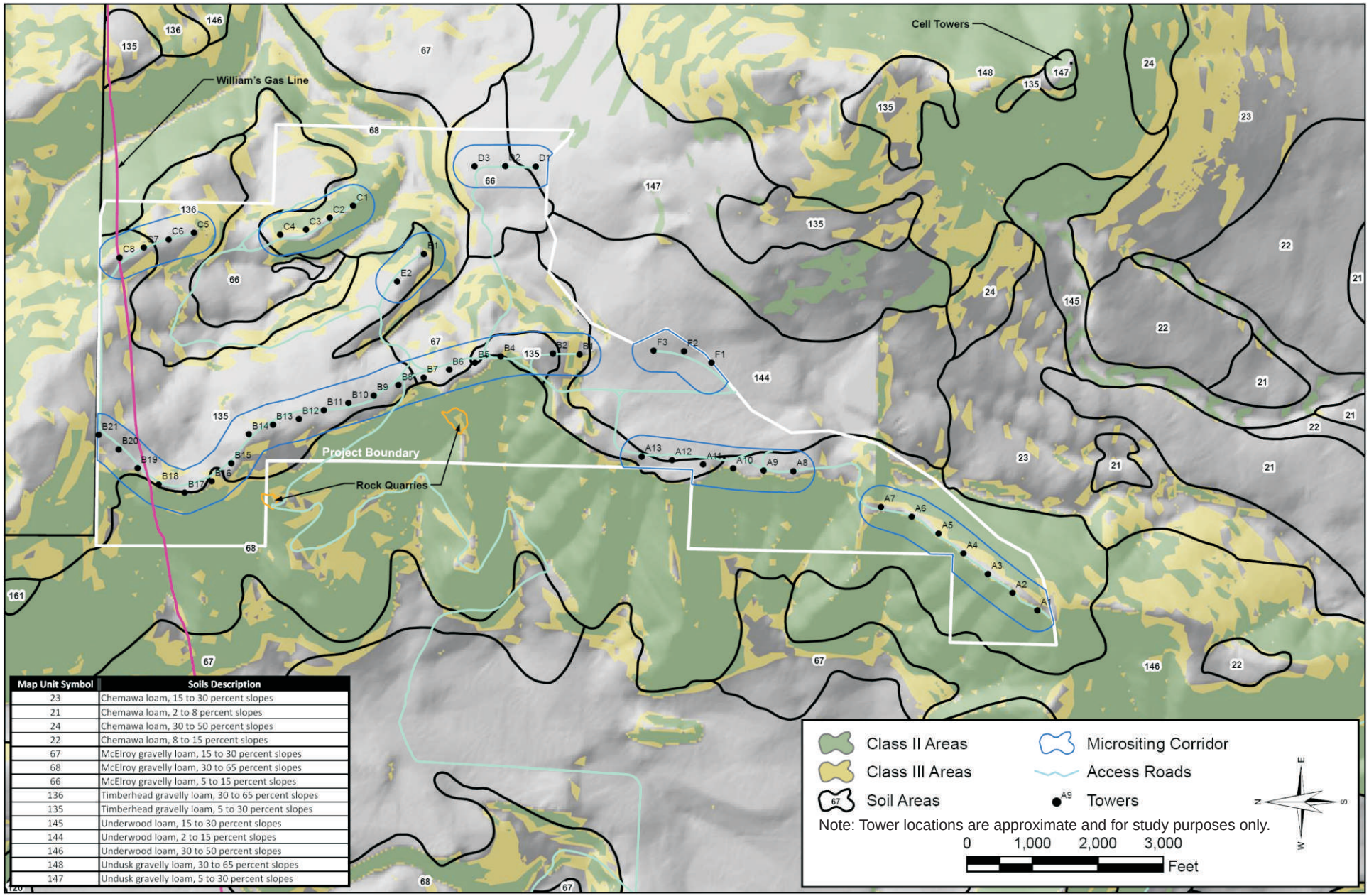
- Review of Sections of the County Code that address Geologically Hazardous Areas
- Review of existing available topographic, geologic and soils literature and maps
- Analysis of project-specific stereo aerial photographs
- Review of project test pit logs and soil samples
- A one day site reconnaissance

According to the County Code, the primary criteria for landslide hazard designations are: presence of pre-existing, known mappable landslides; slope angle; and/or composition of the near-surface soils or rock.

URS has created a color-coded map of the study area using an existing USGS 10 meter digital terrain model (DTM) to segregate slopes into three categories: slopes less than 20%; slopes between 20% and 30%; and slopes greater than 30%. We then superimposed the Natural Resources Conservation Services (NRCS) soil survey map onto the slope map to provide soil type information. The resulting Landslide Hazard Map is presented herein as Figure 2.15-1.

2.15.3.1 Landslide Hazard Area Delineation

Skamania County recognizes three classes of landslide hazard areas (LHAs). Class I (Severe) LHAs are considered to present a severe landslide hazard and are distinguished as areas of known mappable landslide deposits which have been designated landslide hazard areas by the local legislative body. Class II (High) LHAs are areas with slopes between twenty and thirty percent that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than thirty percent. Class III (Moderate) LHAs are areas with slopes between twenty percent and thirty percent not included in Class II.



Map Unit Symbol	Soils Description
23	Chemawa loam, 15 to 30 percent slopes
21	Chemawa loam, 2 to 8 percent slopes
24	Chemawa loam, 30 to 50 percent slopes
22	Chemawa loam, 8 to 15 percent slopes
67	McElroy gravelly loam, 15 to 30 percent slopes
68	McElroy gravelly loam, 30 to 65 percent slopes
66	McElroy gravelly loam, 5 to 15 percent slopes
136	Timberhead gravelly loam, 30 to 65 percent slopes
135	Timberhead gravelly loam, 5 to 30 percent slopes
145	Underwood loam, 15 to 30 percent slopes
144	Underwood loam, 2 to 15 percent slopes
146	Underwood loam, 30 to 50 percent slopes
148	Undusk gravelly loam, 30 to 65 percent slopes
147	Undusk gravelly loam, 5 to 30 percent slopes

Source: GeoDataScape.

Job No. 33758687

Revised Figure 2.15-1

Landslide Hazard Classifications

URS

Whistling Ridge Energy Project
Skamania County, Washington

URS reviewed available geologic and soils literature to develop a landslide hazard classification for the proposed Whistling Ridge Energy Project. An existing published regional geologic map (partially recreated in Figure 3.1-1 of this report) indicates a large landslide in the northeast corner of the study area underlying Tower Line C. Review of stereo photographs of the area where the landslide deposits are mapped, coupled with a site reconnaissance, indicate that there is little geomorphic evidence for landslide activity such as obvious scarps, hummocky or benched terrain, lobate toe areas, or redirected watercourses. No deep subsurface investigations have been carried out at the site to date, but future explorations in support of design for the turbine tower foundations would provide subsurface information regarding the presence of landslide deposits in the area. Based on our preliminary investigation, there does not appear to be any area of the site that meets Skamania County's criteria for a Class 1 LHA.

Class II LHAs are shown in green on Figure 2.15-1. The Class II LHAs at the site are predominantly associated with the steep slopes to the west of proposed Tower Lines A and B. There are also steep slopes east of the seven southernmost Tower Line A towers, and on both sides of Tower Line C.

2.15.3.2 Impacts

Although none of the proposed turbines are located within Class II LHAs, several of the towers along the western side of the project site (Tower Lines A and B) are located along ridgelines with descending slopes that are locally greater than 35 degrees (70%). The heads of some of the drainages along these slopes are arcuate, indicating possible mass wasting activity such as landslides, debris flows, and / or earthflows.

Based on aerial photo and field observations, the primary mass wasting process below the ridgelines appears to be debris flows and soil creep. No evidence for deep-seated, block failure type landslides was observed. Local surficial creep of near-surface soils is indicated by the presence of pistol-butted trees on some of the slopes, primarily on the descending slope west of the northern portion of Tower Line A. Other slopes have mature conifer stands that indicated little or no soil creep. Further subsurface investigation in support of final tower foundation design would help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock mass underlying the ridgelines.

It appears that the primary concern for towers located adjacent to the Class II LHAs is the potential for headward erosion of the steep drainages by debris or earth flow processes. Erosion rates of these drainages are unknown, but no obvious recent mass wasting features were observed in the aerial photos or during the site reconnaissance.

Class III LHAs have been delineated adjacent to proposed wind turbines along the southern Tower Line A, and Tower Line C. Class III LHAs are not anticipated to have any impact on the proposed facilities, due to the robust nature of the proposed foundation designs.

The Landslide Hazard Evaluation identified several areas where the proposed wind turbine generators are located adjacent to slopes that meet Skamania County's criteria for Class II and Class III Landslide Hazard Areas. The primary hazard to the proposed towers appears to be the

potential for exposure to headward erosion of steep drainages on the slopes below some of the tower locations. Exposure of the towers to headward erosion of the steep slope drainages can be minimized by providing maximum possible setbacks from the tops of the steep slopes and/or by siting the turbines along portions of the ridgelines that are above intervening spur ridges. The most critical area of exposure to Class II LHAs is the narrow ridge at the southern portion of Tower Line A.

It is URS's opinion that the proposed project can be constructed and operated without danger to human life or the surrounding environment due to landslide hazards.

2.15.3.3 Mitigation Measures

No mitigation measures are required.

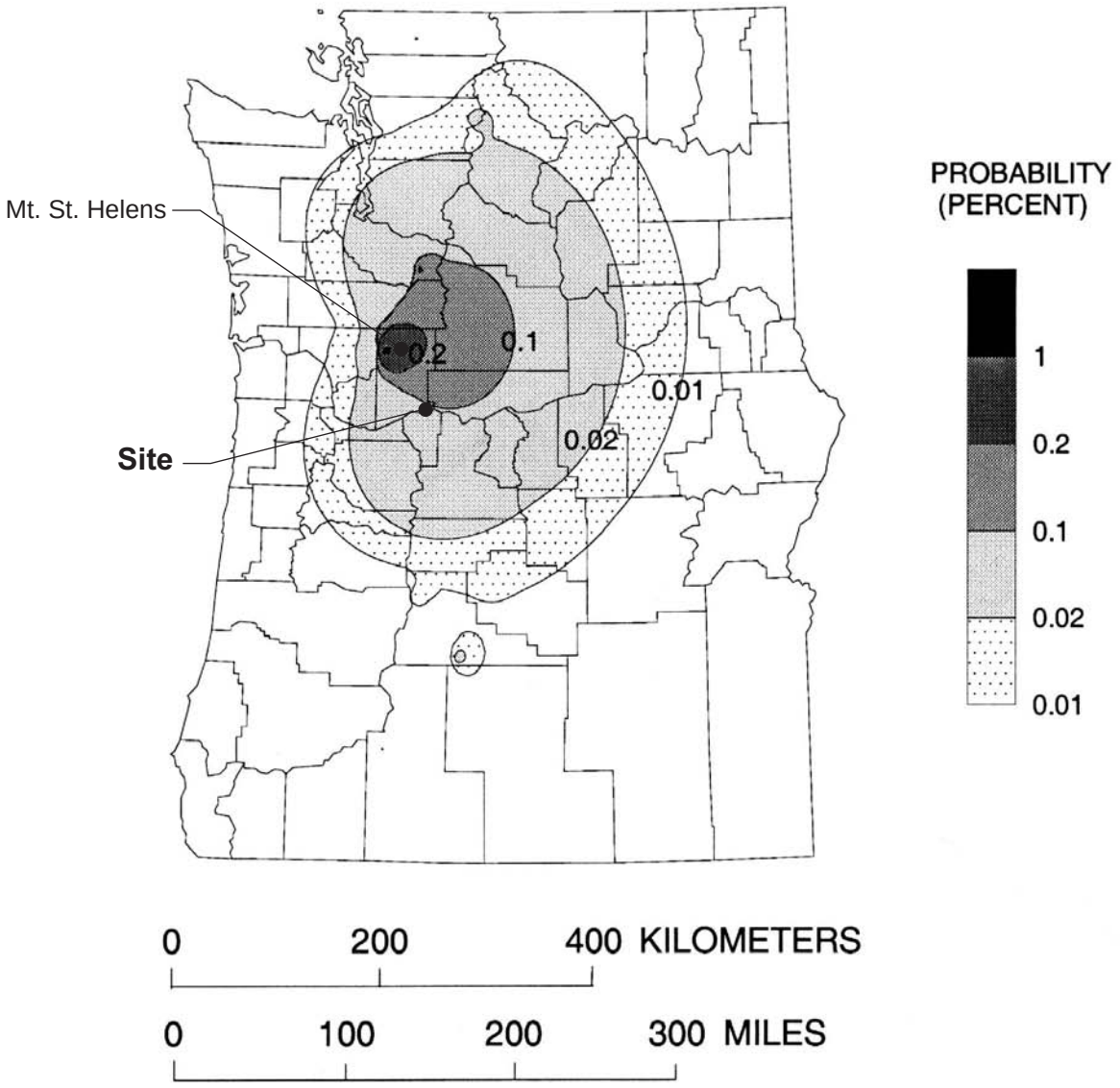
2.15.4 VOLCANIC ERUPTION

The Cascade Mountains of the Pacific Northwest region contain sixteen major volcanoes which extend from Mount Garibaldi in British Columbia to Lassen Peak in California (Harris 1988). Four of the volcanoes within Washington and Oregon have experienced activity within historic time: Mount Baker, Mount Rainier, Mount Hood, and Mount St. Helens. Mount Adams is the closest volcano to the project site, situated approximately 30 miles due north, but is not historically active. Mount St. Helens is the closest historically active volcano to the project site, situated approximately 42 miles to the northwest (see Figure 2.15-2).

Effects of volcanic activity may include lava flows, mudflows, pyroclastic flows, and ash-fall. Volcanic flows are typically limited to the flanks of the volcano and major drainage channels extending from the volcano. The USGS has estimated the areas most likely to be affected by future eruptions of Mount St. Helens. The site is not situated in an area identified as having a potential hazard from a pyroclastic flow or lahar (Wolfe and Pierson 1995). Of greatest impact in terms of area affected by an eruption is the tephra, or ash, carried aloft that subsequently falls to the land surface. Modern meteorological records show that both high altitude wind directions and speeds in Washington have been more prevalent and stronger toward east than toward the west in the site region. The USGS (Wolfe and Pierson 1995) estimates that there is between a 0.02% and 0.1% annual probability that there would be 4 inches (10 cm) or more of ash deposited at the site from eruptions throughout the Cascade Range (Figure 2.15-2). Therefore, no mitigation measures are proposed for direct volcanic hazards.

Secondary processes associated with volcanic eruption, such as lahars, flooding and sediment loading can result in more serious damage. The Whistling Ridge Energy Project site is not located within the modern floodplain of rivers within the watershed of Mt. St. Helens or Mount Adams.

33758687_10.cdr



Explanation

Annual probability of accumulation of ten or more centimeters (four or more inches) of tephra in Washington and Oregon from eruptions throughout the Cascade Range. Probability distribution reflects the frequency of explosive eruptions at each major Cascade volcano, the variability in the thickness of tephra that could be deposited at various downwind distances, and the variability in wind direction.

SOURCE: Wolfe and Pierson, 1995

Figure 2.15-2

Job No. 33758687

Annual Probability of 10 cm of Volcanic Ash

URS

Whistling Ridge Energy Project
Skamania County, Washington

In the event that a volcanic eruption would damage or impact project facilities, the project facilities would be shut down until safe operating conditions return. If an eruption occurred during construction, a temporary shut-down would most likely be required to protect human health and equipment.

2.15.5 FLOODING

The Whistling Ridge Energy Project site is not located within any 100-year floodplains as currently mapped by the Federal Emergency Management Agency (FEMA). The current elevation of the site is above the 100-year floodplain of the Little White Salmon and Columbia Rivers, and mitigation measures for flooding are not planned.

SECTION 2.16 SECURITY CONCERNS (WAC 463-60-275)

2.16.1 SECURITY PLAN

The Whistling Ridge Energy Project site is located on private land approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington. The project would consist of a substation, an Operations and Maintenance building, and graveled site access roads which lead to the wind turbines. Security is primarily a function of controlled access to the project site and lock-out provisions to major equipment and controls.

A thorough review with WindPro Insurance of Palm Desert, CA, a major insurer of wind power projects around the world, found no recorded cases of terrorism, sabotage, or other similar security threats in the past 15 years of their knowledge for more than 17,000 wind turbines operating in 14 different countries. Vandalism has occurred on some wind power projects, which generally has been limited to petty theft of tools and/or equipment.

A full time security plan would be implemented during project construction. Once construction is completed, a comprehensive operations security plan would be prepared along with a detailed emergency plan.

2.16.1.1 Construction Phase

The Site Project Manager would work with a security contractor to develop a plan to effectively monitor the overall site during construction including drive-around security and specific check points. The security inspection and monitoring plan would be changed throughout the course of construction based on the level of construction activity and amount of sensitive or vulnerable equipment and materials in specific area. Much of the security monitoring activities would be straightforward since all site access ways would be accessible from private logging roads.

Security

All site staff and subcontractors would be required to wear an identity badge and display vehicle clearance tags at all times. Newcomers to the project site would be required to check in, log in, and log out at the main site construction trailers. The main site construction trailers would be equipped with outdoor lighting and motion sensor lighting as required.

Parking for the construction contractor employees would be in an assigned parking area. A barrier or other device would be erected around protected areas to exclude vehicles and pedestrians until protection is no longer required.

Secured Lay-Down Areas

Construction materials would be stored at the individual turbines locations, or at the lay-down area around the perimeter of the Operations and Maintenance facility and site construction trailers. Temporary fencing with a locked gate would be installed for a roughly 1.5-acre area adjacent to the site trailers for the temporary storage of any special equipment or materials. After construction is

completed, the temporary fencing would be removed and the area re-seeded with an appropriate seed mix.

2.16.1.2 Operation Phase

Site visitors including vendor equipment personnel, maintenance contractors, material suppliers and all other third parties would be required to obtain permission for access from authorized Whistling Ridge Energy Project staff prior to entrance. The Plant Operations Manager, or designee, would grant access to any critical areas of the site on an as-needed basis.

Access ways to the main Operations and Maintenance facility area, site trailers, and all wind turbine roads would be constructed with lockable access gates. The access gates would be open during working hours and be secured by project site security personnel after working hours.

Both the Operations and Maintenance facility and the main substation would be equipped with outdoor lighting and motion sensor lighting. The substation would be surrounded by an eight-foot-tall chain-link fence with razor wire along the top. All wind turbines, pad transformers, pad mounted switch panels and other outdoor facilities would have secure, lockable doors.

The plant operations group would prepare a detailed security plan to be implemented to protect the security of the project and project personnel.

2.16.2 EMERGENCY RESPONSE PLAN

Whistling Ridge Energy LLC would establish an emergency response plan for the plant to ensure employee safety from the following emergencies: on-site chemical release, medical emergency, major power loss, fire, extreme weather, earthquake, volcano, and bomb threat. The plan would be established prior to completion of construction. The plan would follow the requirements of WAC 296-24-567 and 296-62-3112 and 29 Code of Federal Regulations (CFR) 1910.38, Emergency Action Plan. All hourly and salaried employees, including administrative staff as well as contractors and visitors, would be covered by the plan. The Emergency Response Plan would be administered by the Plant Manager who would be responsible for overall coordination of the plan. See Section 4.1.6, Emergency Response Plans.

The plan elements would include:

- General evacuation
- Downed power system hazards with specific attention to power lines and the substation
- Personnel injury
- Uptower rescue
- Construction emergencies
- Fire/explosion on-site

- Natural gas release off-site
- Chemical release
- Oil release
- Tornado
- Earthquake
- Emergency freeze protection
- Volcanic eruption (ashfall)
- Injury
- Facility blackout
- Facility bomb threat

SECTION 2.17 STUDY SCHEDULES (WAC 463-60-285)

2.17.1 INTRODUCTION

Surveys of the project site have been completed in full consultation with wildlife agencies. Habitat areas have been fully mapped and included in this Application. Additional surveys are planned for northern goshawks and bats to augment information already obtained, as described in Section 2.17.2. Subsequent to the March 2009 submittal of the Application for Site Certification, a~~A~~dditional surveys ~~are planned~~were performed for the roadway corridor ~~within the Columbia River Gorge National Scenic Area in the spring of 2009~~, and existing surveys ~~will be~~were confirmed. All will be included in the information prepared for the environmental impact statement.

2.17.2 ADDITIONAL STUDIES

Additional northern goshawk and anabat surveys will be made in the project area:

- The northern goshawk is not listed as "threatened" or "endangered" by either the state of Washington or federal agencies. The applicant completed northern goshawk surveys in accordance with protocols accepted and recommended by the Washington Department of Fish & Wildlife (WDFW). The surveys were conducted during the relevant seasons in 2004, 2005, 2008 and again in ~~2008~~spring and summer, 2009, in accordance with agreed upon protocols. No goshawks were found on the project site, nor were any observed on any surrounding properties. It is highly unlikely that goshawks will be found on the project site or in areas to the north, owned and managed by Washington State Department of Natural Resources (WDNR). ~~The applicant will conduct an additional survey on the project site in spring 2009 to confirm these findings, in accordance with agreed protocols.~~ The WDNR property near the project site has similar habitat characteristics to the project site, and was recently logged. ~~While no goshawks are expected on the area to the north, due to the proximity of turbines to the WDNR property to the north, the Applicant will conduct an intensive survey effort on approximately 360 acres to the north of the project site to confirm that the project does not present any significant impact to this species.~~

- Anabat detection surveys ~~proposed~~ for 2009 were started in July and will ~~be implemented during the months of July~~continue through October, and will augment our understanding of bat activity within the vicinity of the proposed micrositing corridors. Anabat detectors also will be elevated to gain a better understanding of bat activity at rotor swept height.

The access roadway has been revised to use West Pit Road, ~~that would traverse the Scenic Area is~~ an existing road in a developed area managed for commercial forestry that connects the project area to the Cook-Underwood Road (via Willard Road), entirely outside of the Columbia River Gorge National Scenic Area. The roadway would be widened to provide access for construction vehicles. ~~The following s~~Plant and wildlife surveys ~~are planned for~~were performed in June ~~spring~~ 2009 and the results have been incorporated into this amended application~~:~~.

- ~~Scenic Area Wetland and Habitat Survey~~
- ~~Scenic Area Sensitive Plant Field Survey~~
- ~~Scenic Area Wildlife Survey~~
- ~~Scenic Area Cultural Resource Reconnaissance Survey~~

SECTION 2.18 POTENTIAL FOR FUTURE ACTIVITIES AT THE SITE (WAC 463-60-295)

2.18.1 EXPANSION OF WHISTLING RIDGE ENERGY PROJECT

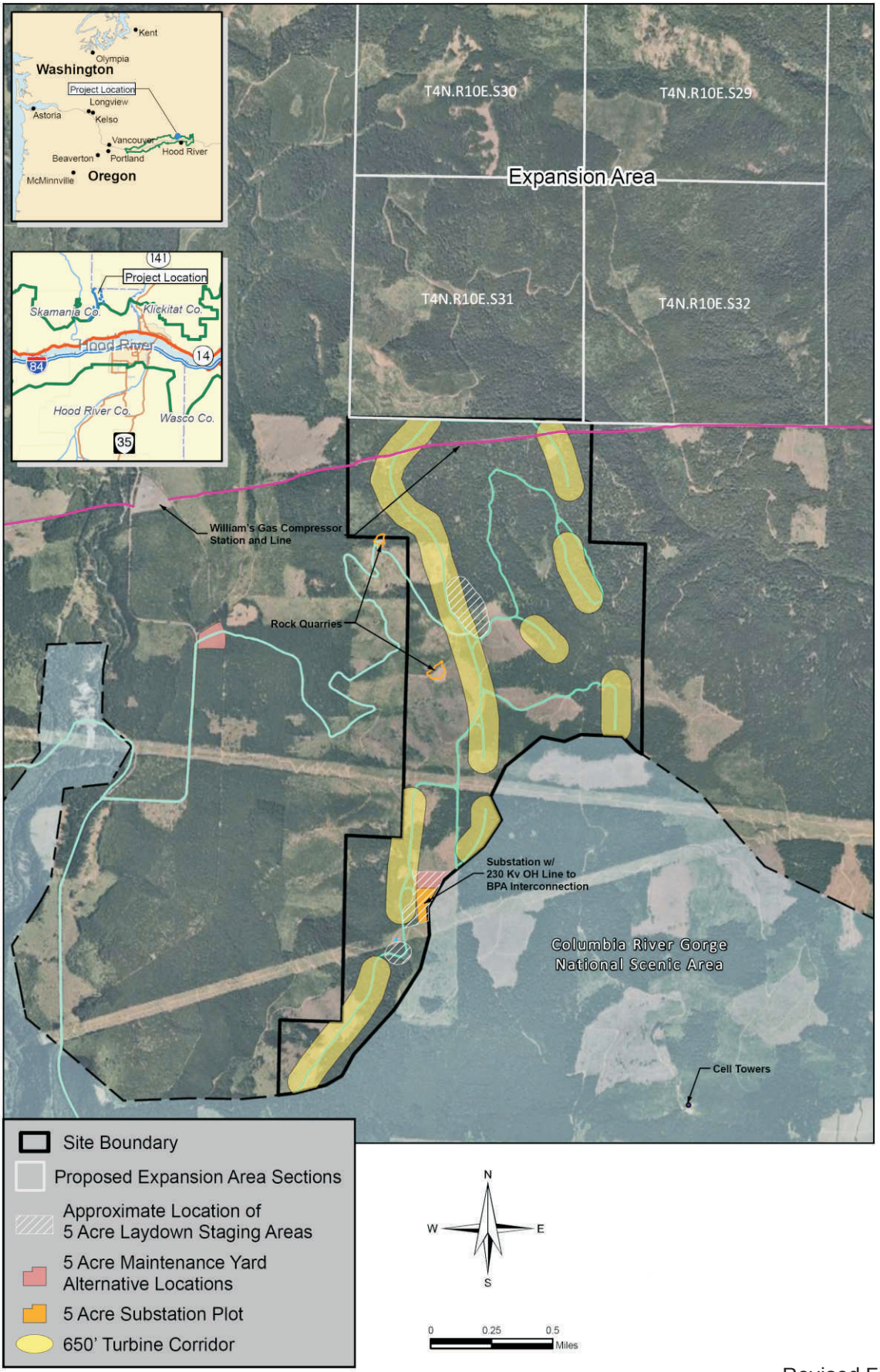
Depending on market conditions and the ability to lease land from the WDNR, there is a potential that the Whistling Ridge Energy Project could be expanded in the future. The potential expansion area would be directly north of the existing project site and consist of the lease of up to four sections[1] from WDNR for the placement of approximately 50 additional wind turbines. The potential expansion would be located in Klickitat County in an area studied during that County's Energy Overlay Zone process. See Figure 2.18-1, Potential Expansion Area.

At this time, such expansion is speculative, and sufficient environmental and engineering information and analyses are not available to pursue permitting. If the project is ultimately expanded to include the WDNR property, revenues generated from these lands would benefit the State School Trust, including local public schools.

The expanded site and the existing and planned facilities (both the transmission and the Operations and Maintenance facilities) would support an expansion in the future, should the expected demand for clean renewable energy continue to grow.

[1] A "section" is one square mile, consisting of 640 acres.

33758687_86.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 2.18-1

Potential Expansion Area

URS

Whistling Ridge Energy Project
Skamania County, Washington

SECTION 2.19 ANALYSIS OF ALTERNATIVES (WAC-463-60-645)

2.19.1 INTRODUCTION

This section summarizes the alternatives that were explored during the development of the Whistling Ridge Energy Project.

2.19.2 SITE SELECTION

The Whistling Ridge Energy Project would be a wind-powered energy facility constructed by Whistling Ridge Energy LLC. Whistling Ridge Energy LLC is a special-purpose corporation formed to develop, permit, finance, construct, own and operate the Whistling Ridge Energy Project. Whistling Ridge Energy LLC is a Washington corporation formed under Title 23B of the RCW. It is wholly-owned by S.D.S Co., LLC and proposed to be constructed on land owned by S.D.S. Co., LLC and Broughton Lumber Company. The project site, north of the Columbia River Gorge, is optimally suited for wind energy, and is crossed by two BPA high voltage transmission lines. The project site already has a network of logging roads, requiring the construction of relatively few new roads. Approximately ~~7.2~~7.9 miles of existing private logging roads would be improved. In areas where there are no existing logging roads near proposed wind turbine strings, approximately 2.4 miles of new gravel access roads would be constructed. Some of these construction roads would continue to be used during the project's operational phase.

As described in the Introduction, the objective of the Whistling Ridge Energy Project is to construct and operate a wind energy generation resource to meet a portion of the projected growing regional demand for new energy resources. The Energy Information Administration projects total electricity demand growth between 1.8% and 1.9% per year from 2001 through 2025. The Western Electricity Coordinating Council forecasts that, due to cooler than normal temperatures, peak demand requirement will increase at a compound rate of 2.4% per year (WECC 2005). Based on data published by the Northwest Power and Conservation Council, electricity demand for the Council's four-state Pacific Northwest planning region (Washington, Oregon, Idaho, and Montana) was 20,080 average MW in 2000 and is estimated to grow to 22,105 average MW by 2015, based on medium demand (NWPCC 2005). The Northwest Power and Conservation Council's Sixth Electric Power and Conservation Plan is expected to be published in draft in August 2009.

Washington and the Northwest region face a growing medium and long-term demand for power. Many regional utilities are seeking to acquire new generating resources to meet their loads. More specifically, several regional utilities, including Avista, Puget Sound Energy, and PacifiCorp (doing business as Pacific Power in Washington) have all completed detailed studies and demand forecasts of their own systems as part of their Integrated Resource Plan or Least Cost Plan process with oversight from the Washington Utilities and Transportation Commission. As a result of their formal Integrated Resource Plan or Least Cost Plan processes, these three utilities have issued Requests for Proposals specifically for wind power and/or other renewable

resources. Finally, Washington now requires that utilities meet the state's Renewable Portfolio Standards requirements, which will likely be confirmed nationally.

The proposed project is intended to help meet this growing regional demand for renewable, wind-generated electricity.

The project is not considered a reasonable alternative to any other wind energy facility or wind energy facility site. No project, on its own, can meet the forecasted or immediately requested demand for power in the region.

EFSEC has previously supported the application of certain criteria for the evaluation of wind energy project sites. While Whistling Ridge Energy LLC is not a developer of multiple sites, and only proposes the site described in this application, the selection of this site conforms to accepted site selection criteria:

- Commercially viable wind resource
- Access to high voltage (115kV or 230 kV) transmission lines within a reasonable distance to a project site, with sufficient available capacity to carry the project's output
- Absence of significant environmental constraints (i.e., no threatened or endangered species, major archeological resources, critical wetlands, etc.)
- Willing landowner(s) with sufficient undivided acreage to support a project
- Accessible site with sufficient road access to permit delivery of large wind turbine components and allow construction of project infrastructure
- Appropriate and compatible zoning designation and/or lack of conflicting land uses

The Whistling Ridge Energy Project site appears to meet all of the above criteria. Other potential sites are not owned and controlled by the Applicant, and they are not deemed to be viable alternatives to the proposed project. Because the site is optimally suited for the production of wind energy, has been used for forestry, has existing roads suitable for wind turbine placement and maintenance, is adjacent to BPA transmission lines, and is owned by the Applicant, no additional sites were considered.

2.19.3 ELECTRICAL TRANSMISSION ROUTING ALTERNATIVES

The project site is crossed by two BPA high voltage transmission lines. A substation with a 230 kW overhead line is proposed to be located immediately adjacent to the BPA right-of-way. The proposed location of the substation was selected to be placed in a relatively clear and low level area adjacent to the planned Operations and Maintenance facility. The elevation was selected to minimize impacts from winter snow. To minimize the need for creating new transmission corridors, no alternative transmission routing corridors were considered.

2.19.4 ALTERNATIVE TECHNOLOGIES AND FUEL

Whistling Ridge Energy LLC has proposed the project to provide an alternative source of energy that does not generate air or water emissions and does not produce hazardous waste. Wind energy is considered a renewable resource, and its operation does not deplete natural resources such as coal, oil, or gas; cause environmental damage through resource extraction and transportation; or require significant amounts of water during operation. Because of the environmental benefits of wind energy, and the suitability of the site already owned by the Applicant for wind energy, no alternative technologies or fuel sources were considered.

2.19.5 ALTERNATIVE CONSTRUCTION ACCESS

There are ~~only two~~three potential ways to access the project site. ~~Both~~ All are via County roads from SR 14 to Cook-Underwood Road. From Cook-Underwood Road the project site can ~~either~~ be accessed by:

- ***Route 1:*** Ausplund Road to a private logging road vacated by Skamania County in 1987, which crosses private property (not owned by the Applicant) that is currently used for residential, agricultural orchards, and commercial timber production and harvest.

- ***Route 2:*** Kollock-Knapp Road to Scoggins Road to a private logging road called the CG2930 road on County Assessor's maps, which crosses property owned by the Applicant that is currently used for commercial timber production and harvest. ~~(See Figures 4.3-1 and 4.3-2 in Section 4.3 Transportation for the location of CG2930.)~~

- ***Route 3:*** Cook-Underwood Road to Willard Road to a new connection to West Pit Road. West Pit Road is a private logging road that is currently used for commercial timber production and harvest. (See Figures 4.3-1 and 4.3-2 in Section 4.3 Transportation for the location of West Pit Road.)

The private logging road in Route 1 was made a County right of way in 1923. It was vacated for public use in 1987 by resolution of the Skamania Board of County Commissioners; however, the rights to use the road by abutting property owners remain. Additionally, road improvements to this route would be required for access to construct the wind energy facility and for ongoing Operations and Maintenance traffic. Impacts to a non-project landowner from these activities would occur if Route 1 were used.

Route 2~~, on the other hand,~~ would require~~s~~ minor roadway improvements that would not directly impact any non-project landowners. However, these roadway improvements would require construction within the Columbia River Gorge National Scenic Area (CRGNSA). Therefore, Route 2 ~~is the preferred, and perhaps the only practicable,~~has been eliminated as a construction roadway access alternative.

Route 3 would require a new direct connection from Willard Road to West Pit Road, and improvements to the West Pit Road. The roadway is located entirely on private property outside of the CRGNSA. Route 3 is the preferred, and perhaps only practicable, access alternative.

2.19.6 ALTERNATIVE HAUL ROUTES AND METHODS OF TRANSPORT

All wind energy components, including tower sections, the nacelle and turbines, and blades would be shipped to either the Port of Longview or Port of Vancouver and then be transported by any or all of the following three modes of travel:

- Specialized trucks along State, County, City, and private roadways
- Burlington Northern Santa Fe (BNSF) rail lines running parallel to SR 14
- Barge and tug boat up the Columbia River and through the lockage facility at the Bonneville Dam to the SDS Lumber Company industrial dock in Bingen

Wind energy components transported on specialized trucks from either of the Ports would be delivered directly to the proposed project site. Components transported either by rail or barge from either of the Ports could be delivered to the SDS Lumber Company industrial facility in Bingen, loaded onto specialized trucks, and then transported to the proposed project site. Fuel would be delivered to the proposed site by truck as needed.

Trucks transporting wind energy components could have loads as high as 17.5 feet measured from the ground to the highest point of the load, as wide as 14.5 feet or as long as 150 feet. Specialized trucks may be used to transport wind energy components from either the Port of Longview or the Port of Vancouver to the west junction of Cook-Underwood Road with SR 14 at MP 56.28. East of that intersection ~~Trucks~~ trucks traveling along SR 14~~ between Vancouver, Washington and Cook-Underwood Road~~ would be physically constrained by a series of three very narrow tunnels with height restrictions as low as 13 feet 9 inches measured vertically from the edge of the roadway. Over-size loads that would include transport of the tower sections, the nacelles and turbines, and blades would encounter restrictions and/or prohibitions along SR 14 between Vancouver, Washington and the junction of SR 14 and Cook-Underwood Road at MP ~~63.32~~56.28 due to the length and/or width of the loads. Cook-Underwood Road near its northern most point at approximate MP 5.5 contains a bridge that crosses the Little White Salmon River. Crossing this bridge with specialized trucks transporting wind energy components would require special provisions agreed upon between S.D.S Co., LLC and Skamania County.

An alternate route for transport of wind energy components from either of the Ports to the east junction of SR 14 and Cook-Underwood Road at MP 63.32 would include trucks traveling on Interstate 84 (I-84) through Oregon to the Boardman junction, then along SR 730 to the junction of I-82 with SR 395, across the Columbia River back into Washington State, and then to SR 14. Trucks traveling on SR 14 between the junction of I-82/SR 395 and Cook-Underwood Road would be physically constrained by one very narrow tunnel with a height restriction of 13 feet 3 inches measured vertically from the edge of the roadway.

The option of using rail to transport the wind energy components from either of the Ports to the SDS Lumber Company facility also was analyzed. Wind energy components on rail cars can be up to 14.5 feet in width, up to approximately 15 feet in height, and as long as 150 feet. The BNSF rail line between Vancouver, Washington and the SDS Lumber Company facility in Bingen, Washington may not be able to accommodate loads with widths in excess of 14 feet.

This may preclude transport of the bottom tower sections using rail. The wind energy nacelles, turbines, and blades could be transported along the BNSF line to the SDS Lumber Company facility. BNSF could transport the wind energy components on standard or heavy-duty 89-foot long flat rail cars. The wind energy components would be off-loaded at the SDS Lumber Company industrial facility to a staging location to be determined and loaded onto specialized trucks for transport to the proposed project site. Transport of wind energy components using specialized trucks from the SDS Lumber Company industrial facility to SR 14 would require the use of Maple Street in the City of Bingen, Washington for approximately 0.25 mile.

The third option analyzed for transporting the wind energy components from either of the Ports to the SDS Lumber Company industrial facility was by using barges. The wind energy components would be off-loaded from a ship at either of the Ports, loaded onto barges, and then transported upriver to the Bonneville Dam using tug boats. The barges and tugs would by-pass the Bonneville Dam via the lockage facility, and continue upriver to the SDS Lumber Company industrial facility. There would be no over-size or over-weight restrictions using barges as a transport mode for wind energy components at either of the Ports, on the Columbia River, or at the lockage facility at the Bonneville Dam. Coordination with the Bonneville Dam Project Office would be required to determine optimal times for lockage use. The Bonneville lockage facility accommodates commercial, government, and recreational vessels. The heaviest lockage traffic on average occurs during the month of August. Vessel traffic is typically heaviest on Thursdays, Fridays, Saturdays, and Sundays. The wind energy components would be off-loaded at the SDS Lumber Company industrial facility to a staging location to be determined and loaded onto specialized trucks for transport to the proposed project site. Transport of wind energy components using specialized trucks from the SDS Lumber Company industrial facility to SR 14 would require the use of Maple Street in the City of Bingen, Washington for approximately 0.25 mile. There are currently no over-size or over-weight restrictions for this roadway. Like the use of rail, this option would still require using specialized trucks to transport the wind energy blades from the SDS Lumber Company industrial facility to the junction of SR 14 and Cook-Underwood Road at milepost (MP) 63.32, and this section of SR 14 has a length restriction of 125 feet.

In Section 4.3 Transportation, there is a detailed description of the limitations on area roadways in terms of the width, height, length and weight of the loads to be transported, and the needed roadway improvements.

2.19.7 ALTERNATIVE SITE FOR OPERATIONS AND MAINTENANCE FACILITY

Two sites are being considered for the operations and maintenance facility, either adjacent to the substation on site or along West Pit Road to the west of the project site. Both sites would be approximately 5 acres in size and include an approximately 3,000 square foot enclosed space, including office and workshop areas, a kitchen, bathroom, shower and utility sink. The building would be constructed of sheet metal, and would be approximately 16 feet tall (to the rook peak). The site along West Pit Road provides the advantage of being at a lower elevation than the site adjacent to the substation which would make it more accessible during winter months. The West Pit site is located on land zoned Residential 5, whereas the alternative site is Unmapped (UNM).

The maintenance and operations use would be allowed by conditional use approval in the Residential 5 zone and is allowed outright in the UNM area.

~~2.19.7~~2.19.8 NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed Whistling Ridge Energy Project would not be constructed or operated, and the environmental impacts described in this Application would not occur. The No Action Alternative assumes that future development would comply with existing zoning requirements for the project area, which include Unmapped, Forest/Agriculture 20 and Residential ~~10~~5. The project area is designated in the County's Comprehensive Plan as "Conservancy." According to the County's Comprehensive Plan, the Conservancy land use is intended to provide for the conservation and management of existing natural resources in order to achieve a sustained yield of these resources, and to conserve wildlife resources and habitats (Skamania County 2007). Logging, timber management, agricultural and mineral extraction are the main activities that take place in this area. Among the uses identified in the 2007 Comprehensive Plan as appropriate in the Conservancy designation are: public facilities, utilities, utility substations, forest management (including temporary logging and mining camps) and surface mining (by conditional use). Wind energy is considered to be a utility and could be proposed by another applicant.

If the proposed project is not constructed, Washington electrical utilities would lose an important non-polluting renewable resource alternative close to the region's major metropolitan areas. The economic benefits associated with this capital investment and the economic activity associated with construction and operation of the facility would be foregone.

It is likely that the region's need for power would be addressed by some combination of user-end energy efficiency and conservation measures, by existing power generation sources, or by the development of new renewable and non-renewable generation sources. Base load demand would likely be filled through the expansion of existing thermal generation or development of new thermal generation, such as gas-fired combustion turbine technology. Such development could occur at appropriate locations throughout the state of Washington.

A base load natural gas-fired combustion turbine would have to generate approximately 41 average MW of energy to replace an equivalent amount of power generated by the project (75 MW at 33% net capacity). An average MW (aMW) is the average amount of energy supplied over a specified period of time, in contrast to MW, which is the maximum or peak output or capacity that can be supplied for a short period.

SECTION 2.20 PERTINENT FEDERAL, STATE AND LOCAL REQUIREMENTS (WAC 463-60-297)

2.20.1 APPLICABLE FEDERAL, STATE AND LOCAL PERMIT REQUIREMENTS

Table 2.20-1 lists all applicable federal, state, and local permits and related requirements that would apply to construction of the Whistling Ridge Energy Project if Whistling Ridge Energy LLC had not elected to request approval under EFSEC jurisdiction. The table lists the permits or requirements, identifies the permitting agency, and cites the authorizing statute or regulation. The table also identifies the section(s) in the application relating to each permit or requirement.

Table 2.20-1
Applicable Federal, State and Local Requirements

Permit or Requirement	Agency/Statute & Regulation	Application §§
Federal		
National Environmental Policy Act (NEPA)	BPA; it is anticipated that there will be a NEPA/SEPA process.	
BPA Interconnection Agreement	BPA	
Threatened or Endangered Species Assessment; Migratory Bird Treaty Act	NEPA lead agency (BPA, USACE and EPA) Endangered Species Act, §7; 16 U.S.C. § 1531 et seq.; 50 CFR Pt 402 Migratory Bird Treaty Act, US Fish & Wildlife Service	§ 3.4.2
Historic Preservation/Landmark Review	National Historic Preservation Act, § 106; 16 U.S.C. § 470 et seq.; 36 CFR §§ 60-63, 800; Historic Sites, Buildings, Objects, and Antiquities, 16 U.S.C. § 469 et seq.; 36 CFR §§ 296.1; 43 CFR §§ 7.1 et seq.	§ 4.1
No Hazard Determination	Federal Aviation Authority	§ 4.2.2
State of Washington		
State Environmental Policy Act (SEPA)	Skamania County would have been lead agency absent EFSEC jurisdiction. Washington Environmental Policy Act, Chapter 43.21C RCW; Chapter 197-11 WAC Washington Department of Ecology SEPA Rules, which establishes uniform requirements for compliance with SEPA.	Parts 3,4,and 5
Temporary air permit for the concrete batch plant Temporary air permit for the rock crushing for roadways	South West Clean Air Agency RCW 70.94; Ch. 173-401 WAC	§§ 3.2 and 5.1
Forest Practices Application	Washington State Department of Natural Resources Ch. 76.09 & 76.13 RCW; Ch 222 WAC	§ 4.2.1

Table 2.20-1 (continued)
Applicable Federal, State and Local Requirements

Permit or Requirement	Agency/Statute & Regulation	Application §§
Construction Stormwater General Permit	Ecology, Water Quality Program Federal Clean Water Act, 40 CFR Parts 122, 123 & 124, Subchapter D; Chs. 80.50 & 90.48 RCW; Chs. 173-216 & 220 WAC	§ 2.10; 5.2
Approval for Over Height and Over Length Loads on State Highways	WSDOT Goldendale Office 509-427-3920	§ 4.3
Possible WSDOT right of way approval	WSDOT Goldendale Office 509-427-3920	§ 4.3
Approval of Industrial Water Well (Notice of Intent to Construct a Water Well; Water Well Report)	Ecology, Water Quality Program Ch. 18.104, 70-119A & 90.44 RCW; Ch 173-160 and 246-291 WAC Federal Safe Drinking Water Act, 42 USC § 300(f) Parts B & C	§ 2.5; 3.3
Archaeology and Historic Preservation	Washington State Office of Archaeology and Historic Preservation Archaeological Sites and Resources, Chapter 27.53 RCW.	
Electrical Construction Permit	Department of Labor & Industries Ch. 296-746 WAC	
Skamania County		
Building Permit (Civil, Structural, Mechanical, Plumbing)	Skamania County Building Official Title 15 SCC (adopting the IBC, UPC, UFC, and UMC)	§ 4.2.1
Zoning (Conditional Use Permit; Consistency with Skamania County 2007 Comprehensive Land Use Plan)	Skamania Community Development Title 21 SCC Ch. 36.70; Ch 36.70A RCW	§ 4.2.1
Compliance with Noise Regulations	Skamania County Sheriff Department Ch. 8.22 SCC Ch. 70.107 RCW; Ch. 173-60 WAC;	§ 4.1.1
Critical Areas Variance and Development Review	Skamania Community Development Ch. 21A SCC Ch. 36.70; 36.70A RCW	§ 3.1
Clearing and Grading Permit	Skamania Community Development Ch 36.70; 36.70A RCW	§ 3.1
Water Availability Verification Evaluation (WAVE); Group B Water System Approval	Skamania Community Development Ch 50.56 and 70.119A; Ch 246-291 WAC; Chapter 15 and 8.68 SCC Federal Safe Drinking Water Act, 42 USC § 300(f) Parts B & C	§ 3.3
On-Site Septic System Site Evaluation and Design Review	Skamania Community Development Ch. 70.118 RCW; Ch. 246-272A WAC	§ 2.7

Table 2.20-1 (continued)
Applicable Federal, State and Local Requirements

Permit or Requirement	Agency/Statute & Regulation	Application §§
Road Approach Permit, Haul Route Agreement and Negotiated Private Road Requirements	Skamania County Department of Public Works Ch. 12.03 SCC; Skamania County Road Approach and Private Roads Standards Development Assistance Manual	§ 4.3
~~Columbia Gorge National Scenic Area Approval~~	~~Skamania Community Development~~ ~~Ch. 22.14 SCC~~ ~~Federal National Scenic Area Act; 16 USC § 544-544p~~	~~§ 4.2.3~~

2.20.2 FEDERAL PERMITS

2.20.2.1 National Environmental Policy Act (NEPA)

Due to the interconnect with the BPA system, and the need for a Large Generator Interconnection Agreement, the project must undergo National Environmental Policy Act (NEPA) review. ~~The Applicant anticipates that~~ BPA and EFSEC ~~will undergo~~are jointly preparing a ~~joint~~ NEPA/SEPA ~~process~~Environmental Impact Statement.

Interconnection Agreement

The Applicant filed for an interconnection on in June 2002 and it is presently under study.

2.20.2.2 Threatened or Endangered Species Assessments

National Environmental Policy Act (federal) lead agency
Endangered Species Act, § 7; 16 U.S.C. § 1531 et seq.; 50 CFR Pt 402

The Endangered Species Act (ESA) provides for the conservation of endangered and threatened species and the ecosystems upon which they depend. The ESA establishes, for federal agency actions, a "procedural obligation to consult" with the US Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).

The consultation process generally involves three steps. First, a federal agency proposing to take action inquires with USFWS and NMFS as to whether a protected species may be present in the area affected by the project. Second, if there is reason to believe the federal action will likely affect a protected species the agency must consult with USFWS and NMFS and avoid jeopardizing the species. The agency prepares a Biological Assessment to determine whether the species (if present) or its habitat would likely be affected by the action. USFWS and NMFS will review the Biological Assessment for completeness and determine whether the federal action will jeopardize the species or not, and will suggest alternatives to reduce or eliminate impacts of the action on the species.

With regard to potential mortalities to avian species, under the Migratory Bird Treaty Act, the USFWS has jurisdiction over the taking of migratory birds. The applicability of the Migratory Bird Treaty Act to wind energy facilities has been debated. However, enforcement under the Migratory Bird Treaty Act has not been initiated for projects like this one that have undergone extensive pre-

application avian survey work, have conferred with wildlife agencies, and can show that potential impacts are insignificant through sound protocols and efforts to minimize and mitigate impacts, including through compliance with voluntary wind energy siting guidelines.

Compliance Plan

The Applicant has completed extensive pre-application habitat and wildlife surveys, conducted pursuant to best industry standards, in consultation with wildlife agencies. A Biological Assessment will be prepared and consultation initiated with the USFWS concurrent with the preparation of the NEPA/SEPA EIS. Compliance is further documented in Section 3.4 Habitat, Vegetation, Fish and Wildlife.

2.20.2.3 Historic Preservation/Landmark Review

National Environmental Policy Act (federal) lead agency (OFE)
National Historic Preservation Act § 106; 16 U.S.C. § 470 et seq.; 36 CFR §§ 60-63, 800; Historic Sites, Buildings, Objects, and Antiques, 16 U.S.C. § 469 et seq.; 36 CFR § 296.1; 43 CFR § 7.1 et seq.

The National Historic Preservation Act authorizes the Secretary of the Interior to expand and maintain a National Register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering and culture. Federal agencies having authority to license any undertaking must, prior to approval of funds or issuance of any license, take into account the effect of the undertaking on any district, site, building, structure or object that is included in, or eligible for, inclusion in the National Register.

The purpose of the Natural Landmarks program is to identify and encourage the preservation of nationally significant examples of the full range of ecological and geological features that constitute the nation's natural heritage. Federal agencies are responsible for considering the existence and location of natural landmarks when assessing the effects of their actions on the environment pursuant to NEPA.

Compliance Plan

A survey for potential historic sites has been prepared and a new survey will be performed and included in the EIS. No evidence of prehistoric activity was observed during the cultural resource survey. No archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented (Section 4.2.5, Historic and Cultural Preservation). Federal and state regulations require consideration of project effects on historic and/or cultural resources. Cultural resources must undergo a Section 106 Review Process for projects with a federal nexus under the National Historic Preservation Act. Section 106 review will be included in an EIS as a part of the NEPA compliance documentation

2.20.2.4 No Hazard Determination

Pursuant to Title 14 of the CFR, Part 77 Objects Affecting Navigable Airspace, notice shall be made to the FAA of any construction of more than 200 feet above the ground level at its site. The wind

turbines, estimated at approximately 426 feet in height (262-foot hub height and 164-foot radius blades, measured from the ground to the turbine blade tip), would exceed the 200-foot measure. If a structure exceeds obstruction standards but does not result in a substantial adverse effect, a determination of no hazard would be required to be obtained from FAA prior to construction.

Compliance Plan

Whistling Ridge Energy LLC will send one executed form set (four copies) of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. The notice required under Sec. 77.13(a) (1) through (4) will be submitted at least 30 days before the earlier of the following dates: (1) the date the proposed construction or alteration is to begin; or (2) the date an application for a construction permit is to be filed.

All no hazard determinations shall address or include:

1. ***Full Description.*** A full description of the structure, project, etc., including all submitted frequencies and effective radiated power shall be included. Use exact information to clearly identify the nature of the project (e.g., microwave antenna tower; FM, AM, or TV antenna tower; suspension bridge; four-stack power plant; etc.).

2. ***Latitude, Longitude, and Height.*** Specify the latitude, longitude, and height(s) of each structure. When an obstruction evaluation study concerns an array of antennas or other multiple-type structures, specific information on each structure should be included.

3. ***Marking and/or Lighting.*** A marking and/or lighting recommendation shall be a condition of the determination when aeronautical study discloses that the marking and/or lighting are necessary for aviation safety.

2.20.3 STATE PERMITS

2.20.3.1 State Environmental Policy Act

EFSEC
Ch. 463.47 WAC

Compliance with SEPA is required before any state or local permits or approvals can be issued for the construction or operation of the facility. Skamania County would be the SEPA lead agency for local compliance absent EFSEC review at the State level. EFSEC is lead agency according to Chapter 463-47 WAC. The SEPA process is generally the same, regardless of lead agency.

Compliance Plan

On April 6, 2009 EFSEC ~~will make~~ issued a Determination of Significance, a threshold determination requiring the preparation of a SEPA EIS~~, likely a Determination of Significance~~. This

will be followed by the preparation and issuance of a Draft EIS. The Final EIS will be published following the close of adjudicatory hearings.

~~It is anticipated that~~ EFSEC ~~will~~ has joined with BPA in the preparation of a joint NEPA-SEPA EIS that will suffice for both Federal and State permitting decisions. It is further anticipated that EFSEC and BPA will coordinate this effort with Skamania County to ensure that the County has ample opportunity to participate in the process, potentially as a cooperating agency.

2.20.3.2 Temporary Air Permit (for Concrete Batch Plant and for Rock Crushing)

Southwest Clean Air Agency (SWCAA)
Ch. 70.94 RCW; Chs. 173-400; 173-460 WAC

Ecology has regulations governing the operation of portable rock crushers and concrete batch plants. Both may be utilized during the construction of roadways and wind turbine foundations.

Compliance Plan

A temporary air permit would have been required for rock crushing for roadbeds and for one or more portable concrete batch plants (for mixing material for foundations) absent EFSEC jurisdiction. Whistling Ridge Energy LLC will comply with all substantive requirements of such permits. It is anticipated based on past practice that EFSEC would coordinate with the Southwest Clean Air Agency and Ecology as appropriate to ensure compliance with local, state and federal air pollution standards and regulations for the construction phase.

2.20.3.3 Forest Practices Application

Washington State Department of Natural Resources (WDNR)
Ch. 76.09 and 76.13 RCW; Ch 222 WACA

Forest Practices Application/Notification (FPA/N) would be required for activities on forest lands including timber harvest, construction of forest roads, installation or replacement of culverts or bridges on forest roads, and constructing or expanding gravel pits on forest land for forestry use absent EFSEC jurisdiction. Chapter 222-20-050 WAC and RCW 76.09.060(3) regulates portions of forest lands that are permanently removed from forestry use within three years of harvest, the forest practice as a Class IV General conversion. Reforestation of permanently converted areas is not required. The harvest must comply with applicable water typing, riparian management zone, and channel migration zone standards limiting the amount and location of timber removed in or near streams. A WDNR-approved Road Maintenance and Abandonment Plan would be required to inventory all existing and constructed forest roads, and to schedule any needed road work. All boundaries would be marked in the field prior to submittal of the FPA/N to WDNR.

Compliance Plan

The Whistling Ridge Energy LLC will comply with the substantive requirement and it is anticipated that EFSEC will coordinate with WDNR.

EFSEC will issue a SEPA ~~determination~~ EIS specifying areas to be temporarily and permanently converted to non-forestry use because of the wind energy facility, and areas that are to remain in commercial forest production.

2.20.3.4 Construction Stormwater General Permit

Washington Department of Ecology
Federal Clean Water Act; 40 CFR Parts 122, 123 & 124, Subchapter D; Chs. 80.50 & 90.48 RCW; Chs. 173-216 & 220 WAC

Coverage under the 2005 Construction Stormwater General Permit will be required for stormwater discharges resulting from construction of the Whistling Ridge Energy Project. Construction activities that disturb more than five acres of land and certain industrial activities typically must file a notice of intent with Ecology and comply with the conditions of the general permits. Permit conditions include the preparation of SWPPPs to implement BMPs to prevent or control stormwater pollution, monitoring of discharges during construction, and regular reporting to Ecology.

Compliance Plan

EFSEC has jurisdiction regarding the NPDES Permit over the project, pursuant to WAC Chapter 463-38. Construction of the facility would disturb more than five acres of land, and EFSEC may require that the Whistling Ridge Energy Project obtain coverage under Ecology's Stormwater General Permit for construction activities.

If coverage is deemed necessary by EFSEC, at least 30 days prior to beginning construction, Whistling Ridge Energy LLC would develop and submit to EFSEC a notice of intent to be covered by Ecology's 2005 Construction Stormwater General Permit for discharges associated with construction. Pursuant to the general permit, Whistling Ridge Energy LLC would prepare SWPPPs that identify appropriate BMPs to reduce the pollution loadings resulting from construction activities and industrial operations. These BMPs would be incorporated into project design, and Whistling Ridge Energy LLC would ensure that they are observed during construction of the project. Monitoring and reporting would be carried out in accordance with permit requirements.

2.20.3.5 Approval for Over-Height and Over-Length Loads on State Highways

Department of Transportation
Road and Bridge Restrictions
Goldendale Office 509-773-4533

WSDOT has restrictions in place for portions of state highways that may be used for the transport of wind turbine equipment to the site. These load restrictions include limits on width, height, length, and weight, and vary depending on the specific roadway.

Compliance Plan

Whistling Ridge Energy LLC will work with WSDOT to select the preferred route for the transport of equipment from either the Port of Longview or the Port of Vancouver to the site. Options include

trucking, rail, and/or use of barges on the Columbia River. Depending on the option selected, the Applicant would comply with the requirements imposed by EFSEC and WSDOT.

2.20.3.6 Right of Way

Department of Transportation
Road and Bridge Restrictions
Goldendale Office 509-773-4533

There may be a need to improve and widen the turning radius of the intersection of SR 14 and Cook-Underwood Road for the deliver of turbines. Widening may require use of WSDOT right of way.

Compliance Plan

The Applicant will work with the WSDOT Goldendale Office to determine optimal intersection design and obtain right of way approval if necessary.

2.20.3.7 Water Well

Department of Ecology
Federal Safe Drinking Water Act; 42 USC § 300(f) Parts B & C
Ch. 18.104, 70.119A, and 90.44 RCW; Ch 173-160 and 246-291 WAC

Absent EFSEC jurisdiction, these matters would have been enforced by Ecology and Skamania County. Groundwater withdrawal wells for industrial use, including irrigation, of up to a maximum of 5,000 gallons per day are exempt from Ecology's water right permit requirements. However, these permit-exempt wells must still comply with the minimum construction standards set forth in Chapter 18.104 RCW and the "first in time, first in right" clause of Washington State Water Law. The well/property owner and the well driller share responsibility for ensuring compliance with the standards. A Notification of Intent to Construct a Water Well form would be submitted to Ecology at least 72 hours prior to well construction. The well driller must file a copy of a Water Well Report with Ecology upon completion of well construction and must attach a well identification tag to the well. Wells must be located at least 100 feet from septic tanks, privies, and other sources of contamination as specified in Chapter 173-160-171 WAC.

Wells to be used for potable water must receive an approved Water Availability Verification Evaluation (WAVE) from Skamania County Community Development Department in accordance with SCC 8.68 and SCC Title 15. Permit-exempt wells not meeting the elimination conditions in Chapter 246-291 WAC are classified as Group B Public Water Systems and subject to standards in SCC 8.68 as administered by Skamania Community Development.

Compliance Plan

Whistling Ridge Energy LLC will comply with the substantive requirements. It is anticipated based on past practice that EFSEC would coordinate with Ecology and Skamania County.

2.20.3.8 Archeological Sites

Washington State Office of Archaeology and Historic Preservation

The Washington State Office of Archaeology and Historic Protection regulates and protects the cultural and historic resources on private and public lands in the State of Washington. The applicable statute is: Archaeological Sites and Resources, Chapter 27.53 RCW.

Compliance Plan

The project will comply with Chapter 27.53 RCW. The Applicant has researched state and federal registries along with all archaeological and historical files and maps located at the Washington State Office of Archaeology and Historic Preservation in Olympia.

2.20.3.9 Electrical Construction Permit

Department of Labor and Industries
Ch. 296-46 WAC

The Department of Labor and Industries is responsible for inspection of electric wires and equipment within the Whistling Ridge Energy Project, and requires that electric wires and equipment comply with National Energy Code standards.

Compliance Plan

Whistling Ridge Energy LLC will design and construct the project in compliance with the applicable electrical regulations and standards to ensure that the project complies with Department of Labor and Industries inspection requirements. Whistling Ridge Energy LLC will coordinate with EFSEC to ensure all necessary Department of Labor and Industries inspections and approvals are obtained.

2.20.4 SKAMANIA COUNTY

2.20.4.1 Skamania County Building Permit

Skamania County Building Official
Title 15 SCC

Absent EFSEC jurisdiction, a building permit is required for construction of the turbine foundations and permanent buildings, including the Operations and Maintenance building, and placement of identifying signs.

Compliance Plan

Whistling Ridge Energy LLC will comply with the substantive requirements for the building permit. It is anticipated based on past practice that EFSEC would coordinate with Skamania County.

2.20.4.2 Zoning

Skamania County Community Development Department
Title 21 SCC

SCC Title 21 governs all unincorporated areas of Skamania County except those portions located within the General and Special Management Areas of the Columbia River Gorge National Scenic Area. The proposed project lies within three zones designated in the existing SCC Title 21 (Figure 4.2-1, Zoning Map). No portion of the project or roads requiring improvements are located~~lies~~ within the Scenic Area (Figure 2.1-1). ~~However, some of the proposed improvements to existing roads are proposed in the General Management Area (GMA) of the Scenic Area (see Figure 2.1-1). Scenic Area compliance for the road improvements is discussed in Section 4.2 of this Application.~~

Turbine corridor A1-A7 falls ~~into two zoning classifications. The south portion of the corridor, which could include up to a maximum of four turbines, is proposed in the Residential 10 (R-10) zone under SCC Title 21. The north portion of corridor A1-A7 will be in~~ within the Resource Production Zone (For/Ag 20). ~~A maximum of three turbines could be located in this zone.~~ The remaining turbine corridors are proposed in the unmapped zone. The alternative site for the Operations and Maintenance facility would be on land zoned Residential 5. Table 2.20-2 identifies the existing comprehensive plan designation and the zoning for each proposed turbine corridor in the project.

Table 2.20-2
Skamania County Zoning and Comprehensive Plan Designations for Proposed Turbine Corridors

Turbine Corridor	2007 Comprehensive Plan Designation	Zone Designation
A8-A13, B1-B21, C1-C8, D1-D3, E1-E2 and F1-F3	Conservancy	Unmapped (UNM)
~~North portion of~~ A1-A7 ~~(maximum 3 turbines)~~	Conservancy	Resource Production Zone (For/Ag-20)
~~South portion of A1-A7 (maximum of 4 turbines)~~	~~Conservancy~~	~~Residential 10 (R-10)~~
Alternative Operations and Maintenance Site Along West Pit Road	Rural II	Residential 5 (R-5)

Compliance Plan

Turbines located within the unmapped zone are permitted outright by the County, limited only by an inquiry concerning whether the use would constitute a "nuisance." Turbines located within the Resource Production Zone ~~and Residential Zone~~ are allowed by Conditional Use approval. The alternative location for the Operations and Maintenance facility would be on land zoned Residential 5, and would also be allowed by Conditional Use approval. Standards in SCC 21.40.050 and 21.56.050 include limitations as to lot size, density, setbacks, a 35-foot building height limit, off-street parking requirements, and prohibition of building location within easements. As proposed, the project meets all these requirements.

While EFSEC's jurisdiction and authority over local land use requirements and determinations is now well established, the analysis contained in Section 4.2.1 of this application demonstrates that, as

of the date of this application, the project can and does comply with the 2007 Comprehensive Plan, and both the zoning code in effect at the time of this Application (SCC Title 21). The Applicant anticipates this project will be fully consistent with the Skamania County Code and that it will meet local requirements.

2.20.4.3 Noise Regulations

Skamania County Sheriff Department
Ch. 8.22 SCC; Ch. 70.107 RCW; Ch. 173-60 WAC

Although no permit is required, absent EFSEC jurisdiction the Skamania County Sheriff Department would be responsible for noise control and abatement under SCC Title 8. SCC Title 8 relies on State standards established for maximum environmental noise levels. Permissible noise levels established by state and local regulation vary depending on the source of the noise (which in this case is "industrial") and the nature of the receiving environment (in this case, largely industrial and agricultural with some residential). Noise performance standards established by state regulation must be met during the construction and operation of the project.

Compliance Plan

The project will be designed to ensure that all noise generated will be below the applicable standards with noise mitigation measures. Modeling indicates that the Whistling Ridge Energy Project will meet all applicable noise regulations which will be enforced by EFSEC. See Section 4.1.1, Noise.

2.20.4.4 Critical Areas Ordinance

Skamania County Community Development Department
Ch. 21A SCC; Ch 36.70; 36.70A RCW

The Skamania County Critical Areas Ordinance would apply absent EFSEC Jurisdiction. SCC 21A.03.010 states that "no building, structure or land shall be used, and no building, structure or road shall be hereafter erected, altered or enlarged, including those proposed by State or Federal agencies, in any designated critical area governed by this title, except as allowed by this title." The Critical Areas Ordinance includes a number of exemptions that may be applicable. Proposed improvements to existing private roads will extend outside previously-disturbed areas within critical areas ~~outside the Scenic Area~~, so that they do not meet any of the allowed exemptions. SCC Title 21A would apply to the project. Two application types are established under SCC 21A.03.030:

1. Variances to buffers established under SCC 21A.04 governing watershed protection areas

2. Development reviews under SCC 21A.05 (Fish and Wildlife Protection Areas) and SCC 21A.06 (Geologically Hazardous Areas)

Compliance Plan

~~Title 21A does not apply in the Scenic Area.~~ West Pit Road crosses one unnamed drainage in the Lapham Creek watershed. This stream had observed flow through the existing culvert under West

Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. West Pit Road and the underlying culver would be widened to allow access to the site by construction vehicles ~~No new construction will occur within streams or their buffers outside the Scenic Area.~~ The planned road improvements that will occur within stream buffers will result in expansion of existing roads to an extent that is less than 100% of the original footage. Thus, no variance would be required under SCC Title 21A.03.030(1) to complete the project according to SCC SCC 21A.020(B)(2)(g and i).

Critical area mitigation requirements, if necessary, are site-related, and may be implemented by EFSEC. EFSEC requirements related to critical areas would be similar to the substantive requirements resulting from the implementation of SCC Title 21A.03.030(2). Watershed protection areas (streams and wetlands) are addressed in Sections 3.3 Water, 3.4 Habitat, Vegetation, Fish and Wildlife, and 3.5 Wetlands. Fish and Wildlife Protection Areas are addressed in Section 3.3, Water. Geologically Hazardous Areas are addressed in Section 3.1, Earth.

2.20.4.5 Clearing and Grading Permit

Skamania County Community Development Department
Ch. 24 SCC; Ch 36.70; 36.70A RCW

Absent EFSEC jurisdiction, a Skamania County Clearing and Grading Permit would be required. A new Chapter of SCC, Title 24 Clearing and Grading, was adopted by the Skamania Board of County Commissioners in February 2008. All grading activity not exempted under SCC 24.02.060 would be prohibited without first obtaining a Clearing and Grading Permit under SCC Title 24.

Compliance Plan

Detailed clearing and grading plans prepared by an Engineer licensed in the State of Washington will be prepared and submitted to EFSEC for review and approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

2.20.4.6 Water Availability Verification Evaluation and Group B Public Water System Approval

Skamania County Community Development Department
Ch. 8.68 and 15 SCC; Ch 50.56 and 70.119A; Ch 246-291 WAC

Absent EFSEC jurisdiction, a Group B Public Water System Approval would be required for permit-exempt industrial water wells that may be used as a drinking water source. The Operations and Maintenance facility proposed in conjunction with the project would be used as such a source.

To document proof of potable water, a WAVE approval would be required from Skamania Community Development.

Compliance Plan

The project will comply with applicable potable water and Group B Water System Standards. Based on past practice, it is anticipated that EFSEC will coordinate with Skamania County and Ecology.

2.20.4.7 On-Site Septic System Site Evaluation and Design Review

Skamania County Community Development Department
Ch. 70.118 RCW; Ch. 246-272A WAC; Federal Safe Drinking Water Act 42 USC § 300(f) Parts B & C

Absent EFSEC jurisdiction, Skamania Community Development would be responsible for ensuring site and design standards identified in WAC 246-272A are met. Generally, a Site Evaluation is requested to determine the type of system required prior to installation of a new on-site septic system. A Site Evaluation Results Letter is issued, which is valid for one year. The project proponent must then hire a qualified on-site septic system designer to design a system for the site in accordance with the Site Evaluation Results Letter. The design must then be submitted for Design Review. An approved Design Review is valid for five years from the date of issuance. Extensions may be granted under certain circumstances.

Compliance Plan

The project site will be evaluated as to applicable on-site septic system design standards and all systems will comply with these standards. It is anticipated that EFSEC will coordinate with Skamania County.

2.20.4.8 Road Approach Permit and Private Road Requirements

Skamania County Public Works Department
Ch 12.03 SCC; Skamania County Road Approach and Private Roads Standards Development Assistance Manual

The proposed road improvements to West Pit Road required to access and construct the project include modifications to existing logging roads and new construction outside the Scenic Area. ~~Improvements to an unnamed private road within the Scenic Area also are proposed. County Assessor's maps identify the existing road in the Scenic Area as CG2930 (County Assessor maps 3-10, 3-10-19, 3-10-20). Figure 4-1 of the 2007 Skamania County Comprehensive Plan does not include the CG2930 road as part of the system of County roads.~~ West Pit Road is an existing private logging road. All private roads in Skamania County must comply with guidelines in the Private Road Guidelines and Development Assistance Manual adopted by County Resolution in 2008 (SCC Title 12.03.030) "where a proposed change in use converts a private driveway (Category 1 road) to a higher category road (SCC 21.03.070)." Also, a road approach permit is required where a private road enters a County road.

SCC 12.03 classifies private roads by use (12.03.030). Current use of the ~~CG2930~~ West Pit Road ~~road~~ is for access to ongoing forest operations taking place ~~in and~~ outside the Scenic Area. No homes are accessed via this road. Because it accesses fewer than four homes, ~~the CG2930 road~~West Pit Road is a Category 1 road under SCC 21.03.030. ~~Existing logging roads outside the Scenic Area are also currently Category 1 roads.~~

The Applicant's proposed wind energy facility would establish a new use on property outside the Scenic Area. It is not likely this change in use will convert the existing Category 1 roads to

Category 6 roads (SCC 21.03.030). However, construction of the project would have impacts to existing County roads and to existing Category 1 private roads that would require road upgrades and repair before, during and after construction. The specifics of this work would be determined through negotiation of a Haul Route Agreement with the County Engineer, which will be approved by the Board of County Commissioners.

A Road Approach Permit ~~would~~ may be required where the ~~CG2930 road~~ new connection of West Pit Road enters ~~Scoggins~~ Willard Road. The specific requirements of this permit would be negotiated with the County Engineer and would likely exceed Category 6 (commercial) private road approach requirements due to the nature of the project. However, it is also likely the project's access road would not be required to meet Category 6 standards for its full length as traffic volumes will remain very low.

Compliance Plan

Whistling Ridge Energy LLC will comply with Skamania County Private Road Requirements as administered through EFSEC. A Haul Route agreement and Road Approach permit will be negotiated to protect and repair Skamania County roads.

~~2.20.4.9Columbia Gorge National Scenic Area Permit~~

~~*Skamania County Community Development Department*~~
~~*Chapter 22.14 SCC*~~

~~The Applicant proposes minor upgrades to access roads located on private lands (owned and controlled by S.D.S. Co., LLC), situated within the Columbia River Gorge National Scenic Area. No portion of the wind turbine generator corridors or any related facilities are proposed within the Scenic Area, and the Scenic Area does not regulate any development activity proposed outside the Scenic Area boundary.~~

~~Columbia River Gorge National Scenic Area Permit Requirements~~

~~The Columbia River Gorge National Scenic Area Act places restrictions on development within the Scenic Area. The boundaries of the Scenic Area are defined in the Act by reference to a "map entitled 'Boundary Map, Columbia River Gorge National Scenic Area,' numbered NSA-001 sheets 1 and 2, and dated September 1986," which is on file with the Commission. Additionally, S.D.S. Co., LLC had the Scenic Area boundary surveyed by Terra Surveying, a licensed land surveyor, in 2006 and 2007. This survey was reviewed for accuracy by USFS Surveyor Don Karsch, who is responsible for reviewing such surveys to establish the Scenic Area boundaries. The survey was accepted by the USFS and recorded in Skamania County with an Auditor's File Number of 2007167932. Certain uses are allowed without review, but some uses require prior approval and others are prohibited. The restrictions depend, in part, on whether the proposed use will take place in the General Management Area (GMA) or a Special Management Area (SMA). The boundaries of the SMAs are defined in the Act by reference to a "map entitled 'Special Management Areas, Columbia River Gorge National Scenic Area,' numbered SMA-002 sheets 1 through 17, and dated September 1986," which is on file with the Commission.~~

The proposed access to the site would be via an existing private logging road, listed as CG2930, connecting to Scoggins Road, which is a County road. CG2930 is currently narrow, approximately 10 to 12 feet wide, and will require permanent widening to a minimum drivable section width of 16 feet with allowance for side slope and drainage from Scoggins Road to the proposed project site (see Figures 4.3-17 through 4.3-25 in Section 4.3). Widening would require possible removal of trees, and possible engineered fill and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. There are two sharp left hand turns in the roadway enroute to the proposed project site (Figures 4.3-17, 4.3-23, and 4.3-24) that will require additional special considerations to accommodate the required truck turning radii for transport of the wind energy blades to the site. Road CG2930 is located within the CRGNSA and approval would be required under applicable standards in conjunction with SEPA and building permit approvals before making roadway improvements.

Certain uses are allowed without review in both the GMA and SMAs, including repair, maintenance and operation of roads. A person can also resurface or overlay existing paved roads and grade and gravel existing road shoulders, provided that the activity does not: (i) increase the width of the road; (ii) disturb the toe of adjacent embankments, slopes or cut banks; or (iii) change the existing structures or add new structures. Forest practices, including the construction of roads, are also allowed in the GMA as long as the practices do not violate conditions of approval for other approved uses and developments. However, a forest practice must relate to growing, harvesting, or processing timber.

The road improvements proposed within the Scenic Area do not fall within any of these exemption categories. The Applicant needs to improve, rather than repair, maintain, or operate, the road. Further, the necessary improvements include widening the existing road. While "forest practices" is a broad category that includes road construction, the improvement of roads for wind energy facility construction does not fall within the definition because wind energy facilities do not relate specifically to growing, harvesting, or processing timber.

The Applicant's road improvements fall within the category of uses that "may be allowed subject to review by the County Administrator for compliance with all applicable provisions protecting scenic, cultural, natural and recreation resources." In SMAs, the use must also be sited to minimize the loss of land suitable for the production of forest products. Uses the Administrator may allow subject to review on GMA lands designated as large-scale agriculture, commercial forest, large woodlands, or small woodlands include construction, reconstruction or modification of roads, not in conjunction with forest use or forest practices. Uses the Administrator may allow subject to review on SMA lands designated as forest include road and railroad construction and reconstruction. Therefore, but for EFSEC consideration of the ASC, the improvements would subject to an administrative review and approval, regardless of whether the road is located in the GMA or SMAs.

Compliance Plan

The Applicant proposes minor upgrades to access roads located on private lands (owned and controlled by S.D.S. Co., LLC) and County rights of way, all of which are situated within the Scenic Area GMA. No portion of the wind turbine generator corridors or any related facilities are proposed within the Scenic Area, and the Scenic Area does not regulate any development activity proposed outside the Scenic Area boundary. In a non-EFSEC application, applicable approvals for road

~~improvement work within the Scenic Area would be administered through Skamania Community Development, with appeal to the Columbia River Gorge Commission, and ultimately resolved through the State of Washington judicial appeals system. Pursuant to RCW Ch. 80.50, in this Application, the EFSEC process preempts the local process for approval of the road improvements within the Scenic Area. However, the Applicant plans to comply with all requirements set forth below by satisfying the EFSEC that all Scenic Area requirements can be met through the EFSEC application process.~~

~~Whistling Ridge Energy LLC has included information within this Application that demonstrates project compliance with the requirements of the Scenic Area for the proposed roadway improvements. See Sections 3.1 Earth, 3.3 Water, 3.4 Habitat, Vegetation, Fish and Wildlife, 3.5 Wetlands, 4.2 Land and Shoreline Use, and 4.3 Transportation.~~

SECTION 3.1 EARTH
(WAC 463-60-302)

3.1.1 INTRODUCTION

The proposed Whistling Ridge Energy Project would be located approximately 7 miles west of the town of White Salmon and approximately 2 miles east of the Little White Salmon River in Skamania County, Washington. The project area is located on private land immediately north of the Columbia River Gorge National Scenic Area boundary. Existing conditions, potential impacts, and, where appropriate, mitigation measures are discussed below. The following sections include detailed evaluation of geology, soils, topography, unique physical features, and erosion/enlargement of the land area.

URS conducted a preliminary geotechnical investigation in 2007, including review of aerial photographs, geologic reconnaissance, test pit analyses, field soil resistivity testing, dynamic cone penetration tests, laboratory testing of soil samples, data analyses, and preparation of design and construction recommendations for the wind energy tower foundation systems and design of approach roadways. See Appendix A for an updated version of the November 2007 geotechnical report.

Site-specific measures have been identified to mitigate potential hazards. With standard and site-specific mitigation measures, impacts on the natural earth environment from the construction and operation of the Whistling Ridge Energy Project are expected to be minor.

3.1.2 GEOLOGY

The White Salmon, Washington area is located within the Cascade Range and the Columbia Intermontane Physiographic Province. The project area is located just within the western boundary of the Columbia Plateau, which is located at the western edge of the Columbia Intermontane Physiographic Province (Freeman et al. 1945). This lowland province is surrounded on all sides by mountain ranges and highlands, and covers a vast area of eastern Washington and parts of northeastern Oregon and western Idaho. The Columbia Plateau is underlain by a series of layered basalt flows extruded from vents (located mainly in southeastern Washington and northeastern Oregon) during the Miocene epoch (between 5.3 and 23.8 million years BP). Collectively, these basalt flows are known as the CRBG. Individual basalt flows range in thickness from a few millimeters to as much as 300 feet. Where significant time elapsed between successive flows, interflow zones developed. The interflow zones are characterized by the presence of highly weathered basalt and paleosols. These interflow zones are generally significantly weaker than the surrounding basalt and sometimes form basal failure surfaces for large landslide complexes within the CRBG.

A variety of younger volcanic rocks and sedimentary materials that range from Pliocene (1.8 to 5.3 million years BP) to Holocene (less than 10,000 years BP in age) overlie the CRBG in the project area. Sedimentary rocks are generally thought to underlie the basalts in the project area.

The proposed project site is located within the northern boundary of the structural Hood River Valley, which extends a few miles into southern Washington. In general, the geology of the area consists of basalt flows extruded from local vents, layered with conglomerate, tuff, tuff breccias, and other volcanoclastic deposits. These formations are typically overlain by silt and clay soil of varying thickness in the project vicinity.

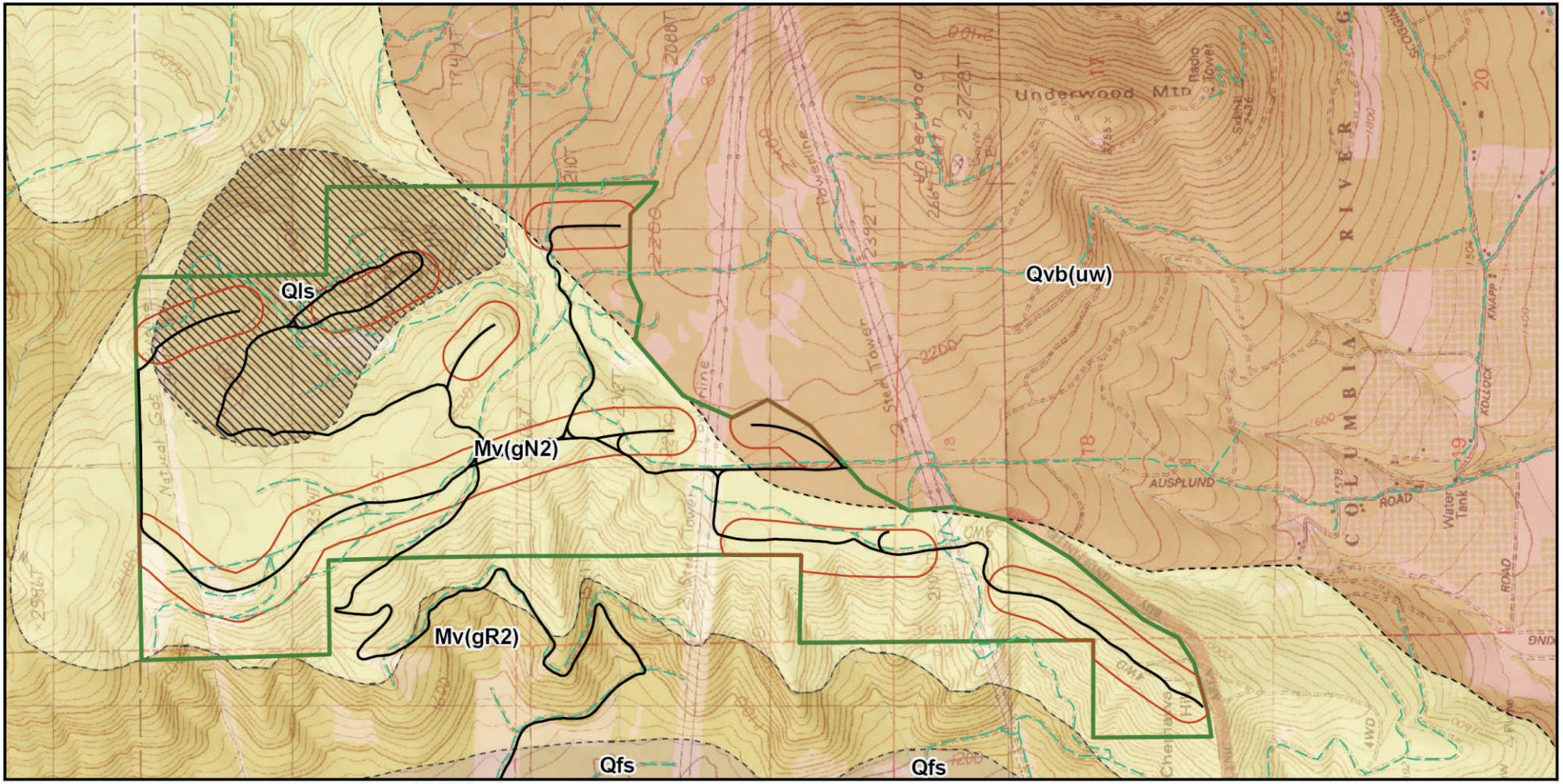
The bedrock underlying the proposed project site consists of Grande Ronde Basalt of the CRBG and Quaternary basalt of Underwood Mountain—a shield volcano that lies approximately midway between the lower reaches of the Little White Salmon and White Salmon Rivers. Its southern slopes drain to the Columbia River. Site geology excerpted from Korosec (1987) is presented on Figure 3.1-1.

Underwood Mountain Basalt Unit: The Pleistocene-epoch (1.8 million years to 10,000 years BP) basalts and cinders erupted from the Underwood Mountain vents and overlie the Tertiary CRBG Grande Ronde and Wanapum basalts. Public records of wells located within the Underwood volcanic field indicate a 310-foot-thick repetitive sequence of thin lava flows (two to eight feet thick), cinders and silty-clays overlying a productive confined aquifer consisting of intensely fractured Grande Ronde basalt. The Miocene-epoch Grand Ronde Basalt consists of multiple basalt flows that are a subgroup of the CRBG, and has been described to have a thickness of up to 1,000 feet, although the thickness in the project vicinity is not known.

Field observations of rock outcrop and test pits excavated during a geotechnical investigation at the proposed site indicate that the near-surface rock consists of yellow-gray volcanoclastic rocks, medium to dark gray, fine-grained to medium-grained basalt and andesite, which is fractured into angular gravels, cobbles, and boulders. The basalt observed in the test pits was most commonly vesicular, very soft to moderately hard, and decomposed to slightly weathered. Some zones displayed non-vesicular characteristics and were generally harder. In most exposures the basalt was moderately to highly weathered, with fractures and vesicles filled by clayey residual soil. In most of the test pits excavated in this basalt, the rock is weathered into varying layers of residual (clay) soil, and clayey gravelly cobble-sized basalt. The residual soil layers often exhibit remnant rock structure.

Unconsolidated Deposits: Unconsolidated deposits are thin to absent in the project vicinity. Based on observations made during field reconnaissance, the surficial materials consisted primarily of a thin veneer of brown, silty topsoil that is likely derived from forest duff and wind-blown deposits. The thickness of this material varied across the site from a few inches to three feet, based on test pit observations. In several areas, bedrock and talus were observed at the ground surface.

33758687_15.cdr



Source: Korosec, 1987.

Job No. 33758687

Revised Figure 3.1-1

Site Geology

URS

Whistling Ridge Energy Project
Skamania County, Washington

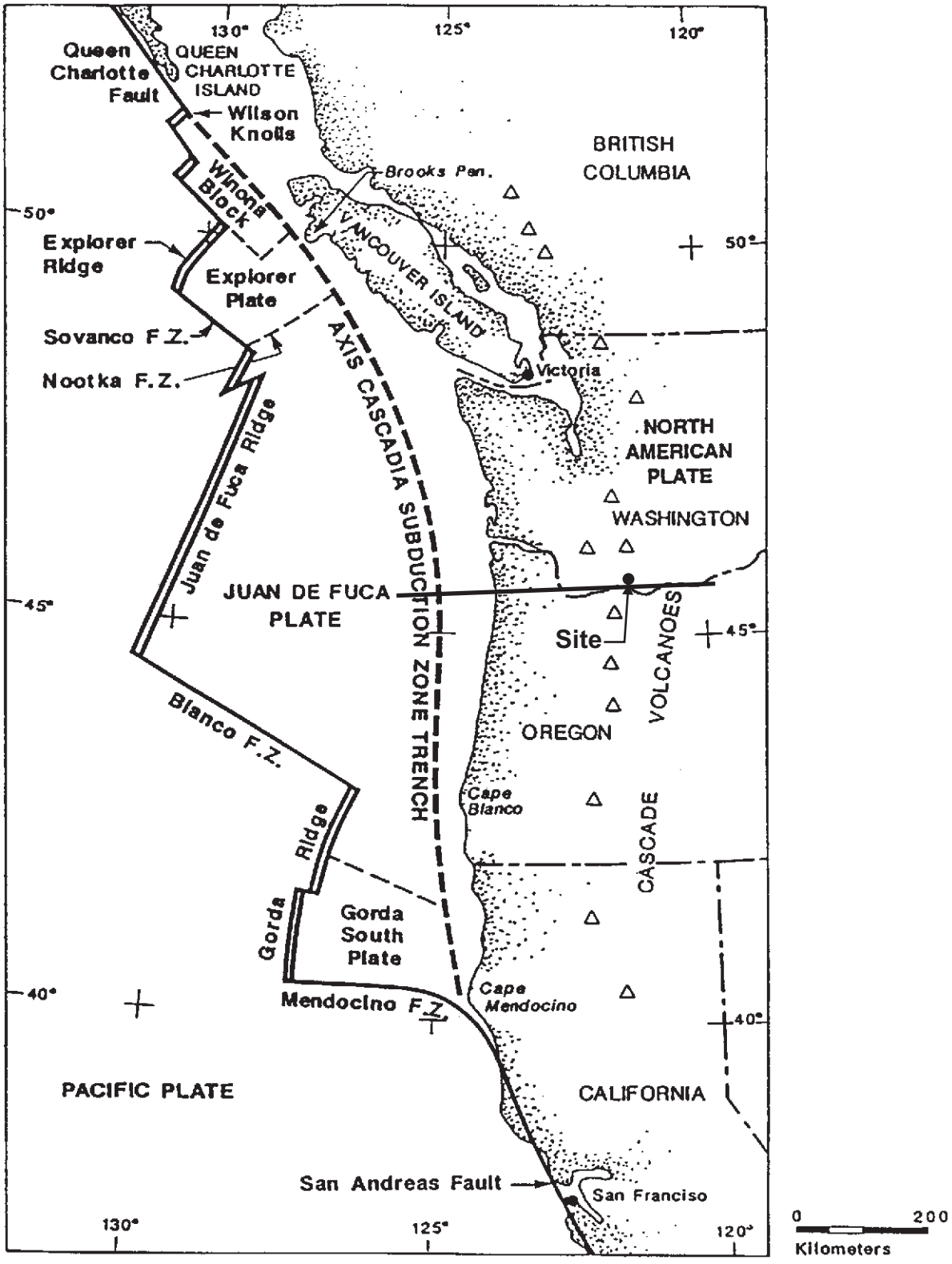
Landslide Deposits: Regional geologic maps indicate the presence of Quaternary-age mass wasting landslide deposits located to the north of Underwood Mountain (Figure 3.1-1). These deposits are mapped as a large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long. A URS engineering geologist reviewed stereo aerial photographs that were flown specifically for this project in 2007 and performed a one-day site reconnaissance. There is no obvious evidence, based on the review, to suggest the presence of a landslide as mapped on the 1:100,000 scale geologic map. If landslide deposits are present, they are so old that most or all of the geomorphic evidence has been removed by erosion.

During the current subsurface exploration, groundwater was not encountered in the site up to a depth of 16 feet bgs. It should be noted that these observations reflect groundwater levels at the time of the field investigation and actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors not observed during this investigation. There may be regional or perched water tables at greater depth. Prior to final design of the tower foundations, additional subsurface investigations (boreholes) would be required to provide geotechnical data at foundation and anchor depths. Future deep foundation investigations would include observation of groundwater, if encountered.

3.1.3 SEISMICITY

Strong ground motions potentially affecting the site can be generated from earthquakes on several regional seismic sources. Earthquakes are the result of sudden releases of built-up stress within the tectonic plates that make up the earth's surface. The stresses accumulate because of friction between the plates as they attempt to move past one another. Earthquakes in the Pacific Northwest can originate from four different types of sources: (1) interplate earthquakes on the CSZ, (2) intraplate earthquakes within the subducting Juan de Fuca plate as it sinks and breaks up below the North American plate, (3) shallow crustal earthquakes on faults within the North American plate, and (4) volcanic earthquakes such as those associated with the eruption of Mount St. Helens. These sources are depicted on Figures 3.1-2 and 3.1-3. The largest historical earthquakes in Washington, southern British Columbia, and northern Oregon are shown on Figure 3.1-4 and summarized in Table 3.1-1.

33758687_11.cdr



Modified from Washington Public Power Supply System (1988) (after Riddihough, 1984).

Job No. 33758687

Figure 3.1-2

Tectonic Setting of the Cascadia Subduction Zone

URS

Whistling Ridge Energy Project
Skamania County, Washington

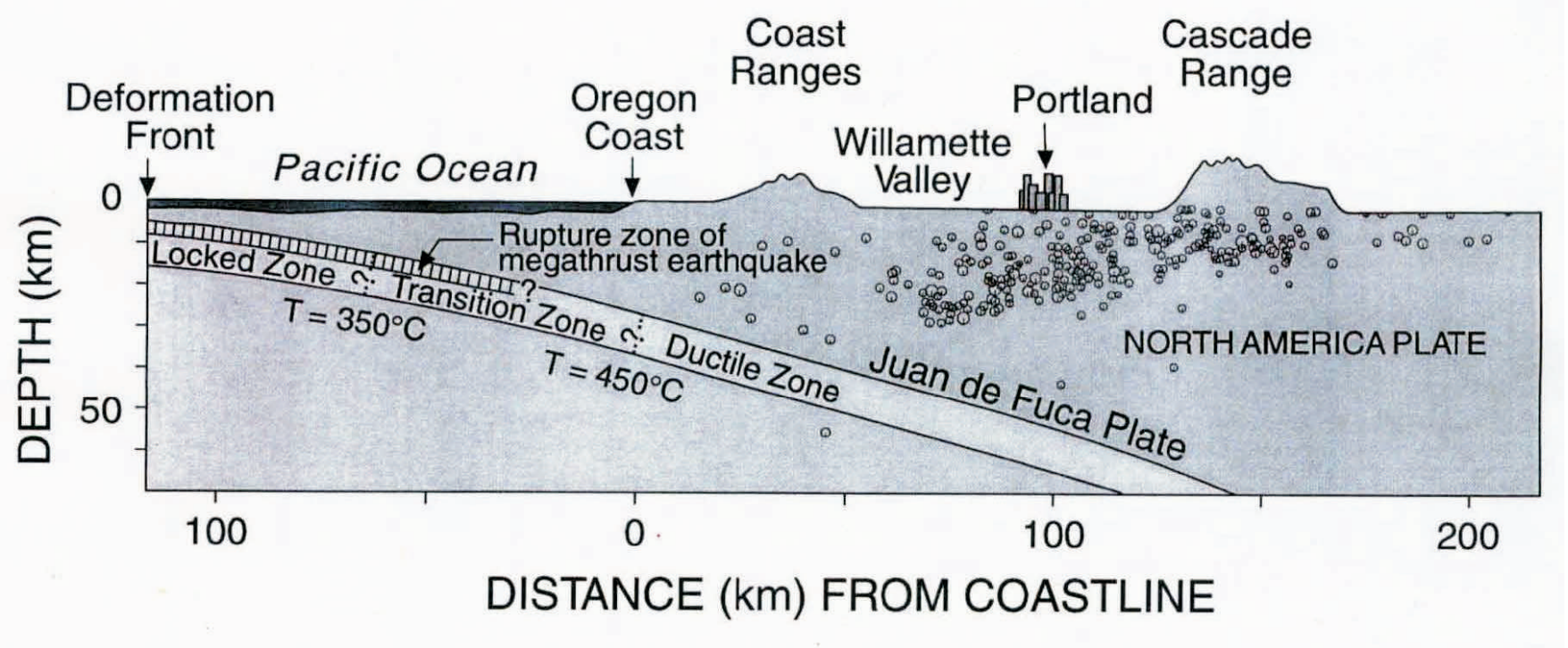


Figure 3.1-3

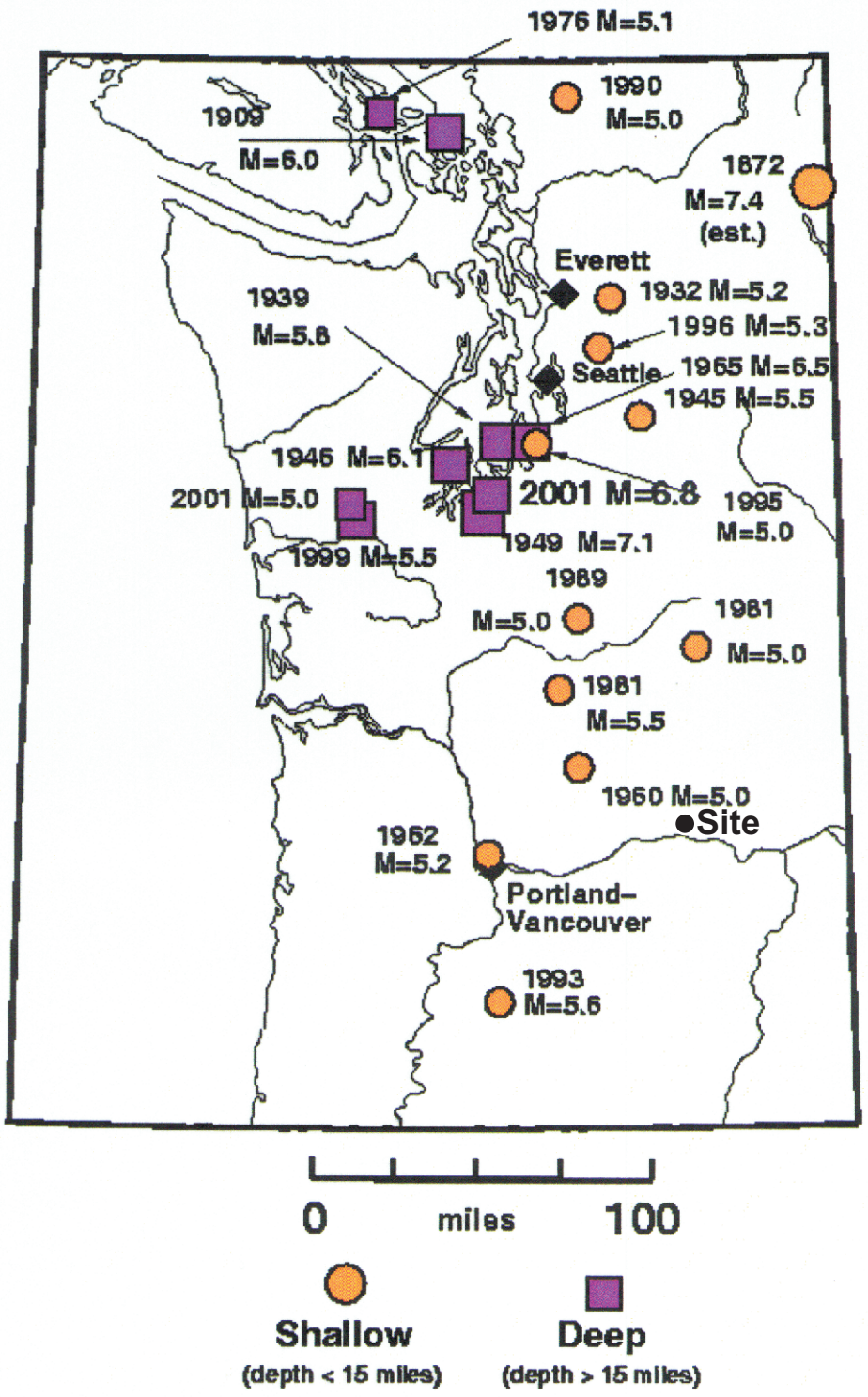
Cascadia Subduction Zone

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_12.cdr



Source: University of Washington

Figure 3.1-4

Epicenters and Dates of M 5.0 Pacific Northwest Earthquakes

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

Table 3.1-1
Largest Known Earthquakes Felt in Washington

Year	Date	Time (PST)	North Latitude	West Longitude	Depth (km)	Mag (felt)[a]	Mag (inst)[b]	Max. Mod. Mercalli Intensity	Location[c]
1872	12-14	2140	48°48'00"	121°24'00"	shallow	7.3	None	IX	North Cascades (Chelan area[d])
1877[e]	10-12	1353	45°30'00"	122°30'00"	shallow	5.3	None	VII	Portland, Oregon
1880	12-12	2040	47°30'00"	122°30'00"			None	VII	Puget Sound
1891	11-29	1521	48°00'00"	123°30'00"			None	VII	Puget Sound
1893	3-6	1703	45°54'00"	119°24'00"	shallow	4.7	None	VII	Southeastern Washington
1896	1-3	2215	48°30'00"	122°48'00"		5.7	None	VII	Puget Sound
1904	3-16	2020	47°48'00"	123°00'00"		5.3	None	VII	Olympic Peninsula, eastside
1909	1-11	1549	48°42'00"	122°48'00"	deep	6	None	VII	Puget Sound
1915	8-18	605	48°30'00"	121°24'00"		5.6	none	VI	North Cascades
1918[e]	12-6	41	49°37'00"	122°55'00"		7	7	VIII	Vancouver Island
1920	1-23	2309	48°36'00"	123°00'00"		5.5	none	VII	Puget Sound
1932	7-17	2201	47°45'00"	121°50'00"	shallow	5.2	none	VII	Central Cascades
1936	7-15	2308	46°00'00"	118°18'00"	shallow	6.4	5.75	VII	Southeastern Washington
1939	11-12	2346	47°24'00"	122°36'00"	deep	6.2	5.75	VII	Puget Sound
1945	4-29	1216	47°24'00"	121°42'00"		5.9	5.5	VII	Central Cascades
1946	2-14	1918	47°18'00"	122°54'00"	40	6.4	6.3	VII	Puget Sound
1946[e]	6-23	913	49°48'00"	125°18'00"	deep	7.4	7.3	VIII	Vancouver Island
1949	4-13	1155	47°06'00"	122°42'00"	54	7	7.1	VIII	Puget Sound
1949[e]	8-21	2001	53°37'20"	133°16'20"		7.8	8.1	VIII	Queen Charlotte Isl., B.C.
1959	8-5	1944	47°48'00"	120°00'00"	35	5.5	5	VI	North Cascades, east side
1959[e]	8-17	2237	44°49'59"	111°05'	10-12	7.6	7.5	X	Hebgen Lake, Montana
1962[e]	11-5	1936	45°36'30"	122°35'54"	18	5.3	5.5	VII	Portland, Oregon
1965	4-29	728	47°24'00"	122°24'00"	63	6.8	6.5	VIII	Puget Sound
1981	2-13	2209	46°21'01"	122°14'66"	7	5.8	5.5	VII	South Cascades
1983[e]	10-28	606	44°03'29"	113°51'25"	14	7.2	7.3	VII	Borah Peak, Idaho
1990[f]	4-13	2133	48°50'42"	122°9'40"	3	12	5.2	VI	Deming
1993[e]	3-25	535	45°02'00"	122°36'26"	16		5.6	VII	Scotts Mills, Oregon
1995[g]	1-29	1511	47°23'24"	121°21'36"	20		5	V	Robinson Pt., Vashon Island
1996[h]	5-02	2104	47°45'36"	121°51'00"	7		5.3		Duvall

Year	Date	Time (PST)	North Latitude	West Longitude	Depth (km)	Mag (felt)[a]	Mag (inst)[b]	Max. Mod. Mercalli Intensity	Location[c]
1999[h]	7-02	0543	47°'33	123°'49"	41		5.8	VI	Satsop
2001[h]	2-28	1054	47°9'9"	122°43'11"	52		6.8	VIII	Nisqually
2001[h]	6-10	0519	47°9'58"	123°0'21"	41		5.0	V	Satsop

Data from Noson et al. (1988), except where noted otherwise

a. Mag (felt) = an estimate of magnitude, based on felt area; unless otherwise indicated, it is calculated from Mag (felt) = -1.88 + 1.53 log A, where A is the total felt area in km²; from Toppozada (1975).
b. Mag (inst) = instrumentally determined magnitude; refer to references listed in the original Table 2 of Noson et al. (1988), or (e) below, for magnitude scale used.
c. All earthquake epicenters are located within Washington unless noted otherwise.
d. Location uncertain but most recent study (Bakun et al., 2002) indicates the epicenter was near Lake Chelan
e. Earthquakes with epicenters outside Washington.
f. USGS
g. Dewberry and Crosson (1996)
h. Data from University of Washington Geophysics Program viahttp://www.pnsn.org/.

The historic record of seismicity in the Pacific Northwest (approximately 150 years) is insufficient to provide documentation of great earthquakes (i.e., M_w 8 or greater) on the CSZ. There has been a low rate of instrumental seismicity recorded and the CSZ was originally thought to be incapable of generating great earthquakes. In the late 1980s, Rogers (1988) and Heaton and Hartzell (1986) inferred that an M_w 9 CSZ earthquake could occur that would rupture the entire 900-kilometer length of the Juan de Fuca plate between the Explorer plate(offshore Vancouver Island, BC) and Gorda plate (offshore northwern California). Geodetic data indicate that western Washington and southwest British Columbia are moving to the northeast with respect to stable North America and the rates of movement diminish landward (McCaffrey et al. 2007). Geologic studies along the Oregon and Washington coasts in the late 1980s through mid-1990s provided data that indicated that multiple great (M_w 8+) earthquakes have occurred on the CSZ during the Holocene (Atwater 1987a, 1987b, and 1992; Carver and Burke 1987; Darienzo and Peterson 1987 and 1990; Grant and McLaren 1987; Peterson and Darienzo 1996; Savage et al. 1991; Adams 1996; Atwater et al. 1995; Nelson and Personious 1996; Shennan et al. 1996) and therefore could occur during the project lifetime. However, it was uncertain whether a single M_w 9+ earthquake or several separate M_w 8+ earthquakes closely spaced in time caused the geologic effects (e.g. subsidence, tsunami deposits, and drowned forests) with similar ages recorded at the various study locations along the Washington and Oregon coasts.

By the mid-1990s there was a general consensus that the CSZ has generated earthquakes of M_w 8+ in the past few thousand years (Atwater et al. 1995, Nelson and Personius 1996, and Weaver and Shedlock 1996), and since then there is increasing evidence that the CSZ has had multiple M_w 8+ and 9+ earthquakes in the last five thousand years (Kelsey et al. 2002 and 2005, Witter et al. 2003, Nelson et al. 1995). Geologic evidence for the most recent great earthquake in 1700 AD has been found at many coastal locations in Washington and Oregon, as well as northern California (Nelson et al. 1995, Yamaguchi et al. 1997). Analysis of historical records of tsunamis in Japan supports the interpretation that a 1700 AD great earthquake on the CSZ was about M_w 9 (Satake and Tanioka 1996, Satake et al. 2003, Atwater et al. 2005).

A single great earthquake of M_w 9+ or multiple M_w 8+ earthquakes occur on the CSZ every several hundred years. At least 10 great earthquakes have occurred in Washington and northern

Oregon in the last 5,000 years with recurrence intervals between the earthquakes ranging from 250 to 900 years. Eight of these 10 events ruptured at least 460 km of the CSZ along the Washington and northern Oregon coasts and the earthquake approximately 1,600 years BP was of similar size and rupture length as the 1700 AD earthquake (Nelson et al. 1995). These earthquakes are expected to occur at depths of approximately 6 to 25 miles beneath coastal and offshore Washington and/or Oregon. An M_w 8+ earthquake on the CSZ offshore southwest Washington and northwest Oregon would generate long period ground motions for a relatively long duration at the Whistling Ridge Energy Project site.

Intraplate seismic events appear to be more widespread geographically and result from rupture within the subducted Juan de Fuca plate at depths of 20 to 55 miles. Based primarily on the historical seismicity of intraplate origin in western Washington and other subduction zones of the world, the intraplate zone is considered capable of generating earthquakes as large as M_w 7.5. Because intraplate earthquakes do not cause deformation at the ground surface that can be distinguished from other types of earthquakes, the typical frequency of these earthquakes cannot be readily assessed. However, these types of earthquakes have historically caused the greatest amount of damage in the Puget Sound region. This source has generated three of the largest historical seismic events to affect the Pacific Northwest: the 1949 Olympia earthquake of magnitude (M) 7.1, the 1965 M_w 6.5 Seattle earthquake, and the 2001 Nisqually M_w 6.8 earthquake. These earthquakes caused substantial damage in central and southern Puget Sound but no substantive damage in the White Salmon area. There have not been any historical, damaging intraplate earthquakes with epicenters located in Oregon or southern Washington in the northern portion of the Willamette Lowland.

There is increasing geologic and geodetic evidence that other regional seismic sources in western Washington and Oregon have the potential to produce shallow continental crust earthquakes. Shallow crustal seismic events appear to be more widespread geographically relative to the other sources of historical seismicity, and often occur along mapped or postulated faults exposed at the earth's surface. A regional geologic fault slip model indicates that the predicted long term velocity of the Oregon Coast Ranges relative to stable North America in southern British Columbia is 1.8 $\pm$ 0.4 millimeters per year (mm/yr) east and 6.9 $\pm$ 0.2 mm/yr north measured at Astoria, Oregon. This is consistent with the geodetic data, which indicate a net velocity of 7.1 $\pm$ 0.4 mm/yr. Of this motion, 4.4 $\pm$ 0.3 mm/yr is likely accommodated by north-northeast shortening across western Washington and the Puget Sound region between Astoria and Bellingham, Washington (McCaffrey et al. 2007). Based primarily on historic and paleo-seismicity, Quaternary shallow crustal faults are considered capable of generating earthquakes greater than M_w 6 and potentially as large as M_w 7.0 to M_w 7.5. The largest historical shallow crustal earthquake is the 1872 North Cascade event, which was initially estimated to be M 7.3 (Noson et al. 1988), but more recently has been relocated to near Lake Chelan and is estimated to have been between M_w 6.5 and M_w 7.0 at the 95% confidence interval (Bakun et al. 2002). The largest instrumentally recorded shallow crustal earthquake in the Portland Basin area is the 1962 M 5.5 earthquake, located 15 km northeast of downtown Portland (Wong and Bott 1995). This has not been definitively associated with a recognized late Quaternary fault.

Studies by Pezzopane (1993), Geomatrix Consultants (1995), and Wong et al. (1999), among others, and more recent compilations by the USGS (Lidke et al. 2003 and Personius et al. 2003)

show numerous shallow crustal faults with evidence of Quaternary displacement and a potential to generate an M_w 6+ earthquake exist in southwestern Washington and northwestern Oregon (Figure 3.1-3). A decade ago, many of these faults were unknown or not recognized as being seismogenic.

No faults are mapped within the footprint of the proposed project area. However, faults are mapped approximately 1.5 miles southwest and northeast of the proposed project area. Many of these faults are inferred and ~~shown as dotted lines~~assumed to be buried by younger surficial deposits. The activity of the area faults is unknown. However, a review of aerial photography shows no indication of recent movement along the trace of the inferred faults.

There has not been an historical surface-rupture earthquake on any fault within northwestern Oregon or southwestern Washington, and paleoseismic investigations of the regional faults have been limited to date. The closest Quaternary faults to the site are the Hood River fault south of the site in Northern Hood River County, Oregon (No. 29 in Figure 3.1-5), the faults near the Dalles east and west of the site (No. 48 in Figure 3.1-5), and the Columbia Hills fault zone on the north shore of the Columbia River southeast of the site (No. 45 in Figure 3.1-5).

According to the updated National Seismic Hazard Maps published by the USGS in 2008 (Peterson et al. 2008 and http://earthquake.usgs.gov/research/hazmaps/), the peak ground acceleration estimated for the ~~Kalama Energy~~Whistling Ridge Energy Project site area is 0.12~~8~~g for a 475-year return period earthquake (i.e., ground motion with a 10 percent chance of being exceeded in 50 years) and 0.24~~40~~g for a 2,475-year return period earthquake (i.e., ground motion with a 2 percent of being exceeded in 50 years).

3.1.3.1 Impacts

Liquefaction is a phenomenon whereby soils undergo significant loss of strength and stiffness when they are subjected to vibration or large cyclic ground motions produced by earthquakes. Typically, cyclic loading of saturated soils leads to the buildup of excess pore-water pressure as a result of soil particles being rearranged with a tendency toward denser packing. Under undrained conditions (such as during earthquake shaking), loads are transferred from the soil skeleton to the pore-water with consequent reduction in the soils' shear strength.

Saturated granular soils without cohesive fines (i.e., gravels, sands, and silts) are most susceptible to liquefaction. Other factors affecting the potential for liquefaction in soils are density, amplitude of loading, confining pressure, past stress history, age of soil deposit, the size, shape and gradation of particles, and the soil fabric structure. Liquefaction-induced ground settlement and lateral spreading have been the primary cause for extensive damage to aboveground structures, foundations, and pipelines during many earthquakes.

Test pits excavated at the project site encountered shallow bedrock covered with a combination of cohesive and cohesionless soil. No groundwater was observed in any of the test pits. Based on the soils encountered during the field explorations, it is URS's opinion that the potential for liquefaction is very low at this site.

33758687_13.cdr

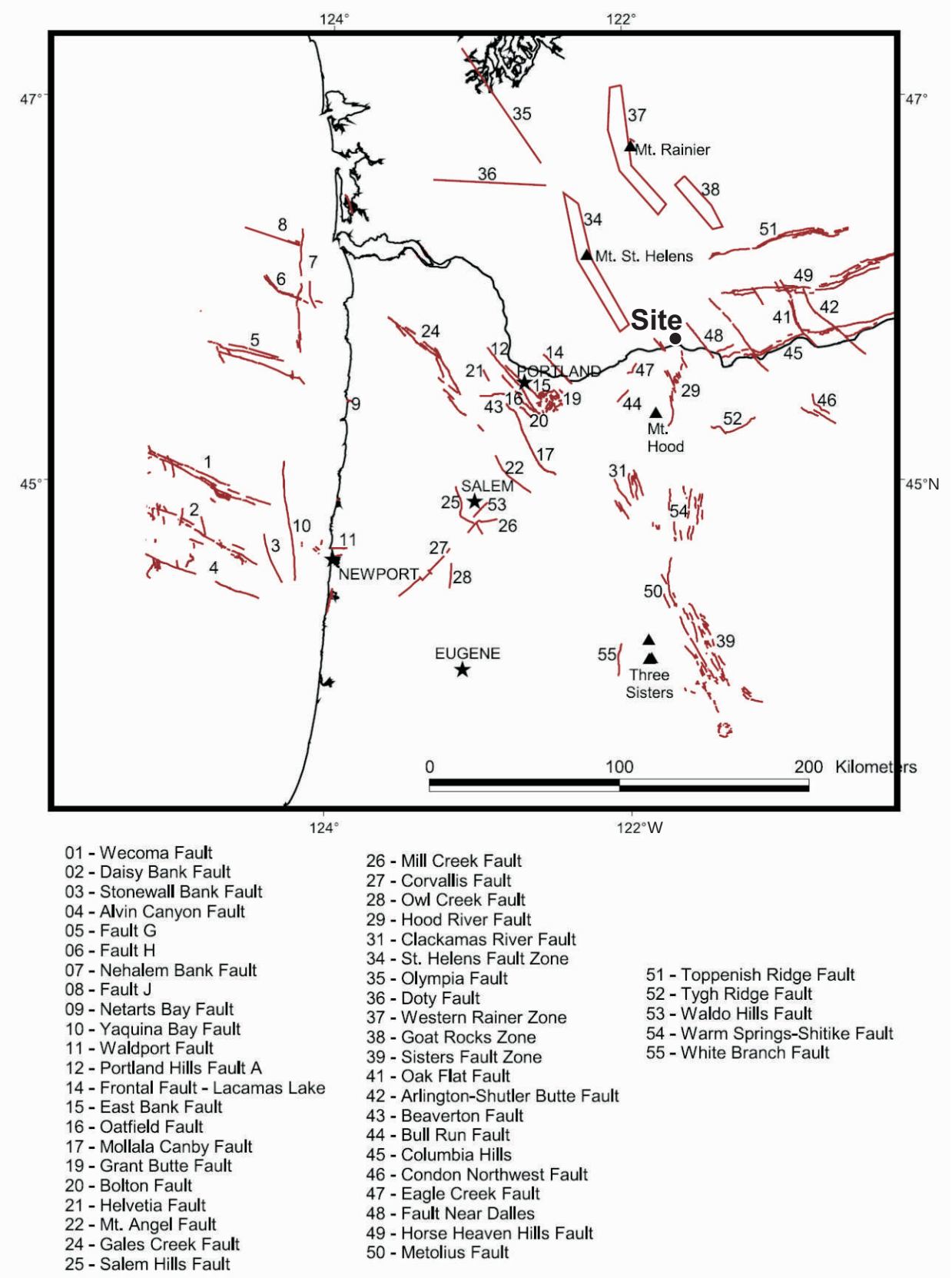


Figure 3.1-5

Quaternary Faults and Seismic Source Zones in Northwest Oregon and Southwest Washington

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

The risk of seismically induced settlement and lateral spreading is low due to the low liquefaction potential. It is URS's opinion settlements and lateral spread induced by a seismic event would be minimal.

Coseismic surface rupture occurs when a fault breaks to the land surface during an earthquake. Surface rupture is usually associated with moderate to large earthquakes (M_w 6.5 or greater) or rarely during smaller, very shallow events. There are no mapped faults crossing the site. Therefore, the potential for coseismic primary surface rupture at the proposed project site is small.

Seismic slope instability could potentially affect the site access road. However, the proposed access road does not cross any mapped landslides, nor were any observed during a preliminary site investigation.

3.1.3.2 Mitigation Measures

No mitigation measures are proposed beyond adhering to local building codes and standard turbine and foundation design. The proposed facility would comply with the state building code provisions for seismic hazards applicable to the proposed location. Access road designs would comply with applicable county, state, and federal codes.

3.1.4 SOILS

3.1.4.1 Existing Environment

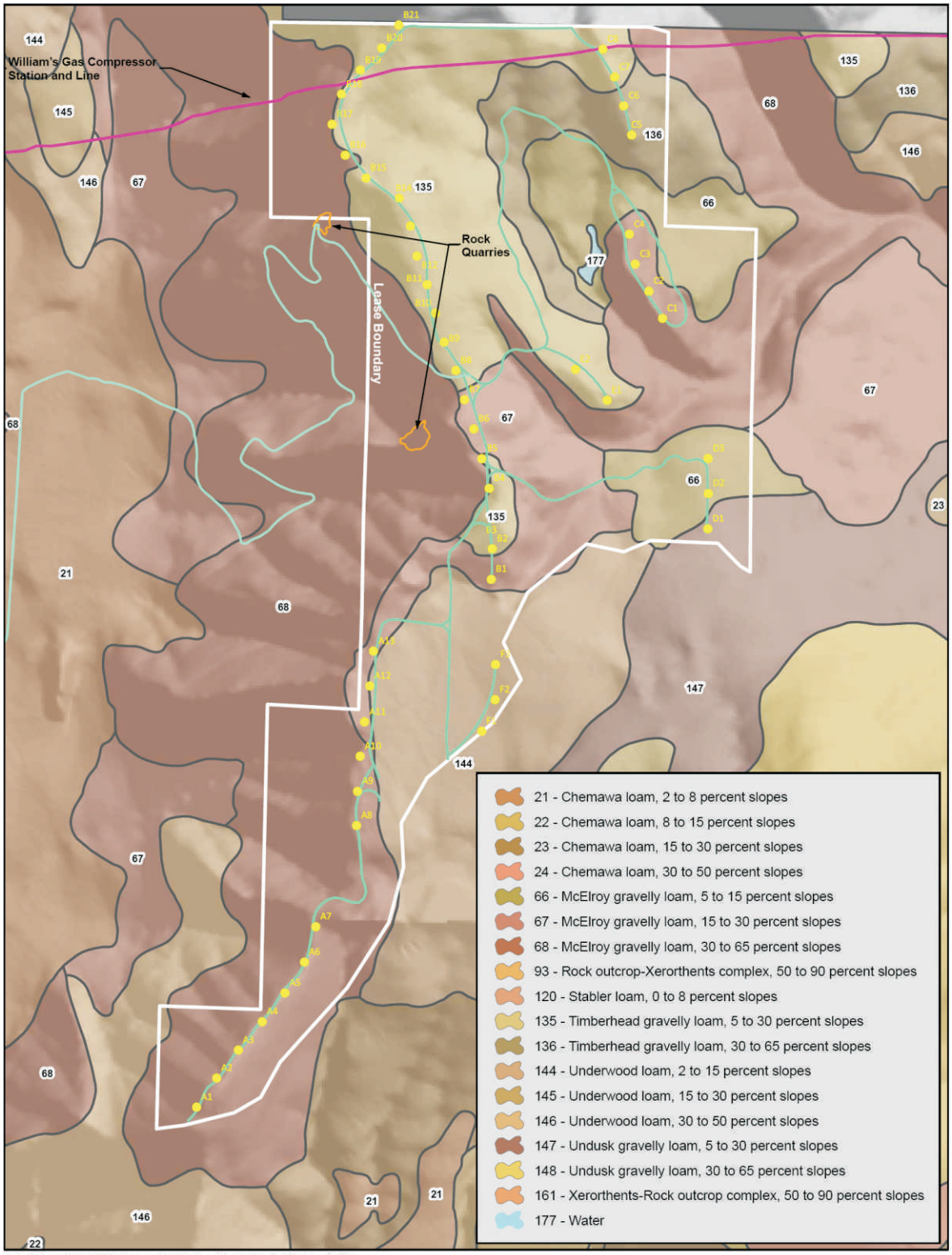
Whistling Ridge Energy Project Site

Soils in the project area are shown on Figure 3.1-6. The NRCS describes the soils in the project vicinity as follows (USDA 2003):

- ~~**Chemawa Series:** The Chemawa series consists of very deep soils (up to five feet) formed in alluvium from volcanic ash and basalt. The soils exist on terraces, footslopes and backslopes at elevations between 800 and 2,500 feet in southeast Skamania County and southwest Klickitat County. Chemawa Soils are well drained with slow to medium runoff and moderate permeability. The Chemawa series soils are present in areas that would be crossed during access to the site, but are not present within the boundaries of the proposed wind turbine site~~

- **McElroy Series:** The McElroy series consists of very deep soils (up to five feet) formed in colluvium and residuum from basalt with a mantle of volcanic ash that influences soils in the top nine to 13 inches. The soils exist on the footslopes and backslopes of mountains on slopes from five to 90 percent at elevations from 400 to 2,600 feet in eastern Skamania County and western Klickitat County. McElroy Soils are well drained with medium to rapid runoff and moderate permeability. The series was established in 1981 following the introduction of volcanic ash from the eruption of Mt. St. Helens.

33758687_87.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.1-6

Soil Classifications

URS

Whistling Ridge Energy Project
Skamania County, Washington

- **Timberhead Series:** The Timberhead series consists of very deep soils (up to five feet) formed in residuum and colluvium from basalt mixed with volcanic ash. The soils exist on mountain ridges between five and 30 percent at elevations from 2,000 to 3,600 feet in Skamania County and western Klickitat County. Timberhead Series soils are well drained with medium to rapid runoff and moderately high to high permeability.

- **Underwood Series:** The Underwood series consists of very deep soils (five feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between two and 50 percent at elevations between 500 and 2,700 feet in southeast Skamania County and west Klickitat County. Underwood Series soils are well drained with slow to medium runoff and moderately high permeability.

- **Undusk Series:** The Undusk series consists of very deep soils (five feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between five and 65 percent at elevations between 2,000 and 2,800 feet in southeast Skamania County and west Klickitat County. Undusk Series soils are well drained with slow to medium runoff and moderately high permeability.

Based on the current test pits and field observations, the site soil is best represented as ~~Stiff Soil~~Soft Rock (IBC Soil Site Class ~~D~~B). Rock, with varying strength and weathering characteristics, was encountered at shallow depths (ranging from three to 12 feet bgs).

Prior to final design of the tower foundations, additional subsurface investigations (boreholes) would be required to provide geotechnical data at foundation and anchor depths.

3.1.4.2 Impacts

Whistling Ridge Energy Project Site

Foundations for the wind turbines and the grading plan would be determined during final design.

Because surface soils on the project site are considered moderately susceptible to erosion, there is potential for adverse impacts on the site soil in areas of steep topography during grading and foundation construction activities.

Roadway Improvements

Improvements to existing roadways and construction of new access and maintenance roads are anticipated for construction and operations of the proposed facility. For the current proposed number of wind turbines, approximately 350 over-size and/or overweight loads would be required over the County and site roads for the towers only, in addition to construction equipment. This quantity does not include delivery of construction materials such as concrete required for the foundation, grading equipment to construct roads and prepare the site or other

construction traffic not associated with the Whistling Ridge Energy Project. Improvements to the County roadways and the private logging roads would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components from SR 14 to the proposed project site are discussed in Section 4.3.2.2, Roadway Improvements~~.~~.

URS drove and observed the haul roads on the property during our September 2007 and June 2009 site visits. The existing logging road (~~CG~~2930~~0~~West Pit Road) to the site has been used primarily for accessing stands of timber for harvesting and exporting timber from the site. At the time of the June 2009 site visit, ~~The~~ the dirt road ~~is currently~~ was surfaced with soil and rock, ~~and is~~ was in poor condition, and ~~. In its current state the road is~~ not suitable for the trucks that would be carrying the wind tower equipment. Roadway improvements were made during the summer 2009 to widen the road for logging purposes, however additional widening and surface improvements would be required for the wind project.

URS would analyze the existing topography and work within the equipment limitations of the haul trucks that would be transporting the equipment to the site. Likely this would include rebuilding large sections of the existing road and surfacing with rock. For areas with steep slopes, there may be a need to flatten and rebuild the slopes to allow access by the hauling equipment. In addition, a new connection would be made between West pit Road and Willard Road, and portions of the West Pit Road widened and realigned beyond the improvements made for logging access. These modifications would likely require construction of new cut and fill slopes.

3.1.4.3 Mitigation Measures

Site-specific geotechnical engineering evaluations would be conducted prior to design of the project to identify design methods to address the potential impacts presented above. Mitigation of soil impacts at the site would be incorporated into the final design of the foundations and roadways. A SWPPP would be developed prior to construction or modification of any roads or facilities. The SWPPP would be submitted for approval to EFSEC and followed throughout construction at the site.

3.1.5 TOPOGRAPHY

3.1.5.1 Existing Environment

Whistling Ridge Energy Project Site

The area of the proposed project is approximately 1,152 acres. The project site is located on a series of north trending ridges that range in elevation from approximately 2,100 to 2,300 feet above msl. The land west of the proposed project site drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. The topography northeast of the site drops gradually toward the White Salmon River or climbs gently up the northeast flank of Underwood Mountain at 2,728 feet above msl. To the south, the topography drops to a terrace of largely agricultural use and then toward the Columbia River. Site topography is shown on Figure 3.1-7.

3.1.5.2 Impacts

Whistling Ridge Energy Project Site

Impacts to the topography due to construction of the Whistling Ridge Energy Project would include grading of access roads and foundations. The areal footprint of the grading and total volume of material excavated would depend on the final foundation design(s) of the turbine towers.

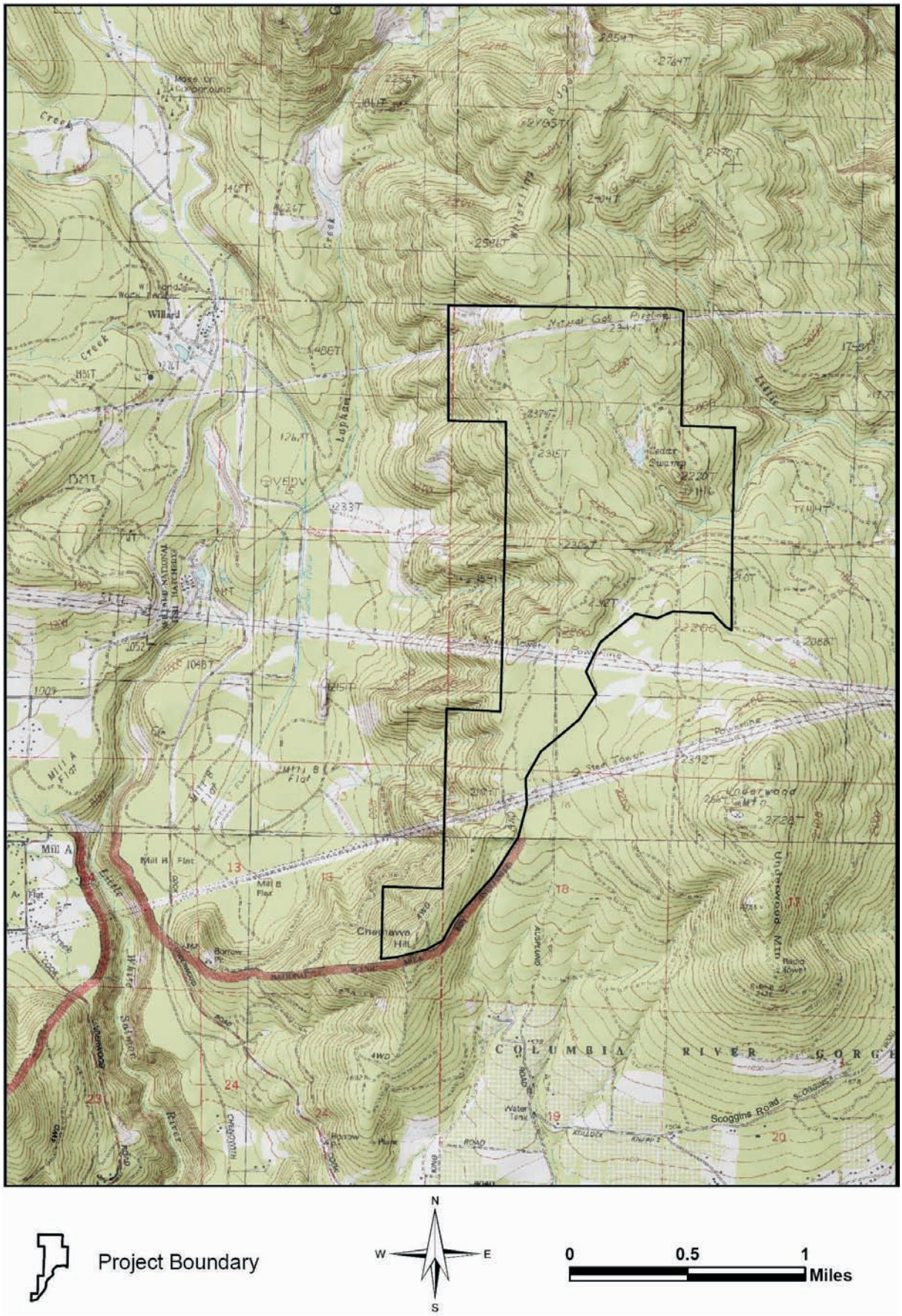
Roadway Improvements

Roadway improvements would be necessary to accommodate the heavy and long loads associated with the turbine towers. It is anticipated that some steep sections of existing or new roads would be regraded to create shallower grades. Some tight-radius turns may require localized ~~rerouting~~ realignment of existing site roadways. These modifications would likely require construction of new cut and fill slopes.

3.1.5.3 Mitigation Measures

No mitigation measures for topography are anticipated at this time.

33758687_103.cdr



Source: GeoDataScape.

Job No. 33758687

Figure 3.1-7

Site Topography

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.1.6 UNIQUE PHYSICAL FEATURES

3.1.6.1 Existing Environment

URS conducted a preliminary landslide hazard evaluation of the proposed Whistling Ridge Energy Project wind turbine site pursuant to SCC Title 21A, Chapter 21A.06 - Landslide Hazard Areas.

A URS Licensed Engineering Geologist conducted a site-specific landslide hazard investigation that consisted of:

- Reviewing sections of the County Code that address geologically hazardous areas
- Reviewing existing available topographic, geologic, and soils literature and maps
- Analyzing project-specific stereo aerial photographs
- Reviewing project test pit logs and soil samples
- Performing a one day site reconnaissance

According to the County Code, the primary criteria for landslide hazard designations are: presence of pre-existing, known mappable landslides; slope angle; and/or composition of the near-surface soils or rock.

URS created a color-coded map of the study area using an existing USGS 10 meter DTM to segregate slopes into three categories: slopes less than 20%; slopes between 20% and 30%; and slopes greater than 30%. We then superimposed the NRCS soil survey map onto the slope map to provide soil type information. The resulting Landslide Hazard Map is presented as Figure 2.15-1.

Landslide Hazard Area Delineation

Skamania County recognizes three classes of LHAs. Class I (Severe) LHAs are considered to present a severe landslide hazard and are distinguished as areas of known mappable landslide deposits which have been designated landslide hazard areas by the local legislative body. Class II (High) LHAs are areas with slopes between twenty and thirty percent that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than thirty percent. Class III (Moderate) LHAs are areas with slopes between twenty percent and thirty percent not included in Class II.

URS reviewed available geologic and soils literature to develop a landslide hazard classification for the proposed project. An existing published regional geologic map (partially recreated in Figure 3.1-1) indicates a large landslide in the northeast corner of the study area underlying Tower Line C. Review of stereo photographs of the area where the landslide deposits are

mapped, coupled with a site reconnaissance, indicate that there is little geomorphic evidence for landslide activity such as obvious scarps, hummocky or benched terrain, lobate toe areas, or redirected watercourses. No deep subsurface investigations have been carried out at the site to date, but future explorations in support of design for the turbine tower foundations would provide subsurface information regarding the presence of landslide deposits in the area. Based on our preliminary investigation, there does not appear to be any area of the site that meets Skamania County's criteria for a Class ~~1~~ I LHA.

Class II LHAs are shown in green on Figure 2.15-1. The Class II LHAs at the site are predominantly associated with the steep slopes to the west of proposed Tower Lines A and B. The proposed site access road, West Pit Road, ascends these slopes to reach the site from the Little Salmon River valley. There are also steep slopes to the east of the 7 southernmost Tower Lines A towers, and on both sides of Tower Line C.

3.1.6.2 Impacts

Although none of the proposed turbines are located within Class II LHAs, several of the towers along the western side of the project site (Tower Lines A and B) are located along ridgelines with descending slopes that are locally greater than 35 degrees (70%). The heads of some of the drainages along these slopes are arcuate, indicating possible mass-wasting activity such as landslides, debris flows, and/or earthflows. The access road from the Little Salmon River valley to the project site will traverse Class II LHAs.

Based on aerial photo and field observations, the primary mass wasting process below the ridgelines appears to be debris flows and soil creep. No evidence for deep-seated, block failure type landslides was observed. Local surficial creep of near-surface soils is indicated by the presence of pistol-butted trees on some of the slopes, primarily on the descending slope west of the northern portion of Tower Line A. Other slopes have mature conifer stands that indicated little or no soil creep. Further subsurface investigation in support of final tower foundation design would help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock mass underlying the ridgelines.

It appears that the primary concern for towers located adjacent to the Class II LHAs is the potential for headward erosion of the steep drainages by debris or earth flow processes. Debris flows could potentially damage to the proposed site access road. Erosion rates of these drainages are unknown, but no obvious recent mass wasting features were observed in the aerial photos or during the site reconnaissance.

Class III LHAs have been delineated adjacent to proposed wind turbines along the southern Tower Line A and along Tower Line C. Class III LHAs are not anticipated to have any impact on the proposed facilities due to the robust nature of the proposed foundation designs.

The landslide hazard evaluation identified several areas where the proposed wind turbine generators are located adjacent to slopes that meet Skamania County's criteria for Class II and Class III LHAs. The proposed site access road will traverse Class II LHAs as well. The primary hazard to the proposed towers appears to be the potential for exposure to headward erosion of

steep drainages on the slopes below some of the tower locations. Exposure of the towers to headward erosion of the steep slope drainages can be minimized by providing maximum possible setbacks from the tops of the steep slopes and/or by siting the turbines along portions of the ridgelines that are above intervening spur ridges. The most critical area of exposure to Class II LHAs is the narrow ridge at the southern portion of Tower Line A. The primary hazard to the access road would be damage sustained due to debris flow or mass wasting. This hazard would not pose an immediate threat to the operation of the towers, but could temporarily limit access to the site. Interruption to site access could be minimized with regular slope monitoring and contingency plans for slope instability (such as alternate access routes and identification of contractors available for emergency assistance).

It is URS's opinion that the proposed Whistling Ridge Energy Project facilities can be constructed and operated without danger to human life or the surrounding environment due to landslide hazards.

3.1.6.3 Mitigation Measures

At this time, no mitigation measures are anticipated. Additional geotechnical investigations for tower foundation design would provide deeper (> 16 feet) subsurface data. If the additional data indicates potential for slope instability, mitigation would be accomplished through engineering design or avoidance.

3.1.7 EROSION/ENLARGEMENT OF LAND AREA (ACCRETION)

Erosion is the breakdown and transport of soils and bedrock by natural processes, including water, wind, and glaciation. The susceptibility of any material to erosion depends on 1) chemical and physical characteristics (e.g., cohesion); 2) topography; 3) the amount and intensity of precipitation and surface water; 4) the intensity of wind; and 5) the type and density of vegetative ground cover, if present.

The assessment of erosion potential is principally based on the erosion potential specified for the surficial soils by the NRCS (formerly the Soil Conservation Service). The NRCS uses an erosion factor, K, to indicate the susceptibility of a soil to sheet and rill erosion by water. This is one of the six factors used in the Universal Soil Loss Equation to predict the average annual rate of soil loss by sheet and rill erosion. The values of K range from 0.05 to 0.69, with higher K indicating more erosion susceptible soil. K-values below 0.13 are considered to have low potential for erodibility; values in the range of 0.13 to 0.26 are considered medium; and values higher than 0.26 are considered high. The effect of wind erosion is given by grouping the soils into different wind erodibility groups.

3.1.7.1 Existing Environment

~~Plant Site~~

The K-values for soil at the proposed development site and access roads are 0.20 for the McElroy and Timberhead gravelly loams, 0.24 for the Undusk gravelly loam, and 0.37 for the Underwood loam (USDA NRCS 1988). These erosion factors indicate that the Underwood loam

has a high potential for erosion by water and the McElroy, Timberhead, and Undusk units have a medium potential. Most soils found in the site vicinity are classified as having a low susceptibility to wind erosion.

3.1.7.2 Impacts

~~**Plant Site**~~

The potential for erosion or aggradation related to the planned development would be greatest during and immediately after the construction process. The NRCS classifies surficial soils at the site as generally having medium erosion potential. During the dry season, soils that are disturbed and stripped of vegetative cover may be susceptible to wind erosion. The potential for erosion by wind and water would be minimized through the use of erosion control measures to be outlined in the SWPPP as described in Section 2.10.

3.1.7.3 Mitigation Measures

BMPs and other measures would be taken to mitigate the erosion hazard at the project site.

Erosion control measures for construction at the site are outlined in Sections 2.10.2 and 2.14.1. The sequences and methods of construction activities would be controlled to limit erosion and are summarized below:

- Construction activities would be controlled to help limit erosion. Clearing, excavation and grading would be limited to those areas of the project absolutely necessary for construction of the project. Areas outside the construction limits would be marked in the field and equipment would not be allowed to enter these areas or to disturb existing vegetation.

- The construction contractors would implement the EFSEC-approved Erosion and Sedimentation Control Plan during construction to minimize soil loss due to surface water flows.

- The EFSEC-approved Environmental Protection Control Plan would be implemented to provide adequate maintenance and inspection of the erosion and sediment control system. The plan specifies that control structures would be inspected at a frequency sufficient to provide adequate environmental protection. Such inspections would increase in frequency during rainfall periods. In addition, supplies including sandbags and channel-lining materials would be stored on site for emergency use.

- Surface runoff would be diverted around and away from cut and fill slopes and conveyed in pipes or protected channels. If the runoff is from disturbed areas, it would be directed to a sediment trap prior to discharge.

SECTION 3.2 AIR
(WAC 463-60-312)

3.2.1 AIR QUALITY

Air quality in Washington is typically regulated by several agencies. In Skamania County, the Southwest Region Clean Air Agency is typically the local authority for air quality permitting of industrial sources, and permits minor sources through the Notice of Construction permit process. Ecology generally retains the authority for air quality permitting of major sources in attainment areas through the Prevention of Significant Deterioration (PSD) permit process. The United States Environmental Protection Agency (EPA) also has a role in the PSD process and in ensuring all states have plans in place to maintain compliance with ambient air quality standards.

The fuel source for the Whistling Ridge Wind Energy Facility would be wind that is transformed from kinetic energy into electrical energy by wind turbine generators. No air emissions would be generated from operation of the wind turbine generators at the project. The operation of the project would have no effect on the climate (visible plumes, fogging, misting, icing, or impairment of visibility, and changes in ambient levels caused by emitted pollutants). There would no emissions from the operation of the project, and thus none to be regulated. There are no areas within Skamania County that are currently designated as non-attainment areas for air quality. For a description of the meteorological conditions at the site, see Section 2.1.3.2, Climate.

In recent years, many of the new power plants proposed and constructed in the Pacific Northwest have been fossil fuel fired plants, primarily using natural gas as fuel. Fossil fuel fired plants, in contrast to wind power projects, emit significant quantities of the carbon dioxide that is the primary cause of anthropogenic climate change. Natural gas fired plants also emit sulfur oxides and nitrogen oxides, which contribute to both ground-level air quality problems and acid rain. By producing electricity without generating air emissions, which would otherwise be produced by fossil fuel fired plants, the project would have a significant beneficial impact on overall air quality and climate.

3.2.2 CONSTRUCTION EMISSIONS

Construction of the project would result in temporary air emissions from the following sources:

- Exhaust from the diesel construction equipment used for project site preparation, grading, excavation, and construction of on-site structures
- Exhaust from water trucks used to control construction dust emissions
- Exhaust from diesel trucks used to deliver equipment, concrete, fuel, and construction supplies to the construction site

- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site and from vehicles used by workers to commute to the construction site

- Exhaust from diesel-powered welding machines, electric generators, air compressors, etc.

These emissions would be similar in nature to those produced by any construction project that involves heavy equipment and transportation of materials to the project site.

3.2.3 OPERATION EMISSIONS

Operation of the project would produce no air emissions as no fuel would be burned to produce energy. Operation of the project would therefore have no negative impact on air quality. According to the EPA, air emissions from fossil fuel combustion for electricity production are a leading source of air pollution nationally, accounting for:

- 67% of sulfur dioxide emissions

- 28% of nitrogen oxide emissions

- 36% of carbon dioxide

- 3% of mercury

The most likely alternative to wind energy generated by the project would be electricity generated from the combustion of fossil fuels. Fuel combustion from electric utilities generated 6.6 million tons of carbon monoxide and 6.0 million tons of nitrogen oxides in 2006. Total fossil fuel combustion produced 5,638 million metric tons carbon-equivalent of carbon dioxide in 2006 (EPA 2008).

As the energy produced by the project would displace the need for other energy produced by fossil fuel combustion, operation of the project would have a positive effect on air quality and climate change by reducing overall air emissions.

3.2.4 ODOR

Construction of the project would produce limited odors associated with exhaust from diesel equipment and vehicles. Mitigation efforts are described in Section 3.2.6, Mitigation Measures.

Operation of the project would create no odors as no combustion is involved and no odor-producing materials would be used in project operations.

3.2.5 DUST

Construction of the project would create fugitive dust emissions from construction-related traffic and additional wind-blown dust as a result of ground disturbance. Whistling Ridge Energy LLC would implement an effective dust control program to minimize any potential disturbance from

construction-related dust. Dust suppression would be accomplished through application of either water or a water-based, environmentally safe dust palliative such as lignin. The use of a dust palliative such as lignin (a non-toxic, non-hazardous compound derived from trees) would result in the use of substantially less water for dust suppression and therefore less traffic from water trucks to the construction site. The final decision regarding dust suppression techniques would be made by the EPC contractor in consultation with local authorities.

Operation of the project would result in minimal or no increase in dust levels. Project related-traffic increases on gravel access roads would generate small amounts of additional fugitive dust. This increased traffic would consist largely of weekly or less frequent trips to turbines in service vehicles for maintenance and repair activities.

3.2.6 MITIGATION MEASURES

The following mitigation measures for construction-related air emissions and dust are proposed:

- All vehicles used during construction would comply with applicable Federal and state air quality regulations
- Operational measures would be implemented, such as limiting engine idling time and shutting down equipment when not in use
- Active dust suppression would be implemented on unpaved construction access roads, parking areas and staging areas, using water-based dust suppression materials in compliance with state and local regulations
- Traffic speeds on unpaved project roads would be kept to 25 mph to minimize dust generation
- Carpooling among construction workers would be encouraged to minimize construction-related traffic and associated emissions
- Disturbed areas would be replanted or graveled to reduce wind-blown dust
- Erosion control measures would be implemented to limit deposition of silt to roadways

Mitigation measures for construction impacts are described in greater detail in Section 2.3, Construction on Site, and Section 1.4, Mitigation Measures.

No mitigation is proposed for project operations, as there would be no air or odor emissions.

SECTION 3.3 WATER
(WAC 463-60-322)

Project operation would require water use primarily for the Operations and Maintenance building. When the project is operational, there would be eight to nine permanent full-time and/or part-time employees on the Operations and Maintenance staff. The average total water supply needs would be less than 5,000 gpd.

A well would be drilled to provide potable water for the bathroom and kitchen in the Operations and Maintenance building. All water would be discharged to a septic tank installed on site. There would be no process water generated on site, so no water associated with plant operations would be discharged to surface waters. The project would have negligible impacts on surface water and groundwater resources in the vicinity.

Stormwater runoff drains to open land and the ephemeral and perennial streams that flow either westward toward the Little Salmon River or eastward toward the White Salmon River. Stormwater is conveyed to these streams via ditches and culverts.

3.3.1 SURFACE WATER RESOURCES (MOVEMENT/QUALITY/QUANTITY)

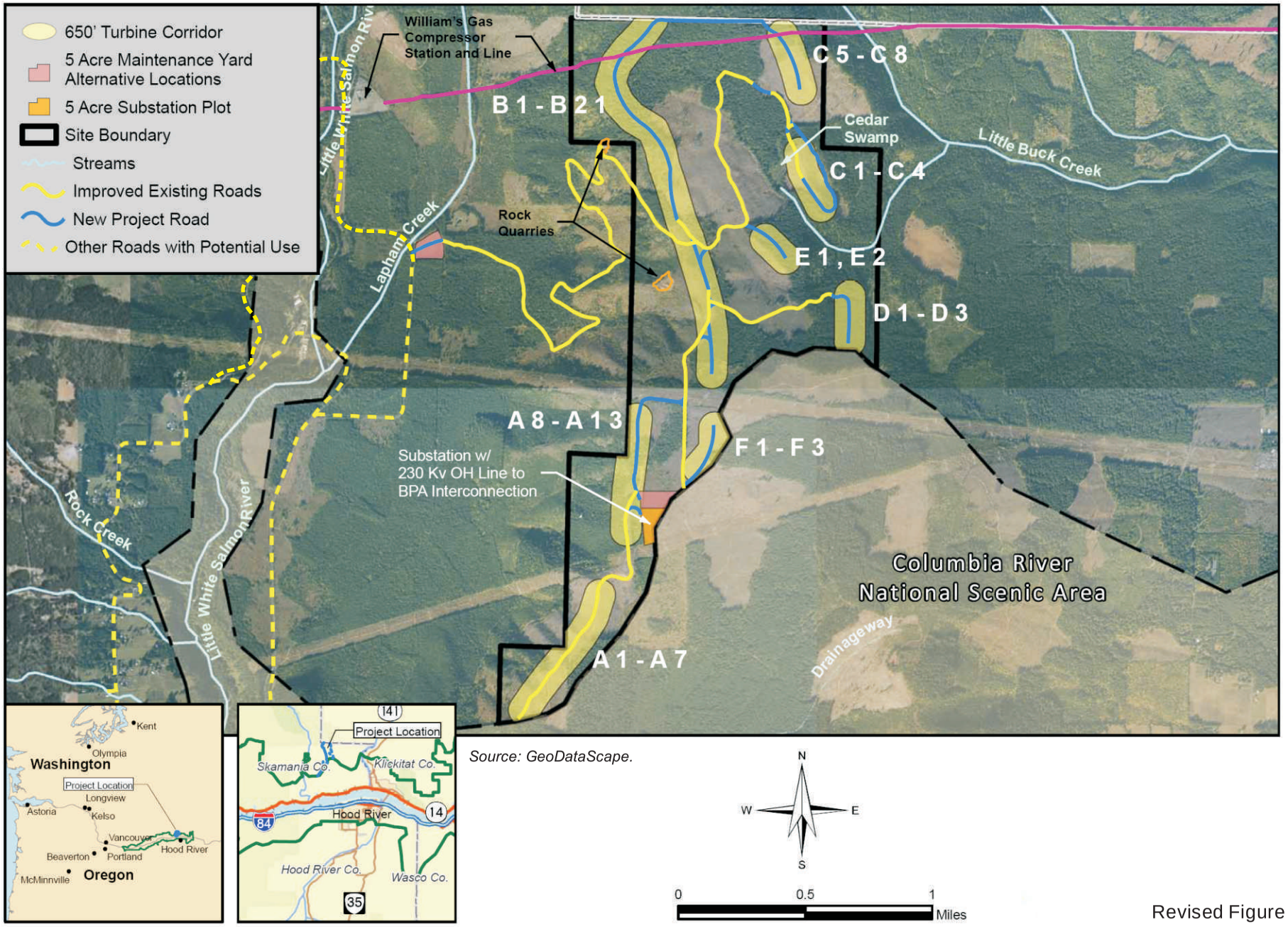
3.3.1.1 Existing Surface Water Conditions

The project area is generally mountainous with steep-sided narrow drainages. Elevations of the turbine positions generally range from 2,100 feet to 2,300 feet above msl. The Columbia River flows south of the site and receives runoff via the White Salmon drainage area from the east portion of the site and via the Little White Salmon Basin from the west portion of the site.

USGS review identified one undelineated wetland occurring outside the impacted area, west of turbine E3. This wetland is labeled as “Cedar Swamp” on the USGS topographic map (Figure 3.3-1). Five intermittent drainage ways were identified on the map at the northeastern portion of the project area. Three of the drainage ways drain to Cedar Swamp from the north. The remaining two drainage ways are to the south of Cedar Swamp, and ultimately drain intermittently to Little Buck Creek, a perennial stream that is outside of the project area to the east. The planned improvements to existing roads that would occur inside the Scenic Area would cross one intermittent stream (shown on Figure 3.3-1). This stream has no defined channel and carries water only during runoff events. It is classified as a Class V stream under SCC 21.04.020(B).

The project area soils are classified as well-drained, with slow to moderate runoff, and slight to moderate hazard of water erosion. The presence of scour, sedimentation, steep slopes, ephemeral and perennial streams, and the soil classifications suggest that surface water runoff and infiltration within the project are moderate (Haagen 1990). Water runoff from the northeast area of the project drains southeast via Cedar Swamp and tributaries to Little Buck Creek before flowing south to the White Salmon River, and ultimately to the Columbia River. Water runoff from the southwest area of the project drains west and southwest to a flat area east of the project, ultimately draining to the Columbia River.

33758687_99.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.3-1

Waterways in the Project Vicinity

URS

Whistling Ridge Energy Project
Skamania County, Washington

The proposed access road, West Pit Road, crosses one unnamed drainage in the Lapham Creek watershed. This stream had observed flow through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to Lapham Creek.

3.3.1.2 Impacts to Surface Water

No wetlands or other surface water bodies are proposed to be filled as a result of the project. Wetlands are discussed in further detail in Section 3.5, Wetlands.

The planned improvements to ~~existing roads that would occur inside the Scenic Area~~West Pit Road would cross one ~~intermittent stream~~unnamed drainage which currently flows under West Pit Road through a culvert (Figure 3.3-1). This ~~stream~~ drainage has no defined channel ~~and carries water only during runoff events~~downstream of the culvert. It is classified as a Class V stream under SCC 21A~~.04.020(B)~~ Appendix C. Buffers are established for Class V streams. However, expansion of existing uses is allowed within these water resource buffers. Development review would be required under SCC 21A.05 and SCC 21A.06 in Fish and Wildlife Protection Areas and Geologically Hazardous Areas in consultation with WDFW. However, existing roadways would be allowed without review. The road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold. For a full discussion of fish, wildlife, their habitats, and project impacts to these, please see Section 3.4.

The impacts to surface water relating to site drainage during and following construction are expected to be minimal. The highest risk of construction-related impacts to surface water quality is expected to be associated with the construction and improvement of new and existing roadways. These activities are expected to disturb the largest areas, exposing soils in potentially steep areas. Roadway improvements to West Pit Road would be needed. The culvert under West Pit Road through which the unnamed drainage flows would be maintained however would likely be extended along with the roadway widening. The highest priority for these activities would be to control erosion and sedimentation. A SWPPP would be developed for the project, consisting of structural and non-structural BMPs, to minimize the potential for discharge of pollutants from the site during and after construction activities.

The SWPPP would be developed to meet the requirements of the Ecology General Permit to Discharge to Stormwater pollution control program associated with construction activities. Examples of structural BMPs included in the SWPPP to be implemented during construction activities are the installation of silt curtains, mats, hay bales, check dams, silt traps, and other methods for controlling and diverting runoff away from exposed soils or areas susceptible to erosion. Examples of non-structural BMPs to be included in the SWPPP are management practices for handling and disposing of materials, as well as spill prevention. BMPs associated with construction are discussed in further detail in Section 2.10, Surface Water Runoff.

Stormwater would be conveyed through roadside ditches, discharging to existing on-site drainage ways. New culverts would be constructed in the newly constructed roads, where required, to convey runoff toward the existing drainage ways, and existing culverts would be

replaced to better accommodate seasonal flow regimes of intermittent streams crossing roadways. Culvert outlets to natural channels would be armored to control erosion and scouring of site soils. Permanent vegetation would be established and other permanent BMPs would be used to control erosion and sedimentation. With all permanent stormwater BMPs in place, operation-related impacts to stormwater are expected to be minor.

The amount of chemicals kept on site would be very minimal, and all would be located at the Operations and Maintenance building, under cover. An SPCC Plan would be developed and kept on site for the prevention and response to spills.

3.3.1.3 Mitigation Measures

Permanent BMPs would be designed and incorporated into the final construction plans and specifications prepared by the site civil design engineer. These permanent BMPs would include erosion and sediment control through site landscaping, grass, and other vegetative cover. All final designs would conform to the applicable Stormwater Management Manual. Non-structural BMPs also would be incorporated into the operations manual including good housekeeping, preventative and corrective maintenance procedures, steps for spill prevention and response, employee training, and inspection and record-keeping procedures.

3.3.2 RUNOFF/ABSORPTION

3.3.2.1 Existing Runoff/Absorption Conditions

As discussed in Section 3.3.1.1, site soils are well-drained with slow to moderate runoff and slight to moderate hazard of water erosion. This infers that currently there is both moderate stormwater runoff and infiltration onsite.

3.3.2.2 Impacts to Runoff/Absorption

The current site is not developed, with the exception of private, gravel logging roads, and is composed of well-draining soils. The construction of the Whistling Ridge Energy Project would involve roadway improvements on approximately ~~7.2~~7.9 miles of existing private, gravel logging roads, construction of about 2.4 miles of new gravel access roads, the project substation, an Operations and Maintenance building, the collector system pad, a pad for each turbine tower, and underground electric cables buried in trenches along the access roads Temporary roadways would be built to provide additional access for heavy machinery during construction.

As a result of permanent improvements, site surface water runoff is expected to increase slightly. However, since the increased area of impervious surfaces is small compared to the total project area (estimated at less than 1 acre), these impacts are expected to be minimal. Stormwater would continue to be routed off site via culverts and some stormwater would continue to infiltrate in the way it does currently. Based on the conditions and implementation of BMPs, the net impact to absorption on the site is considered negligible. No negative impacts on runoff and no negative impacts on adjacent surrounding properties are anticipated as a result of the permanent site improvements. See Section 2.10, Surface Water Runoff for further detail of permanent improvement areas.

3.3.2.3 Mitigation Measures

The required BMPs are expected to: minimize erosion, control sedimentation, prevent run-on of stormwater onto disturbed areas, and prevent runoff from disturbed areas. One measure may be treatment of stormwater exiting disturbed areas. Construction-phase erosion and sedimentation control BMPs, as described in Section 2.10, Surface Water Runoff, would be implemented to mitigate the expected impacts of soil disturbance. These may include chemical source control, silt fencing, stabilized construction entrances, street sweeping, straw bale check dams, and rock check dams. With implementation of BMPs, no negligible impacts on runoff or on adjacent surrounding properties are anticipated during construction activities. Construction BMPs are described in further detail in Section 2.10, Surface Water Runoff.

Permanent, operations-phase runoff control and water quality enhancement BMPs, also described in Section 2.10, Surface Water Runoff would be implemented to mitigate the expected impacts of increased runoff rate and pollution from vehicle traffic. These BMPs would include stabilized landscaped areas and vegetated ditches or swales, and would provide the necessary control of stormwater runoff.

3.3.3 FLOODPLAINS

3.3.3.1 Existing Conditions

The project area is located outside the 100-year floodplain for the Little White Salmon and Columbia Rivers as currently mapped by FEMA. The project site is located on a series of north trending ridges that range in elevation from approximately 2,100 to 2,300 feet above msl. The land west of the proposed project site drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. Because the current elevation of the site is above the 100-year floodplain, additional mitigation measures for flooding are not planned.

3.3.3.2 Potential for Flooding and Protective Measures

Because the site is above the 100-year floodplain, an evaluation of the change in surface water elevation created by the additional fill placed for site development would not be necessary.

3.3.4 GROUNDWATER RESOURCES

This section describes the hydrogeologic resources at the Whistling Ridge Energy Project site, project impacts, and mitigation.

3.3.4.1 Hydrogeologic Setting

The project site is located approximately 7 miles west of the town of White Salmon, Washington, and approximately 2 miles east of the Little White Salmon River. A subsurface investigation was conducted in September 2007, which included twelve test pits excavated from seven to 16 feet in depth to assess near-surface soil and rock characteristics. Surficial soils are primarily characterized as soft, moist sandy silt to clay with sand, and clayey sand. Immediately

beneath the unconsolidated soils, rock with variable strength and weathering properties is present. The test pit data is limited to depths no greater than 16 feet bgs. It is anticipated that rock quality of basalts would improve with depth but that weaker interflow zones consisting of volcaniclastic material and paleosols are possible at any depth. The bedrock underlying the proposed project site consists of Grande Rhonde Basalt of the CRBG and Quaternary basalt of Underwood Mountain. Groundwater was not encountered up to a depth of 16 feet bgs during subsurface exploration. However, these observations reflect groundwater levels at the time of the field investigation and actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors no observed during this investigation. Regional or perched water tables may be present at a greater depth.

3.3.4.2 Impacts to Groundwater Resources

Operation of the project would have minimal impacts to groundwater. For operations, a well would be installed by a licensed installer to serve the Operations and Maintenance facility. A well using less than 5,000 gallons of water a day, and thus exempt from permit requirements in RCW 90.44.040, would be installed to provide water for use to the Operations and Maintenance building. The well would be installed by a well contractor licensed pursuant to Chapter 173-162 WAC, and in compliance with the requirements and standards of Chapter 173-160 WAC. The well would be installed consistent with Skamania County Community Development Department and Ecology requirements for the new wells. This well would provide water for bathroom and kitchen use and is expected to consume less than 5,000 gpd. It is unlikely that the project water use would have a direct effect on groundwater quantity, quality, and flow direction in the immediate area below the proposed facilities. Although the impervious surfaces would increase slightly with the construction of the project, they are not expected to be significant enough to notably affect the water recharge and runoff on site. Therefore, impacts to the hydrologic setting within the Whistling Ridge Energy Project site are considered negligible.

3.3.4.3 Mitigation Measures

No impacts have been identified regarding the quantity of water infiltrating the site following construction. BMPs that are recommended for site development include stabilized landscaped areas and vegetated ditches or swales.

Storage of chemicals onsite is minimal; however, the site development plan would require an SPCC Plan that would protect groundwater (See Section 2.9, Spillage Prevention and Control). Therefore, mitigation for groundwater quality impacts is not necessary.

3.3.5 PUBLIC AND PRIVATE WATER SUPPLIES

3.3.5.1 Existing Conditions and Water Authorization

The Pleistocene epoch (1.8 million years to 10,000 years BP) basalts and cinders erupted from the Underwood Mountain vents and overlie the Tertiary CRBG Grande Ronde and Wanapum basalts. Public records of wells located within the Underwood volcanic field indicate a 310-foot thick repetitive sequence of thin lava flows (two to eight feet thick), cinders and silty-clays overlying a productive confined aquifer consisting of intensely fractured Grande Ronde basalt.

The Miocene-epoch Grand Ronde Basalt consists of multiple basalt flows that are a subgroup of the CRBG, and has been described to have a thickness of up to 1,000 feet, although the thickness in the project vicinity is not known. There are no public water supplies within the project area.

3.3.5.2 Impacts to Public and Private Water Supplies

Water Usage

As described earlier, water use during operations is expected to be less than 5,000 gpd and would be provided by a well that would be drilled on site. Water use is expected to be consistent year-round.

Water Supply During Construction

Water used during construction would be primarily associated with road construction, wetting of concrete, dust control, and other activities. Water consumed during construction activities would be purchased by the contractor from an off-site vendor with a valid water right and transported to the site in water-tanker trucks. No water would be used from the site during construction. There would be no water treatment requirements or methods on site. Environmentally benign dust palliatives such as lignin may be added to water used for dust suppression to improve efficiency and reduce water use.

Future Conditions

The well that would be drilled for the project, and its associated use of less than 5,000 gpd, is not expected to impact water levels in private wells in the vicinity of the project. There are no public water supplies within the project area; therefore, no impacts are anticipated to public water supplies.

3.3.5.3 Mitigation Measures

No impacts to public water supplies and no adverse impacts to private water supplies (water wells) are expected. Therefore, no mitigation measures are required.

SECTION 3.4 HABITAT, VEGETATION, FISH AND WILDLIFE (WAC 463-60-332)

3.4.1 HABITAT AND VEGETATION

This section describes existing habitat and vegetation resources within the Whistling Ridge Energy Project site, the potential impacts of the proposed project on these resources, and the mitigation planned for the project.

3.4.1.1 Existing Conditions

The project site is located in the Southern Washington Cascades Province, within the grand fir (*Abies grandis*) and Douglas-fir (*Pseudotsuga menziesii*) major vegetation zones (Franklin and Dyrness 1988). Topography in the area is characterized by generally accordant ridge crests, separated by steep, deeply dissected valleys. The prevailing climate is cool and wet. The majority of precipitation falls as snow, which may accumulate one to three meters during the winter season.

Whistling Ridge Energy Project Site

The proposed Whistling Ridge Energy Project site is located on Underwood Mountain, northwest of White Salmon, Washington. The project site, which includes turbine strings, access roads, laydown staging areas, the operations and maintenance facility, and substation, measures 1,152 acres. Major drainages in the vicinity of the project site include the White Salmon Basin to the east and the Little White Salmon River Basins to the west, both of which drain to the Columbia River, which is located south of the project site.

Historically, the project site was dominated by grand fir and Douglas-fir. The relative abundance of each of these coniferous species was driven by elevation, aspect, underlying soil, and previous disturbance history (Franklin and Dyrness 1988). Mixed conifer and deciduous forest stands were present, typically following natural disturbance events. Deciduous forests also were present, composed mainly of alder (*Alnus rubra, A. viridis* ssp. *sinuata*), Pacific dogwood (*Cornus nuttallii*), and big-leaf maple (*Acer macrophyllum*).

For the last century, the predominant land use in the area located between Underwood Mountain and the Little White Salmon River has been commercial forest production. Lands within the project site are privately owned, and have been actively-managed for timber for the last century. As a result of ongoing timber harvest, forests within the project site are characterized by a mosaic of stand ages; however, average stand age has declined as a result of relatively short stand rotations. Forest management practices have resulted in a shift in species dominance to the commercially valuable Douglas-fir. Changes in stand structure and complexity, patch size, and species distribution also have occurred. Few large, old-growth conifers exist in the vicinity of the project site, and there are no known late-successional stands within or adjacent to the project site. A linear clearing associated with a high voltage transmission line corridor traverses the southern portion of the project site in an east-west axis. Canopy species within the corridor have been removed, and areas are managed to be devoid of shrub and tree species. The project site

contains a network of roads ranging in width from approximately 8 to ~~12~~ 20 feet. These roads are currently used to support logging activity and for accessing BPA transmission lines. Existing roads within the project site can be accessed from County roads extending north from SR 14.

Habitat, vegetation, and rare plant surveys were conducted within the Whistling Ridge Energy Project site in 2003. Environmental assessments included a pre-field information review and field surveys designed to classify habitats and identify rare plants that may occur within the project site.

Habitat Types

Habitat maps were created by CH2M Hill (Figure 3.4-1). Existing data was obtained from Washington Natural Heritage Program (WNHP) and through discussions with the USFWS. Habitats were identified using WDNR orthophotos from January 2002 and classified using the US Forest Service Classification System (USFS 1985). Habitat maps were field-verified during the 2003 plant survey season. These data were entered into a GIS database and used to calculate the total acres of each habitat type that would be crossed by the proposed project elements. The results of the habitat survey are provided in the Vegetation Technical Report (Appendix B-1).

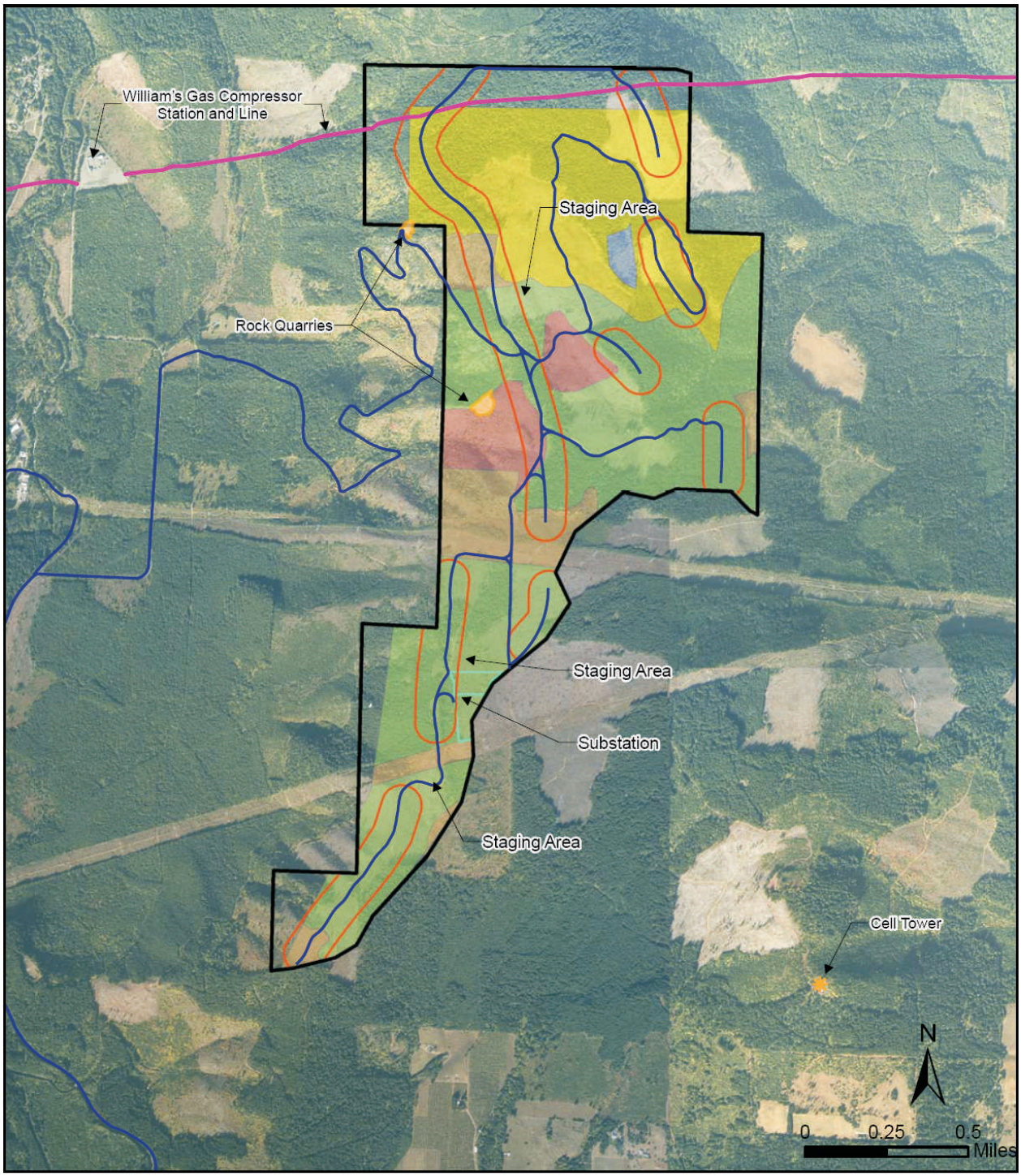
Five vegetation communities and wildlife habitats were identified within the project site:

- Grass-Forb Stand (recent clearcuts)
- Brushfield/Shrub Stand
- Conifer-Hardwood Forest
- Conifer Forest
- Riparian-Deciduous Forest

Grass-Forb Stand. Grass-forb stands are defined as habitats where shrubs comprise less than 40 percent crown cover and are less than 5 feet tall (USFS 1985). This stand type typically occurs when a natural or anthropogenic disturbance such as a wildfire, wind, or timber harvest results in the removal or death of the majority of large trees, or when brushfields are cleared for planting. These habitats may be devoid of vegetation, or covered by herbaceous grasses and forbs. Tree regeneration in grass-forb stands is typically less than 5 feet tall and 40 percent crown cover.

Grass-forb stands within the project site are primarily located in recently clearcut harvest areas. Vegetation in these areas is minimal and consists predominantly of weedy herbaceous species, including bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and dandelion (*Taraxacum officinale*). Coarse woody material (CWM), occasional slash piles, and large areas of bare ground are common in these areas.

33758687_88.cdr



Brushfield/Shrub
Conifer Forest
Conifer-Hardwood
Grass-Forb
Riparian-Deciduous
650' Turbine Corridor
Access Roads
Substation
Site Boundary

Aerial Photo: Bergman Photographic, Portland, OR 2008

Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-1

Habitat Types, 2003 Survey

URS

Whistling Ridge Energy Project
Skamania County, Washington

Brushfield/Shrub Stand. Brushfields are defined as the shrub-dominated habitats (USFS 1985). These habitats typically develop following clearcut harvest, or natural disturbance that may result in removal of vegetation.

The majority of brushfields are young plantations that have been planted with Douglas-fir. The plantations typically have not reached the closed-canopy stage. Vegetation consists of remnant forest understory species, such as vine maple (*Acer circinatum*), Sitka alder, beaked hazelnut (*Corylus cornuta* var. *californica*), serviceberry (*Amelanchier alnifolia*), oceanspray (*Holodiscus discolor*), bracken fern (*Pteridium aquilinum*), sword fern (*Polystichum munitum*), and early successional species such as Himalayan blackberry (*Rubus armeniacus*), fireweed (*Epilobium angustifolium*), common yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritacea*), and grasses. Large amounts of bare soil, slash and other logging debris are common.

Vegetation control has occurred in some areas as part of existing forest management practices. Control methods include herbicide application and/or mechanical control. Areas where vegetation management has occurred are visually and functionally different from areas where control has not been implemented. In areas where vegetation control has not occurred, dense vine maple thickets with occasional alder or Douglas-fir frequently occur. Patches of alder saplings, salmonberry (*Rubus spectabilis*), vine maple, red elderberry (*Sambucus racemosa*), oceanspray, lupine (*Lupinus* spp.), Oregon oxalis (*Oxalis oregana*), and grass also may be present in these areas. Small diameter CWM is common.

Conifer-Hardwood Forest. Conifer-hardwood forests within the project site are predominantly characterized by the presence of bigleaf maple and Douglas-fir, with some red alder. The forest stand condition is characterized as a multi-layer, closed sapling-pole forest (USFS 1985). Canopy height ranges from 40 to 60 feet, and canopy closure is between 60 and 80 percent. The majority of canopy cover results from the presence of Douglas-fir (~70 percent). The shrub layer is characterized by vine maple, salmonberry, thimbleberry (*Rubus parviflorus*), red elderberry, beaked hazelnut, and Pacific dogwood. Density of the shrub layer is variable. The herbaceous layer is characterized by sword fern, trailing blackberry (*Rubus ursinus*), oxalis, grasses, and moss. CWM is generally low to moderate. Deciduous snags are more common than conifer snags; however, short well-decayed conifer snags may be present.

Conifer Forest. Coniferous forests located within the project site are dominated by grand fir and Douglas-fir. Forest stand condition is primarily closed sapling-pole-sawtimber and large sawtimber. The diameter at breast height (dbh) of pole-size conifers measures 8–12 inches. The dbh of sawtimber measures 12 to 23 inches. Closed sapling-pole-sawtimber stands are characterized by closed canopy, relative short live crowns, and exclusion of shrub species and many forb species. CWM in these stands is typically low, consisting mainly of remnants from historic forests. Snags are rare; however, small diameter snags become more common in the pole and sawtimber stages, as smaller individuals are out-competed.

Large sawtimber is considered to be at least 21 inches in dbh. Large sawtimber stands are characterized by within-stand differentiation of canopy species, the emergence of dominant trees,

and a more diverse and multilayer understory composed of shrubs and forbs. Snags and CWM are generally rare; however, this may vary depending on past harvest practices, stand management, and actual stand age.

The majority of coniferous forests within the project site is managed for commercial timber production, and is replanted following harvest. Commercial timber lands are widespread throughout the vicinity of the project site.

Riparian Deciduous Forest. Riparian deciduous forests may develop in near-stream areas as a result of natural or anthropogenic disturbance. Riparian deciduous forest habitats are present within the project site in an area known as "Cedar Swamp". Historically this area was dominated by large, old-growth western redcedar (*Thuja plicata*); however, these trees have since been harvested. Cedar Swamp is now dominated by willow (*Salix sp.*) and cottonwood (*Populus balsamifera*), with scattered occurrences of young western redcedar.

The vegetation communities described above are common throughout the Southern Washington Cascades Province. In the proposed project site, these communities are primarily maintained through forest management. Because the project is located within private commercial timber lands, existing forest management practices are expected to continue for the foreseeable future. The total acreage of each habitat type was calculated during the 2003 surveys; however, because of active forest rotation schedules, some of these areas have been harvested. Aerials photos from ~~2008~~ 2009 were used to update the habitat maps from 2003 with recent timber harvests. The updated acreages of each habitat type can be found in Table 3.4-1 and are shown on Figure 3.4-2.

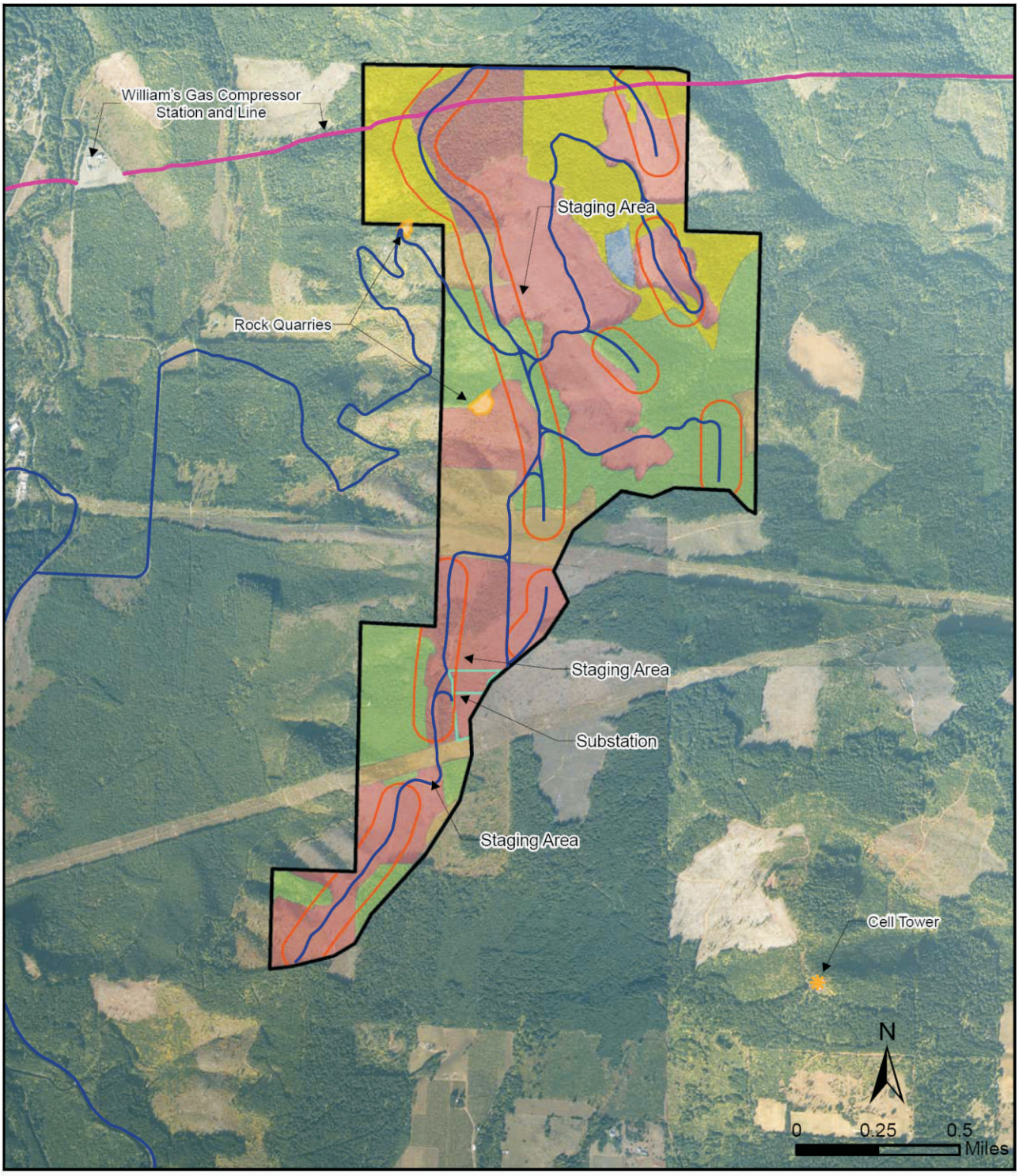
Table 3.4-1
Habitat Types within the Project Site

Habitat Type	Area (acres)
Grass-Forb Stand	~~414~~522
Brushfield/Shrub Stand	103
Conifer-Hardwood Forest	~~346~~310
Conifer Forest	~~281~~209
Riparian Deciduous Forest	8
Total	1,152

Rare Plant Species and Vegetation Communities

Several sources were used to identify special-status plants that have been documented or have the potential to occur within the vicinity of the proposed project, including:

33758687_89.cdr



Brushfield/Shrub
Conifer Forest
Conifer-Hardwood
Grass-Forb
Riparian-Deciduous
650' Turbine Corridor
Access Roads
Substation
Site Boundary

Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-2

Habitat Types, 2009 Aerial

URS

Whistling Ridge Energy Project
Skamania County, Washington

- Federal-listed or proposed as a rare, threatened, or endangered species in Skamania County (USFWS 2009)

- A WNHP record search of known rare plant locations in the vicinity of the project site (WNHP 2003a)

- *Rare Plant List for Skamania County* (WNHP 2003b)

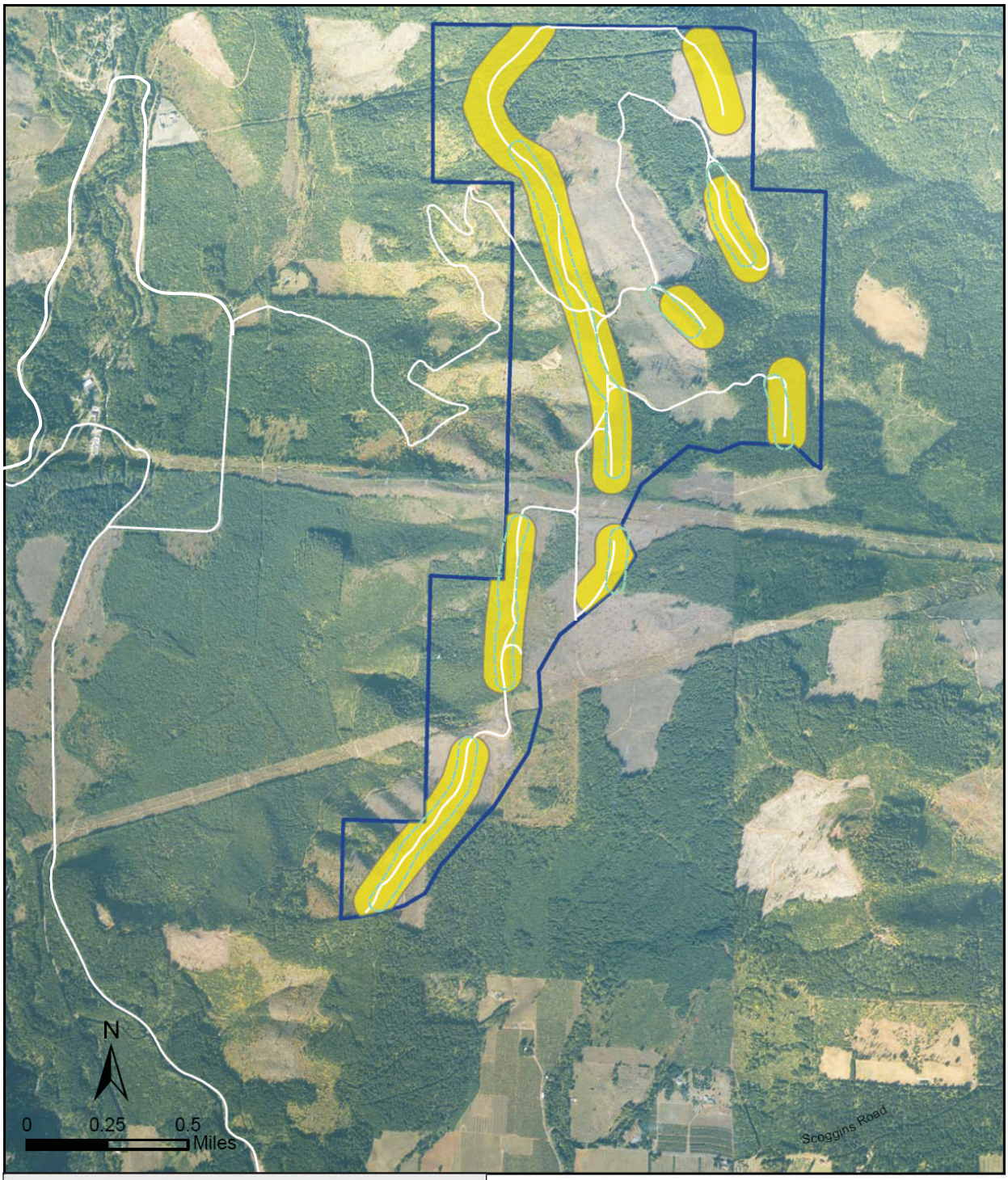
These data indicated that no federal-listed plant species are known to occur in the vicinity of the project site. However, four rare plants occur within two miles of the project site, including branching montia (*Montia diffusa*), Suksdorf's desert parsley (*Lomatium suksdorfii*), Siskiyou false hellebore (*Veratrum insolitum*), and golden chinquapin (*Chrysolepis chrysophylla*). Two additional rare plant species are reported as historically occurring in the vicinity of the project site, including bolandra (*Bolandra oregana*) and white-top aster (*Aster curtus*). Three occurrences of the Oregon white oak/Idaho fescue (*Quercus garryana/Festuca idahoensis*) vegetation community, a Known High-Quality or Rare Plant Community and Wetland Ecosystem of Washington, are documented within two miles of the project site (WNHP 2003a). These are located along the Columbia and White Salmon Rivers. No additional rare plants sites have been recorded in the vicinity of the project site since the rare plant surveys were conducted in 2003 (WNHP 2009).

Surveys were conducted in May and June 2003, and followed methods described in the Bureau of Land Management (BLM) Survey Protocols for Survey and Manage Strategy 2 Vascular Plants (Whiteaker et al. 1998). Survey dates were selected to encompass all or a portion of the blooming times of all rare plants potentially occurring in the project site. All surveys were completed by CH2M HILL. Surveys were conducted within a 300-foot corridor centered on proposed turbine strings and associated access roads, and a 100-foot corridor centered on existing roadways that were identified as needing improvement. Rare plant surveys also were conducted in proposed locations for the Operations and Maintenance facility, substation, and staging areas. No rare plant or habitat surveys were conducted on County roads used to access the site or along the underground cable routes. However, much of this area has been harvested recently and does not contain rare plant habitat.

No rare plant species or plant communities were detected on the project site. A detailed account of survey methods and results can be found in the Rare Plant Survey Report (Appendix B-2). A list of plant species observed during vegetation surveys also can be found in Appendix B-2.

Because turbines have been added and removed from the initial alignment, field surveys conducted ~~to date~~prior to the March 2009 Application submittal (Figure 3.4-3) may not cover 100% of the proposed wind farm. Additional surveys ~~are planned for~~were conducted in May and July 2009 to supplement the previous studies and ~~would~~ included County roads and underground cable routes where potential rare plant habitat could exist.

33758687_90.cdr



Aerial Photo: Bergman Photographic, Portland, OR 2008

Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-3

Rare Plant Surveys (2003 - 2006)

URS

Whistling Ridge Energy Project
Skamania County, Washington

Noxious Weeds

The project site contains several noxious weed species, which are nonnative, invasive plants. The weed species observed during field visits to date are listed in Table 3.4-2.

Table 3.4-2
Noxious Weed Observations

Scientific Name	Common Name	Status
Centaurea diffusa	Diffuse knapweed	Class B
Cirsium arvense	Canada thistle	Class C
Cirsium vulgare	Bull thistle	Class C
Cytisus scoparius	Scot's broom	Class B
Daucus carota	Queen Anne's lace	Class B
Hypericum perforatum	Common St. John's-wort	Class C
Linaria dalmatica	Dalmatian toadflax	Class B

The Washington Noxious Weed Control Board identifies lists of noxious weed species that require control, eradication, or monitoring. Class A noxious weeds are nonnative species with a limited distribution within a state and require eradication to reduce the potential of becoming more widespread.

Class B noxious weeds are regionally abundant, but may have limited distribution in some counties. In Washington, in regions where a Class B noxious weed is unrecorded or of limited distribution, prevention of seed production is required. In these areas the weed is a "Class B designate." However, in regions where a Class B species is already abundant or widespread, control is a local option. In these areas the weed is a "Class B non-designate."

Class C noxious weeds are already widely established, but placement on the state list allows counties to enforce local control if desired.

Improved Roadways outside the Site Boundary

Access to the proposed project site <u>from SR 14</u> would ~~require traversing lands located within the Columbia River Gorge National Scenic Area.~~<u>be via Cook-Underwood Road to Willard Road, and then via a new direct connection to West Pit Road, an existing private logging road.</u> Approximately ~~2.1~~2.5 roadway miles in this area would require ~~minor~~ improvements as a result of the proposed project. ~~This improved~~<u>West Pit</u> ~~road~~ <u>Road</u> is owned and operated by S.D.S Co., LLC~~, and would be used to connect existing County roads within the Scenic Area to project roads owned by S.D.S Co., LLC on the project site~~. ~~In addition, four existing roadway intersections in the Scenic Area would require slight modification to accommodate transportation~~

~~of the large turbine segments (Figure 4.3-2). These intersections have not been surveyed for habitat or rare plants.~~ Surveys ~~are planned for spring~~for habitat and rare plants were conducted in May and July 2009 and none were found.

3.4.1.2 Impacts

Whistling Ridge Energy Project Site

Habitat Types

Construction and operation of the Whistling Ridge Energy Project would require the removal of vegetation in some areas to accommodate roadway construction and improvement, turbine siting, staging, and construction. Each turbine footings and foundations would measure approximately 3,100 square feet. Vegetation surrounding each turbine would be managed according to the following specifications:

- A circular area extending 50 feet from each turbine would be harvested and graveled
- From 50 feet to 150 feet from the base of the turbines, tree heights would be limited to 15 feet above the elevation of the base of the turbine
- From 150 feet to 500 feet from the base of the turbines, tree height would be restricted to 50 feet above the turbine base within an area formed by a 90 degree arc centered on the ordinary downwind direction

The A and F turbine strings and parts of the B and C turbine strings would be accessed by existing roads. Modifications to these roads are anticipated in order to support the long and heavy loads required for delivery of the wind turbine systems. An estimated 5.1 miles of roads within the project site would require improvements as a result of the proposed project. The majority of new roads would be constructed to access parts of the B and C turbine strings, and all of the D and E turbine strings. Access to these turbines would require 2.4 miles of new roadway. All roads used to access turbines would be maintained throughout the life of the project.

All vegetation clearing would be completed using crawler tractors, rubber-tired skidders, mobile feller-bunchers, or cable yarding equipment. This equipment is typically used in timber harvest, and is currently used to harvest other mature stands located on S.D.S. Co., LLC property. Logs would be transported by truck to SDS Lumber Company facilities in Bingen, Washington. Except for maintained and permanently cleared areas, cleared areas would be replanted with trees within one year following completion of construction (typically the following spring). Areas where trees are permanently removed would be replanted with appropriate native grasses and low-growing shrubs. Because it is being implemented for the purpose of the project, cleared areas would be considered “forest conversion” under the Washington Forest Practices Act. However, cleared areas would still be reforested in accordance with typical commercial forestry management practices when feasible.

Permanent and temporary impacts to habitat types within the project site can be found in Tables 3.4-3 and 3.4-4.

Table 3.4-3
Temporary Impacts from Project Elements to Habitat Types (acres)

Habitat Type	Turbine Corridor[a]	Road Corridor[b]	Transmission Line Corridor[c]	Total
Grass-Forb Stand	19.44	5.19	1.39	26.02
Brushfield/Shrub Stand	2.97	1.27	1.26	5.50
Conifer-Hardwood Forest	14.87	1.62	2.22	18.71
Conifer Forest	9.52	2.43	0.05	12.00
Riparian Deciduous Forest	0	0	0	0

a. Total temporary impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line connecting each turbine string.
b. The temporary impact area of proposed roadway modifications ~~development~~ within the ~~region~~ project site area encompassed by a 100-foot corridor along all roads ~~in the project starting at the intersection of the site boundary and the Scenic Area~~. Does not include overlap of transmission corridor or turbine corridor.
c. The temporary impact area of proposed development within the area encompassed by a 100-foot corridor along all project transmission lines. Does not include overlap of road corridor or turbine corridor.

Table 3.4-4
Permanent Impacts from Project Elements to Habitat Types (acres)

Habitat Type	Turbine Corridor[a]	Road Corridor[b]	Transmission Line Corridor[c]	Total
Grass-Forb Stand	11.89	4.81	0.43	17.13
Brushfield/Shrub Stand	1.49	1.33	1.36	4.18
Conifer-Hardwood Forest	9.85	1.22	2.34	13.41
Conifer Forest	5.61	2.84	0	8.45
Riparian Deciduous Forest	0	0	0	0

a. Total permanent impact area of proposed development within the 650-foot corridor measured on either side of an imaginary line connecting each turbine string.
b. The permanent impact area of proposed ~~development~~ roadway modifications within the ~~region~~ project site area encompassed by a 100-foot corridor along all roads ~~in the project starting at the intersection of the site boundary and the Scenic Area~~. Does not include overlap of transmission corridor or turbine corridor. Also excludes existing roadway.
c. The permanent impact area of proposed development within the area encompassed by a 100-foot corridor along all project transmission lines. Does not include overlap of road corridor or turbine corridor.

Rare Plant Species and Vegetation Communities

Because no rare plants were identified in the portion of project site surveyed to date, no project-related impacts are anticipated to any federal- or Washington State-listed plant species during construction or operation of the proposed project. Impacts to habitats are expected to vary depending on the location and quality of habitat. Mature forests within the project site would be harvested to accommodate the facility. However, timber harvest in these areas would occur in the absence of the proposed project based on existing harvest rotation schedules.

Noxious Weeds

While no Class A weeds have been observed in the project area, several Class B and C weeds are present. Constructing the project can foster the spread of noxious weeds throughout the project area. New roads are a pathway for weeds to invade. Many weeds are adapted to disturbed conditions and can establish immediately after construction. Increased traffic also can lead to the spread of weeds. Noxious weeds can threaten the general ecological health and diversity of native ecosystems. Noxious weed infestations are the second leading cause of wildlife habitat degradation. Noxious weeds would be managed within the project site. By implementing BMPs, weeds are not anticipated to spread further as a result of the development of the wind energy facility.

Improved Roadways outside the Site Boundary

A total of ~~2.1~~2.5 roadway miles located outside the proposed project site would require upgrades as a result of the proposed project. ~~These roads~~West Pit Road traverses forests of varying stand age. ~~Half~~ Much of the ~~upgraded~~ roads ~~are~~ is adjacent to areas characterized by ~~recent~~ clearcut harvest. Road improvements are expected to have negligible impact on habitat and vegetation. ~~Preliminary assumptions of the degree of anticipated impact will be verified during 2009 field surveys.~~

~~In addition, four existing roadway intersections in the Columbia River Gorge National Scenic Area would require slight modification to accommodate transportation of the large turbine segments. These intersections have not been surveyed for habitat or rare plants. However, the impact areas for most of these modifications would be immediately adjacent to the road in previously disturbed areas and do not appear to contain natural habitat conditions. Preliminary assumptions of the degree of anticipated impact would be verified during 2009 field surveys.~~

3.4.1.3 Mitigation Measures

Mitigation for potential impacts resulting from the proposed project includes the following:

- The applicant has commissioned extensive studies by qualified biologists of rare plants and habitats at the project site to avoid impacts to sensitive populations. The results and recommendations of these studies have been incorporated into the proposed design, construction, and operation of the project. In the event that the final project layout includes areas that contain suitable habitat for rare plants which have not previously been surveyed, an additional rare plant survey would be conducted at the appropriate time of year.

- The turbine strings have avoided sensitive riparian areas.

- Locating wind turbines in an actively-managed commercial forest avoids impacts to higher quality habitats.

- To the extent possible, new road construction and associated habitat impacts have been minimized by improving and using existing roads instead of constructing new roads.

- Use of certified "weed free" straw bales during construction to avoid introduction of noxious weeds

- All temporarily disturbed areas would be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to avoid the establishment and spread of noxious weed species.

- Implementation of a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species.

3.4.2 FISH

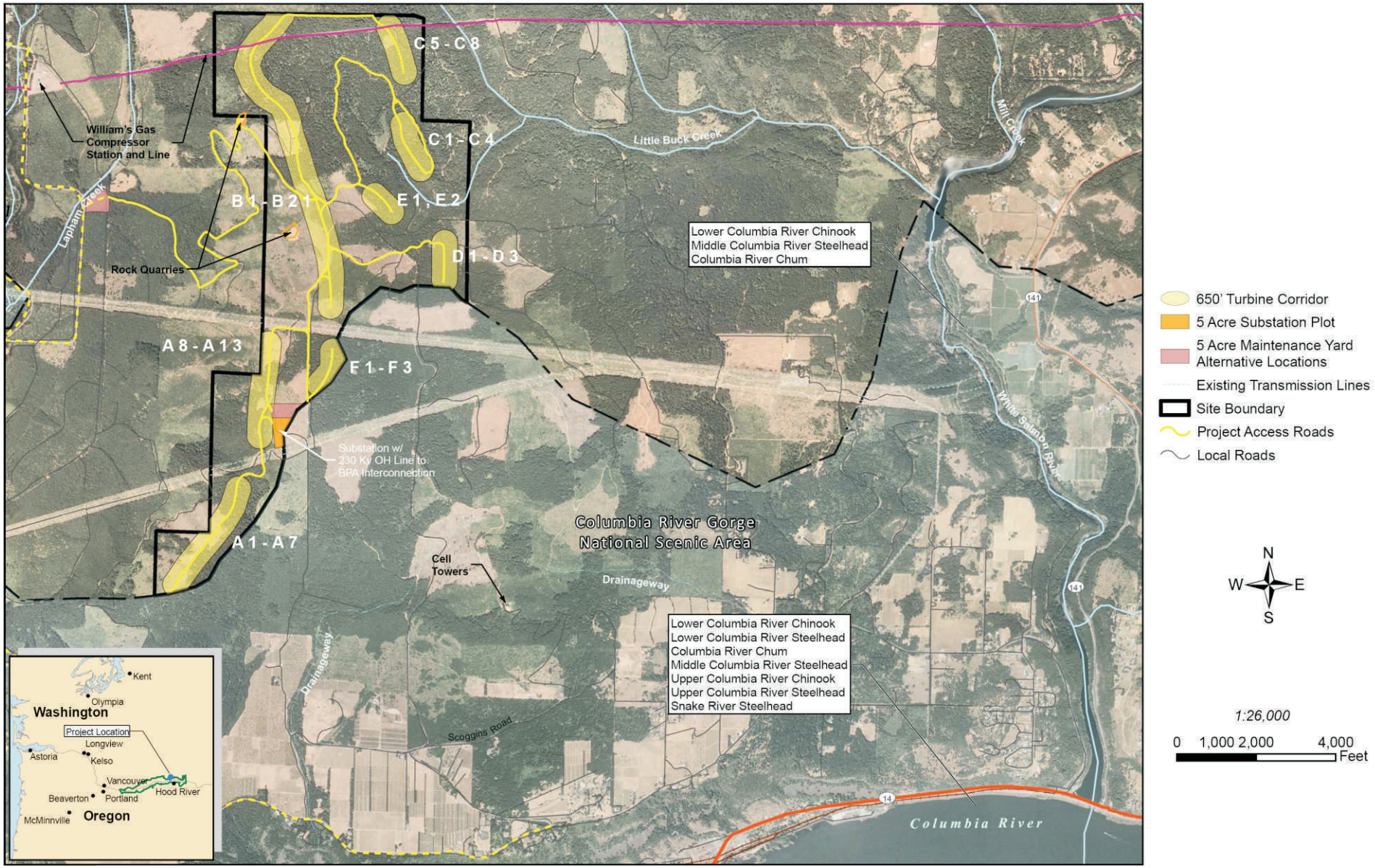
3.4.2.1 Existing Conditions

Lands surrounding the Whistling Ridge Energy Project are generally mountainous with steep-sided narrow drainages. Elevations of the turbine positions range from approximately 2,100 feet to 2,300 feet above msl. The Columbia River flows south of the site and receives runoff via the White Salmon drainage area from the east portion of the site and via the Little White Salmon River from the west portion of the site.

The Whistling Ridge Energy Project is sited on lands characterized by shallow slopes, located between Underwood Mountain and the White Salmon River, approximately three miles from the Columbia River. The proposed layout is situated on a ridge above the Little White Salmon River drainage; however, project elements such as roadway, turbine strings, and facilities do not cross tributaries to this system. The ridgeline is oriented in a north-south direction. A tributary to Little Buck Creek is located in the northeast portion of the project site, and drains into the White Salmon River (Figure 3.4-4). Little Buck Creek is not crossed by any project elements. No perennial streams are located in or adjacent to the Whistling Ridge Energy Project footprint.

~~Road CG2930 crosses one unnamed, intermittent creek that drains to the south. This road would require small radius improvements to support loads required for construction of the project.~~West Pit Road crosses one unnamed drainage in the Lapham Creek watershed. This stream had observed flow through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert. There is no surface water connection to Lapham Creek and fish are not present in this stream.

Although no special status fish species are present in Little Buck Creek, this creek does drain into Northwestern Lake, which in turn drains into the White Salmon River. The White Salmon River contains evolutionarily significant units and designated critical habitat for three species listed as threatened under the ESA: (1) Lower Columbia River Chinook, (2) Middle Columbia River Steelhead, and (3) Columbia River Chum (Figure 3.4-4).



Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-4

Location of Designated Critical Fish Habitat

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.4.2.2 Impacts

Due to the location of water bodies on the project site, no impacts to aquatic species, their habitat, or designated critical habitat are expected as a result of construction and operation of the proposed facility. Water quality would be maintained during construction and operation of the project by incorporating BMPs.

3.4.2.3 Mitigation Measures

Section 3.3, Water, lists the project BMPs that would be incorporated to protect water quality and quantity. Pursuant to an erosion control plan for the project and an NPDES permit, drainage improvements would be made as needed. All temporarily disturbed areas would be regraded and reseeded with an appropriate mix of native plant species to restore vegetation after the construction phase is completed.

3.4.3 WILDLIFE

3.4.3.1 Existing Conditions

Whistling Ridge Energy Project Site

This section summarizes baseline wildlife surveys conducted at the Whistling Ridge Energy Project site discusses potential impacts that may result from the proposed actions, and lists potential mitigation for these impacts.

While the information provided in this section reflects survey efforts comparable to other wind energy facilities permitted in the Northwest, evaluation of wildlife resources within the project site is ongoing. Data presented in this Application were collected during preliminary wildlife and avian surveys. In order to provide the best information available to the decision-making process, the applicant believes that additional data is warranted. Final impact assessments would be conducted during the SEPA process.

The applicant contracted Turnstone Environmental Consultants (TECI), and Western Ecosystems Technology (WEST) to conduct wildlife investigations on the project site. Wildlife surveys were conducted between 2004 and 2008, and included:

- Surveys for northern spotted owl, western gray squirrel, and northern goshawk (TECI)
- Fall avian migration and summer avian breeding/nesting surveys (WEST)
- Bat acoustic surveys (WEST)

In addition, WEST performed avian surveys as part of an analysis of potential avian/wind plant interactions in Klickitat County contained in the Klickitat County Energy Overlay Draft EIS (Kennedy Jenks 2003) and Final EIS (Anchor Environmental 2004). The surveys included two

observation points in Skamania County, in the vicinity of the project site, shown on Figure 1, Avian Survey Points and Geographic Regions Used for Data Analysis, in the Draft EIS.

Current habitat conditions are described in Section 3.4.1 Habitat and Vegetation, and are not repeated below. For complete reports on surveys discussed below, see Appendices B-1 and B-2.

Special Status Species

Three special-status wildlife species are documented present within the vicinity of the proposed project: northern spotted owl (*Strix occidentalis caurina*), western gray squirrel (*Sciurus griseus)*, and northern goshawk (*Accipiter gentilis*) (Table 3.4-5).

Table 3.4-5
Federal and State Status of Special Status Species
with the Potential to Occur at the Whistling Ridge Energy Project Site

Common Name	Scientific Name	Washington State Status	Federal Status
northern spotted owl	*Strix occidentalis caurina*	Endangered	Threatened
western gray squirrel	*Sciurus griseus*	Threatened	Species of Concern
northern goshawk	*Accipiter gentilis*	Candidate	Species of Concern

Northern Spotted Owl. The northern spotted owl is listed threatened under the ESA. This species also is included as a state-listed threatened species in State of Washington. In Washington State, northern spotted owls inhabit the Eastern and Western Cascades, Western Lowlands and Olympic Peninsula Provinces. Within these regions, the northern spotted owl is associated with a variety of areas containing suitable habitat for nesting, roosting, foraging and dispersal. The species prefers forest habitats characterized by multi-layered canopy, and a high incidence of large trees that provide suitable structure for nesting and roosting. Northern spotted owls have large home ranges and use large tracts of land containing late successional forests. Fragmented forest habitats may be used for dispersal and foraging. Spotted owls will nest in stick nests of northern goshawks, on clumps of mistletoe, in large tree cavities, on broken tops of large trees, or on large branches or cavities in banks and rock faces.

Two historical northern spotted owl activity centers, Mill Creek (MSNO# 0991) and Moss Creek (MSNO#1003), are located north of the project site. The nest cores of both activity centers are located on public lands managed by the WDNR and the US Forest Service (USFS). The Mill creek activity center is composed of contiguous yet scattered northern spotted owl habitat located on private and public (WDNR) lands. This site was designated in 1992, and was last known to have spotted owls present in 2000. Surveys performed since 2000 have not resulted in any spotted owl sightings. The Moss Creek activity center is comprised of patchily distributed northern spotted owl habitat and a mix of rural residential lands, industrial timberland, and lands administered by WDNR and USFS. This activity center was established in 1994 and was last considered to have spotted owls present in 2002. Typically spotted owl activity centers will have their status changed to "historic" after three consecutive years with no documented spotted owl observations. ~~However, the state of Washington currently has a moratorium on changing the status of a known spotted owl activity center.~~ Northern spotted owl critical habitat is designated on lands located to the west/ northwest of the project site, and is almost entirely within the Gifford Pinchot National Forest Boundary. No spotted owl critical habitat is present on the project site.

Spotted owl surveys followed the 1992 Revised Version of "Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls" (USFWS 1992). Surveys were conducted in suitable habitat located in and adjacent to the proposed project site, and included Mill Creek and Moss Creek spotted owl activity centers (Figure 3.4-5).

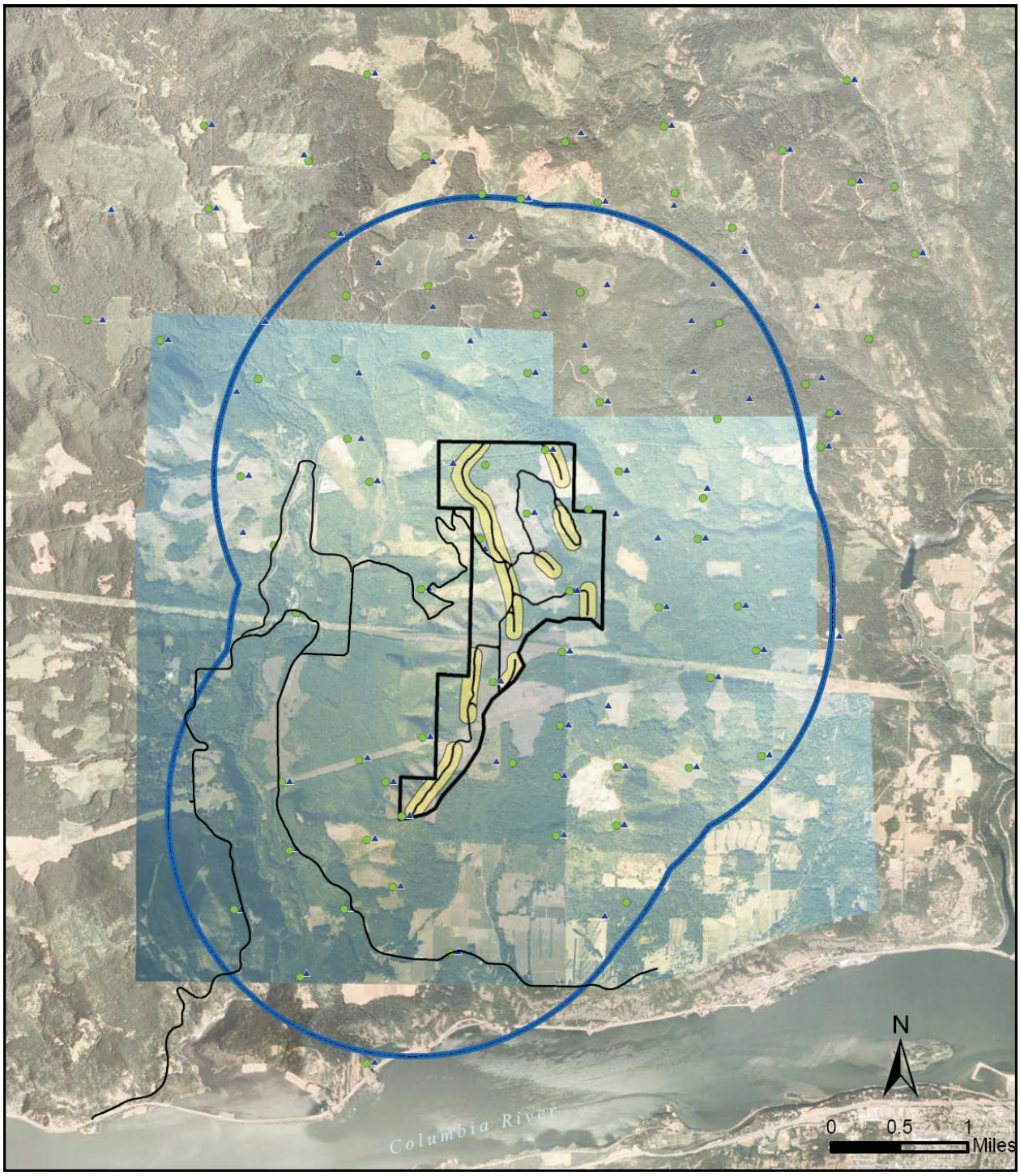
Suitable habitat was identified using topographic maps, aerial photography, and stand classification data from S.D.S Co., LLC.

During the 2003–2004 survey periods, the project site was surveyed between March 24, 2003 and July 23, 2003 using the one-year survey methodology, and between March 31, 2004 and August 18, 2004 using the two-year survey methodology. An additional survey was completed by TECI in 2004 in order to lengthen the time period in which management activities could occur before surveys would again be required. No spotted owls were detected during the 2003–2004 surveys.

Detailed methodology and results for the 2003 and 2004 northern spotted owl surveys can be found in Appendix B-3.

More recent spotted owl surveys were conducted in May 2008 and spring - summer of 2009. Surveys were conducted using the two-year survey methodology, which requires a minimum of three visits for two consecutive years in order to determine presence/absence of the spotted owl. During the three 2008 surveys, only barred owls were detected. USFWS is developing a new survey protocol addressing interactions between barred owls and spotted owls. The protocol is not due to be available until 2010, however Turnstone was able to obtain suggestions on new survey techniques to be used. One of those suggestions was to visit core areas in the day time looking for spotted owls that may not respond in the presence of barred owls. Turnstone has taken these suggestions and used them in the field, conducting four day site visits up and above the current protocol parameters. Turnstone has completed all required night visits and performed the last day visit on August 10th, all in the core areas where spotted owls were found historically. There have been no visuals or responses to date. Surveys were implemented in all potentially suitable habitat located within a 1.8 mile radius of the corridor (Figure 3.4-5). This area totaled 14,901 acres. The survey area also included the Moss Creek and Mill Creek activity centers, which expanded the survey area by 7,222 acres. No spotted owls were detected in either the survey area or historic activity centers. Detailed methodology and results for the 2008 northern spotted owl surveys can be found in Appendix B-4. The 2009 survey data will be included as part of the EIS.

33758687_92.cdr



2003/2004 Calling Stations
2008 Calling Stations
Potential Habitat Area
Site Boundary
Access Roads
650' Turbine Corridor

Aerial Photo: Bergman Photographic, Portland, OR 2008
2006 USDA NAIP Imagery

Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-5

Potential Spotted Owl Habitat Area

URS

Whistling Ridge Energy Project
Skamania County, Washington

Western Gray Squirrel. The western gray squirrel is listed as a "threatened" species by the WDFW. In Washington, western gray squirrel distribution has been reduced to three geographically isolated populations: the "Puget Trough" population, centered in Thurston and Pierce counties, the "South Cascades" population, located in eastern Skamania County and Klickitat and Yakima Counties, and the "North Cascades" population, located in Chelan and Okanogan Counties. Western gray squirrels are arboreal species. Although they forage on the ground, this species rarely strays far from trees. They use tree canopies for cover and nesting. Western gray squirrels prefer areas where contiguous tree canopy allows arboreal travel in a minimum of a 198 feet (60 meters) radius around the nest (Ryan and Carey 1995). Western gray squirrels are diurnal species, with most activity occurring during morning hours. This species is most active during August and September, when this species is collecting and storing food for winter (Ryan and Carey 1995). The principal food source for the gray squirrel is acorns; however, conifer seeds are also eaten (Dalquest 1948). While pine nuts and acorns are considered essential foods for accumulating body fat in preparation for winter, green vegetation, seeds, nuts, fleshy fruits, and mushrooms also are consumed (WDW 1993, Carraway and Verts 1994, Ryan and Carey 1995).

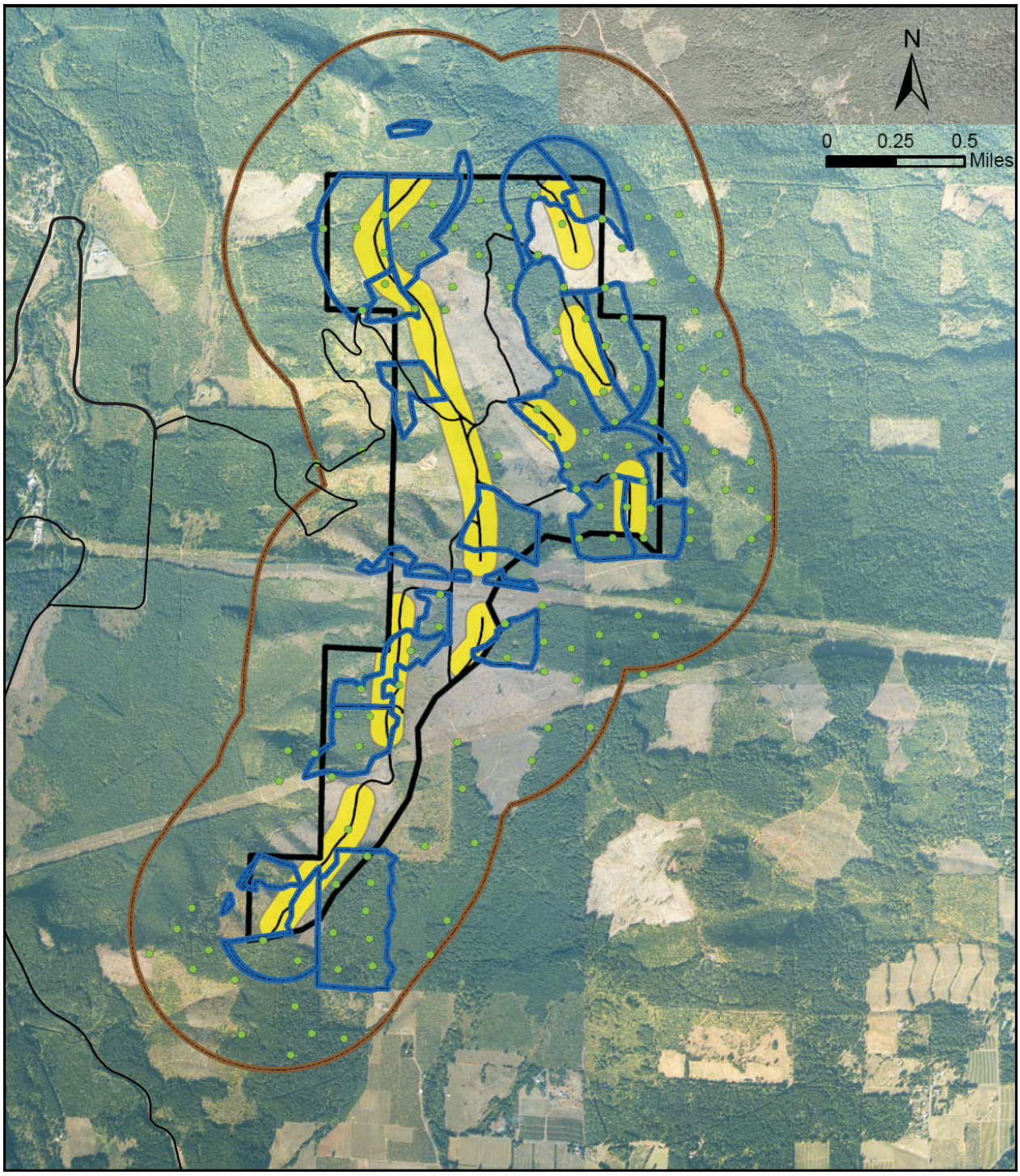
Western gray squirrel surveys were implemented by TECI on lands located in and adjacent to the project site in 2004 and 2008 (Figure 3.4-6). Surveys conducted in 2004 included a general search for western gray squirrels and nests while conducting northern goshawk station placement and surveys. Two adult western gray squirrels were identified through that effort.

An additional protocol survey was completed following methods described in "Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance" (Van der Haegen, Van Leuven, and Anderson 2004). No western gray squirrels were detected during protocol surveys. Detailed methodology and results for western gray squirrel surveys can be found in Appendix B-3.

Additional western gray squirrel surveys were completed by TECI in 2008. Prior to implementing field surveys, TECI consulted with a WDFW biologist to identify survey criteria and methodology. It was determined that gray squirrels surveys should be performed in areas where project activities would result in the removal of potential western gray squirrel habitat or structural modification (i.e., stand thinning), and these surveys should include unaltered habitat within 400 feet of potential disturbance.

An area consisting of a 1,050-foot buffer around the proposed turbine layout to account for lands that may be impacted by the project, and also the 400-foot buffer of undisturbed lands, was identified for potential survey. This area included 1,420 acres; however, only 738 acres was identified as potentially suitable to support western gray squirrel (Figure 3.4-6). Surveys were conducted following methods described by Van der Haegen, Van Leuven, and Anderson (2004). Surveyors searched for individuals and nests, focusing mainly on gray squirrels, but also noting other species. When possible, historical use by western gray squirrels was determined. No gray squirrels or nests were detected during these surveys. Detailed methodology and results can be found in Appendix B-4.

33758687_93.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-6

Northern Goshawk and Western Gray Squirrel Surveys

URS

Whistling Ridge Energy Project
Skamania County, Washington

Northern Goshawk. The northern goshawk is categorized as a "species of concern" by the U.S. FWS, and as a "listing candidate" for sensitive, threatened or endangered species by the State of Washington. Goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest and Douglas fir. They are occasionally found nesting in coast redwood and mixed hardwood forest. Goshawk nest sites tend to be associated with patches of relatively large, dense forest; however, home ranges often consist of a wide range of forest age classes and conditions. Nest sites tend to be positively correlated with proximity to water or meadow habitat, forest openings, level terrain or "benches," northerly aspects and patches of larger, denser trees, although variation in habitat associations does occur (USFWS 2002).

Northern goshawk surveys were conducted by TECI biologists in 2003 and 2008 on properties managed by S.D.S. Co., LLC and adjacent private land. In 2003, surveys were conducted in suitable habitat located in four core project sections, including the provincial home range radius of 0.5 mile around the core area (Figure 3.4-6). Suitable habitat was identified using topographic maps and aerial photography. Survey stations were establish at 0.2-mile intervals on roads and trails located in suitable habitat within 0.5 mile of a proposed wind turbine location. Potential goshawk habitat was surveyed in accordance with "Survey Methodology for Northern Goshawks in the Pacific Southwest Region" (Woodbridge and Hargis 2006). All raptor species responses detected during surveys also were recorded.

TECI completed two protocol surveys during the 2004 northern goshawk survey season. One hundred eighty five calling stations were surveyed each time. No northern goshawk responses were recorded during any of the two site visits. Detailed methodology and results for northern goshawk surveys can be found in Appendix B-3.

In 2008, the potential survey area for the northern goshawk was determined by protocol parameters outlined in the Northern Goshawk Inventory and Monitoring Technical Guide (USFS 2006), consultation with biologists from the WDFW and GIS analysis. The survey area was established by placing a 150-foot buffer around the turbine string layout, and then adding an additional 2,624 foot buffer per protocol. Forest stands with greatest potential to contain suitable habitat structure and composition to support northern goshawk were identified using GIS data and aerial photographs. Criteria for selecting stands included stand age greater than 25 years, and an average tree dbh of at least 12 inches. Based on these criteria, 1,093 acres was identified for surveys (Figure 3.4-6).

It was determined that the "Broadcast Acoustical Survey" methodology would be used for a two-year survey effort. TECI biologists completed two protocol surveys at 136 calling stations during the 2008 goshawk survey season. The first survey was conducted during the nesting period, and the second during the fledgling period. No northern goshawk responses were documented during either of the two site visits. Detailed methodology and results can be found in Appendix B-4.

Summary of Survey History. The project layout was finalized in October 2008, and included additions to proposed turbine strings, removal of previously proposed turbines, and identification

of areas requiring improved roadways. Changes to the project layout resulted in lands added to the project area that, in some cases, were not included in wildlife surveys conducted prior to October 2008. The effect of these changes regarding special status species are:

- For northern spotted owls, the final turbine alignment did expand the area requiring owl surveys; however, because the survey area had included spotted owl activity centers located at the northern reach of the project site, the area was accounted for in the May 2008 surveys.

- For western gray squirrels, the final turbine alignment did expand the area requiring western gray squirrel surveys. These areas were identified after surveys were completed; however, the survey window was still open and an additional field survey was implemented in added areas.

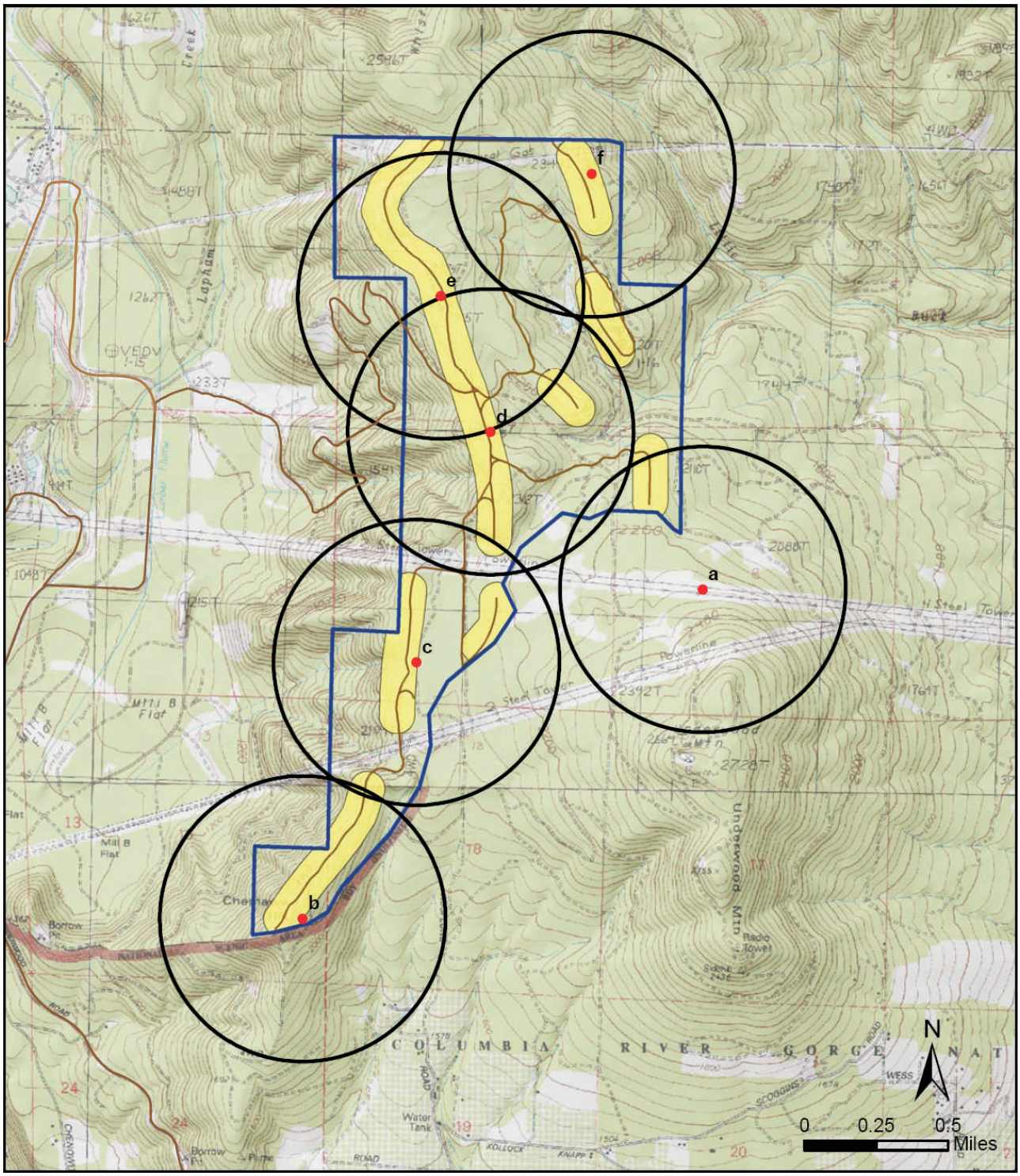
- The applicant completed northern goshawk surveys in accordance with protocols accepted and recommended by WDFW. The surveys were conducted during the relevant seasons in 2004, 2005, 2008 and again in ~~2008~~2009. No goshawks were found on the project site, nor were any observed on any surrounding properties. ~~It is highly unlikely that goshawks will be found on the project site or in areas to the north, owned and managed by WDNR.~~ The applicant ~~would~~ conducted an additional survey on the project site in spring 2009 ~~to~~ and confirmed these findings, in accordance with agreed protocols. The WDNR property near the project site has similar habitat characteristics to the project site, and was recently logged. ~~While no goshawks are expected on the area to the north, due to the proximity of turbines to the WDNR property to the north, the Applicant would conduct an intensive survey effort on approximately 360 acres to the north of the project site to confirm that the project does not present any significant impact to this species.~~

- Anabat detection surveys proposed for 2009 ~~would be~~have been started ~~implemented~~ for the~~during the~~ months of July through October, and ~~would~~ will augment our understanding of bat activity within the vicinity of the proposed micrositing corridors. Anabat detectors have also ~~would be~~been elevated to gain a better understanding of bat activity at rotor swept height.

Avian Migration and Breeding/Nesting Surveys

Avian surveys were conducted during the fall migration period (September 11 to November 4, 2004) and the breeding/nesting season (May 15 to July 14, 2006) by WEST biologists. Study protocol followed methods described by Reynolds et al. (1980). An 800-meter circular plot was centered on each observation point (Figures 3.4-7 and 3.4-8). All observations, behavior, and flight patterns of birds in and near plots were recorded. Flight patterns, such as direction of travel and flight altitude also were recorded. Observations of birds beyond the 800-meter radius were recorded; however, these data were analyzed separately from data collected from survey plots. The location of raptors, other large birds, or species of concern observed during counts was recorded on field map.

33758687_94.cdr



Source: GeoDataScape.

Job No. 33758687

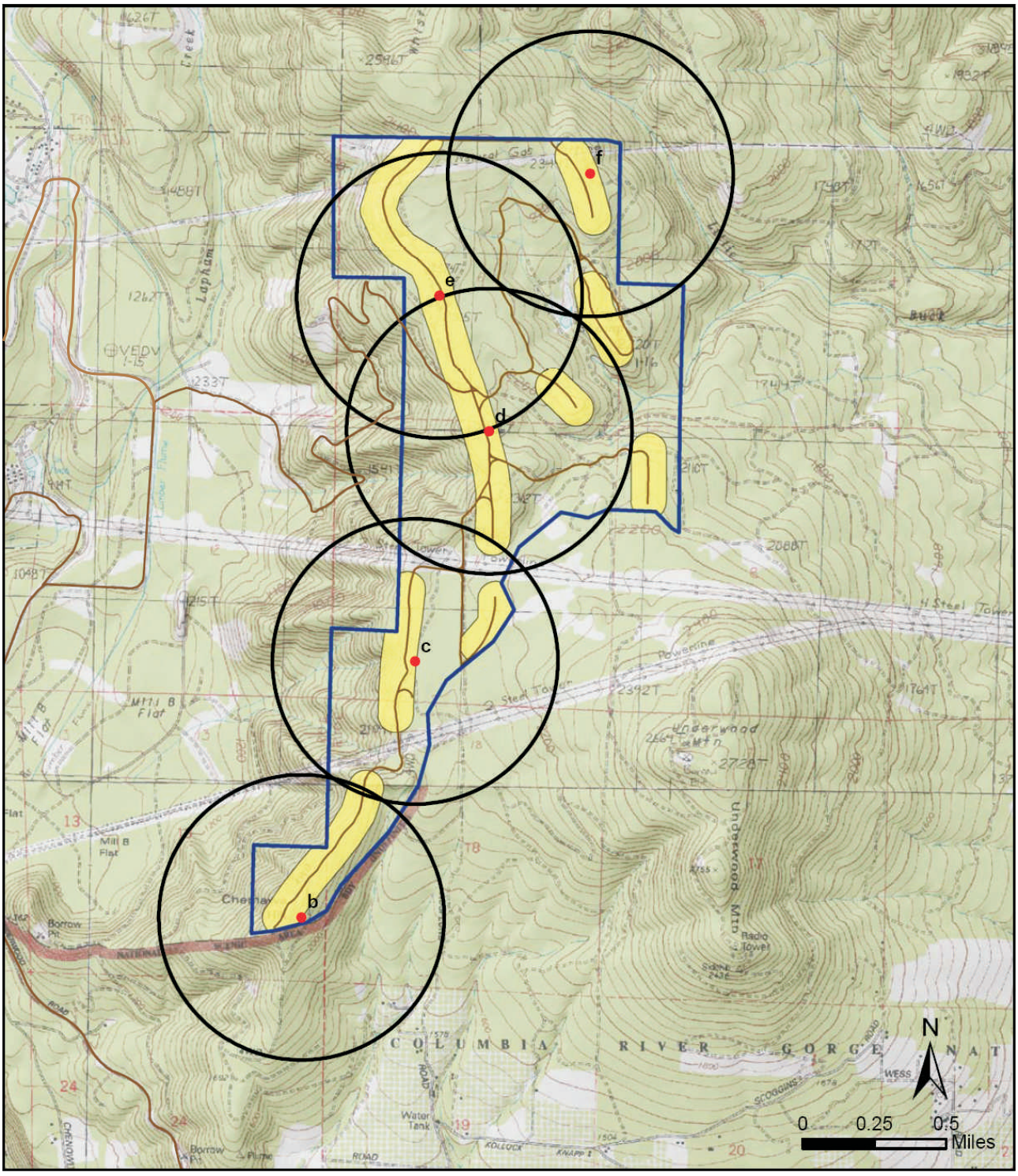
Revised Figure 3.4-7

Location of Avian Surveys (Fall 2004)

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_95.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-8

Location of Avian Surveys (Spring 2006)

URS

Whistling Ridge Energy Project
Skamania County, Washington

A relative index to collision risk (R) was calculated for bird species observed in the survey area using the following formula:

$$R = A*P_f*P_t$$

Where A = mean use for species i averaged across all surveys, P_f = proportion of all observations of species i where activity was recorded as flying (an index to the approximate percentage of time species i spends flying during the daylight period), and P_t = proportion of all flight height observations of species i within the rotor-swept height.

This index does not account for differences in behavior other than flight characteristics (i.e., flight height and proportion of time spent flying). Point count data were used to establish diurnal indices of avian use, and how these indices compare to other wind resource areas in the United States.

Fall Migration Surveys (2004). General avian surveys identified thirty-nine 39 species of bird in the survey area (Figure 3.4-8). Passerines (songbirds) were the most abundant avian group, constituting 87.4% of observations. This group was also observed with the greatest frequency (94.4% of surveys). Raptors were the second most abundant group observed; however, this group represented only 4.9% of observations. Raptors were observed during 38.5% of the surveys, followed by woodpeckers (22.6% of surveys) and doves/pigeons (9.3% of surveys).

The most common species at the project site included dark-eyed junco, American goldfinch, Steller's jay, common raven, and white-crowned sparrow. The species of birds most frequently observed during fall surveys were common raven, Steller's jay, dark-eyed junco, red-breasted nuthatch, and golden-crowned kinglet. Eight species of raptor were observed during the survey. Those with the highest use of the site were sharp-shinned hawk, Cooper's hawk, and red-tailed hawk. The highest raptor use observed at the site during 2004 surveys occurred between September 11 and October 12, 2004. These data do not indicate that any areas within the proposed site have substantially higher raptor use than others.

No federal or state listed endangered or threatened avian species were observed during the survey period. Four state candidate species were observed: golden eagle, northern goshawk, pileated woodpecker, and Vaux's swift. Two State Monitor species were also observed, including four single turkey vultures and four groups totaling 27 western bluebirds. Detailed results and summary tables can be found in Appendix B-5.

Summer Breeding Nesting Surveys (2006). Fifty-five species of birds were observed during summer breeding and nesting surveys in 2006. Passerines were the most abundant group (88.5%), followed by raptors and woodpeckers (3.3% each), and doves/pigeons (3.2%). The most frequently observed groups were passerines (100% of surveys), woodpeckers (35.6% of surveys), and raptors (31.1% of surveys). Species with the highest use of the project site included white-crowned sparrow, red crossbill, western tanager, spotted towhee, and MacGillivray's warbler. The most frequently observed species included white-crowned sparrow (77.8% of the surveys), western tanager (75.6% of surveys), spotted towhee (64.4% of surveys), MacGillivray's warbler (48.9%), and dark-eyed junco (48.9%). Three species of raptors were

observed, including red-tailed hawk, northern goshawk, and sharp-shinned hawk. Raptor use in the fall was only slightly higher than during the summer breeding season. The data do not indicate that any portions of the project site have substantially higher raptor use than other areas. For all bird species combined, use of the project site by avian species was slightly higher during the summer breeding season than during the fall migration period.

Detailed results and summary tables can be found in Appendix B-6.

Bats

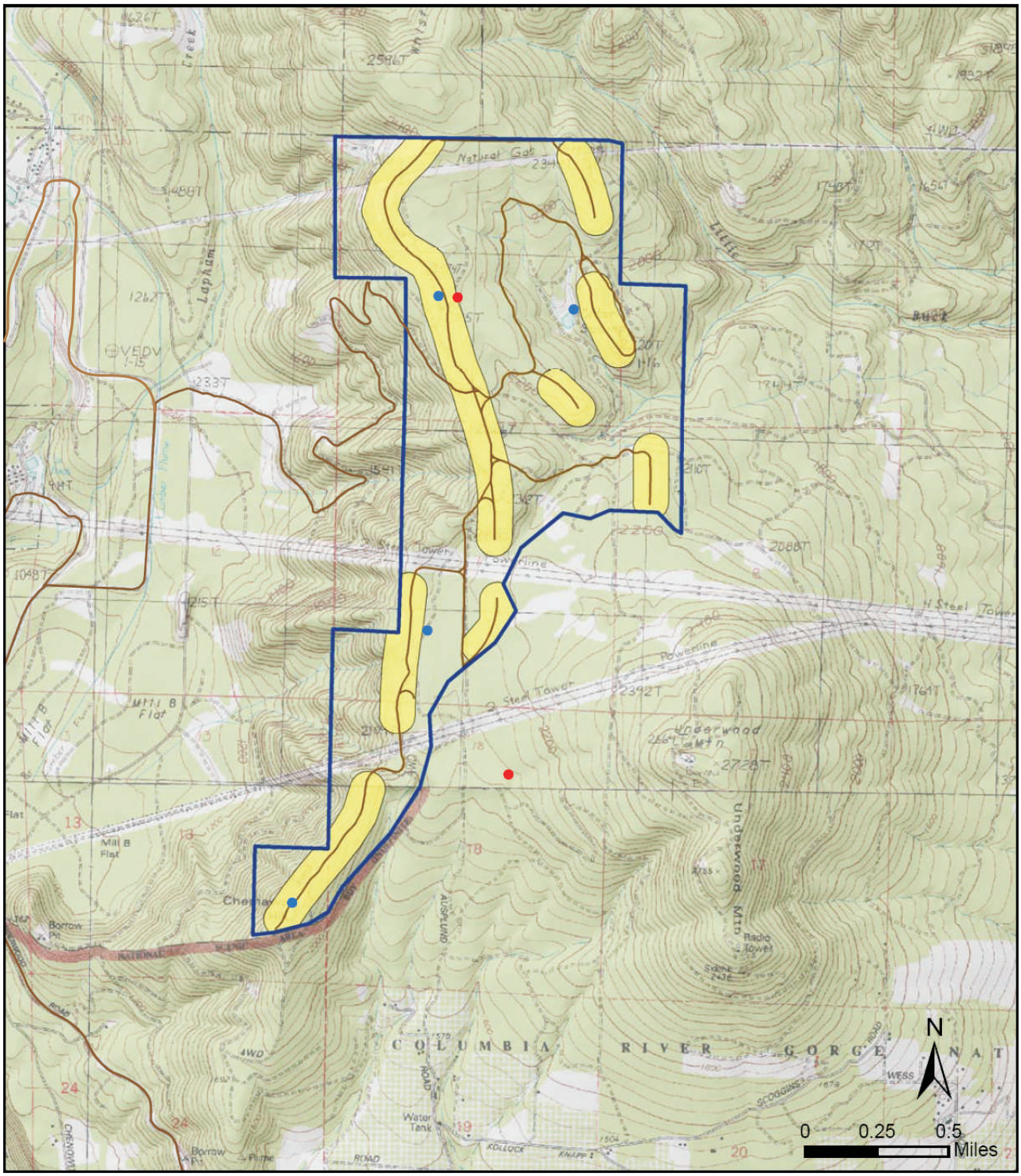
This section describes the results of bat acoustic studies conducted for the Whistling Ridge Energy Project in 2007 and 2008. Detailed information on these investigations can be found in Appendices B-7 and B-8.

Bat acoustic studies conducted in 2007 and 2008 were implemented at various locations on the project site. The purpose of these surveys was to quantify bat use of this area, and use these data to estimate the seasonal and spatial use of the project site. Passive Anabat® II echolocation detectors coupled with Zero Crossing Analysis Interface Modules (ZCAIM; Titly Electronics Pty Ltd., NSW, Australia) were used in both survey years. Anabat detectors record bat echolocation calls using a broadband microphone. Bat species are generally grouped into those that emit low frequency (<35 kHz) or high frequency (≥ 35 kHz) calls. The units of activity equaled the number of bat passes, and were used to calculate the number of bat passes per detector night (Hayes 1997). The data thus indicate the level of bat activity rather than absolute abundance.

In 2007, detectors were placed at two locations from August 20 through October 21 (Figure 3.4-9). The northernmost detector was located just outside the proposed corridor. This detector was initially placed at ground level; however, it was raised to a height of 130 feet (40 meters) on September 7. The southernmost detector was located outside the project site (i.e., outside of the Township, Range, and Section described above); however, it was placed in habitat believed to be representative of that found on the project site. The southernmost detector was placed at ground level, and remained at that location for the duration of the study.

Due to equipment failures, both Anabat detectors were only operable for 24% of the sampling period, amounting to 45 detector-nights. During this survey period, 348 bat passes were recorded. Bat activity was similar between north and south ground level Anabat units (mean = 11.67 ± 2.0 and 9.6 ± 4.1, respectively). At both ground-level locations, the number of high-frequency bat passes per detector night was approximately one and a half times greater than the number of low-frequency passes. High frequency calls are associated with species such as western red bat and mouse-eared bats (*Myotis* spp). Bat activity recorded after the northern Anabat detector was elevated was much lower (mean = 2.47 ± 1.1) than that recorded at ground level, and passes of low-frequency bats greatly outnumbered high-frequency bat passes. Low-frequency calls are associated with big brown bat, silver-haired bat, and hoary bat. Conclusive species identification was only possible for hoary bat, which accounted for approximately 5% of all species.

33758687_96.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.4-9

Location of Bat Acoustic Studies

URS

Whistling Ridge Energy Project
Skamania County, Washington

Patterns of nightly activity were similar among detector locations; however, definitive comparisons cannot be made because the timing of when the north detector was placed at ground-level did not coincide with when data was collected from the southern ground-level detector.

The bat acoustic survey effort was greater during the 2008 survey period. Four Anabat detectors were placed in the project vicinity from July 3 to October 7, 2008 (Figure 3.4-9). This period corresponded with summer breeding and fall bat migration. One detector was placed at a wetland located to the west of turbines C1–C4. Data collected at this site are use to assess activity levels of local breeding bats that may be using the wetland, but was not used to evaluate risk of bats to collision mortality. The remaining three detectors were placed in upland habitats that more closely resembled habitat where turbines may be placed (one in a linear road corridor that passed through forested habitat, and two others in clearcuts).

For the three upland survey locations, bat activity was monitored for a total of 97 nights. Anabat detectors were operational for 95.5% of the sampling period. A total of 39,326 bat passes were recorded during 278 detector-nights. Average bat passes per detector night at the upland locations equaled 138.44. A total of 80.7% of all bat passes was recorded from the detector located in the road corridor. Bat passes recorded in clearcut habitats accounted for only 19.1% of all bat passes.

Bat activity at the wetland location was monitored for a total of 97 nights, and was operational 100% of the time. A total of 17,269 bat passes were recorded during 97 detector-nights. The average number of bat passes per detector night at this location equaled 178.03.

Temporal activity patterns were similar among the upland survey locations, with the highest bat activity occurring during the months of July and August. Peak activity across all upland sites occurred between July 10 and July 16. Bat activity in the wetland area was highest during the month of July, with peak activity occurring on July 5. Bat activity in this area between July 3 through mid-August was over four times higher than activity from mid-August through October 7 (mean = 218.6/detector night and 52.3/detector night, respectively).

At the upland sites, low-frequency bats accounted for 67% of all bat passes. The opposite was true for the wetland site, where high-frequency bats accounted for 69.7% of all bat passes. As in 2007, species identification was only possible for the hoary bat. Hoary bats comprised 6.0% of passes recorded at upland locations, and use was similar across the three sites. This species comprised 2.0% of total bat passes recorded at the wetland location. Activity was relatively high at the wetland and road corridor stations, and accounted for the majority of the calls recorded. Increased activity near the wetland is likely due to bats drinking and foraging in this area. Increased activity along the linear road clearing is likely due to its use as a travel corridor by local bats.

The 2008 acoustic surveys resulted in a vastly higher detection rate than that observed during 2007 surveys. Several factors contributed to the high level of detected bat activity during the 2008 surveys, including increased number of survey sites and the fact that all detectors were placed at ground level where heightened foraging activity occurs. However, the primary reason

for the greater number of detections recorded during 2008 surveys were due to timing and locations of the equpiment. In 2008, four times the number of bats was recorded from July 3 to mid-August, as mid-August through October; the peak activity period recorded in 2008 was thus missed during 2007 surveys as detectors were not installed until late August.

The temporal variation in activity levels is indicative of the importance of conducting detection surveys during this period. Anabat detection surveys proposed for 2009 ~~would be~~has been implemented ~~during~~ for the months of July through October, and ~~would~~ will augment our understanding of bat activity within the vicinity of the proposed corridor. Anabat detectors have also ~~would be~~been elevated to gain a better understanding of bat activity at rotor swept height.

Priority Wildlife Habitats

Priority wildlife habitats, including mule deer and black-tailed deer winter range, are present to the east of Underwood Mountain, extending to lands located to the north/northeast. Winter range for Columbia black-tailed deer is present in lands located west of Underwood Mountain, and extends north and south from the project site. Elk winter range is present throughout the project site.

Improved Roadways outside the Site Boundary

Access to the Whistling Ridge Energy Project would ~~require traversing lands located within the Columbia River Gorge National Scenic Area~~be using Cook-Underwood Road to Willard Road, and then via a new connection to West Pit Road to the project site boundary. West Pit Road is an existing private logging road. Approximately ~~2.1~~2.5 roadway miles in this area would require improvement as a result of the proposed project. This section would be used to connect existing County roads ~~within the Scenic Area~~ to other existing roads owned by S.D.S. Co., LLC.

3.4.3.2 Impacts

Whistling Ridge Energy Project Site

Construction and operation of the Whistling Ridge Energy Project is expected to have limited impacts on wildlife resources. Project actions would include the construction of permanent roadways, improvement (i.e. widening and resurfacing) of existing roadway, and the installation and operation of wind turbines. Impacts to wildlife habitat may result from vegetation removal in forested areas where the proposed roadway and turbine alignment is planned. Vegetation management in areas surrounding each turbine would range from complete removal of vegetation to limitations on tree height.

Wildlife and avian investigations conducted to date quantify the use of habitats located within the project site. Surveys for federally listed and candidate species, avian migration and breeding, and bat acoustic studies are ongoing, and include northern goshawk and bat surveys planned for 2009. The analysis presented below establishes an analytical framework and data for evaluation of the Application.

Special Status Species

Three federally listed or candidate species have the potential to occur within the project site, including northern spotted owl, western gray squirrel, and northern goshawk.

Northern Spotted Owl. The spotted owl prefers forest habitats characterized by multi-layered canopy, and a high incidence of large trees that provide suitable structure for nesting and roosting. No late seral forests are present within the project site. It is assumed that active timber harvest that has occurred in this area has altered the landscape such that limited suitable habitat exists. Further, no spotted owls have been detected in the proposed project site or spotted owl activity centers located in proximity to the proposed project. No impacts to northern spotted owls are expected.

Western Gray Squirrel. The gray squirrel prefers habitat where contiguous tree canopy allows arboreal travel in a minimum of a 198-foot (60-meter) radius around the nest (Ryan and Carey 1995). Ongoing forest management on lands located within the proposed project site has reduced suitable habitat for this species through fragmentation of mature forest stands. Contiguous forest habitat located on the project site would not persist indefinitely in the absence of the proposed project. The project site also contains very few oak trees, and those that were observed were of small stature (less than 20 feet tall), stunted, and growing in openings on exposed rocky slopes in shallow soils. Acorn crops from oak trees are an important food source for western gray squirrels, and the lack of this primary food source may deter use of the project site by gray squirrels. Because habitat for this species is considered rare or of moderate/poor quality on the project site, impacts to western gray squirrel are expected to be negligible.

Northern Goshawk. Goshawks inhabit a wide variety of forest habitats, including true fir, mixed conifer, montane riparian deciduous forest and Douglas fir forests. Goshawk nest sites tend to be associated with patches of relatively large, dense forest located in proximity to water; however, home ranges often consist of a wide range of forest age classes and conditions. Although no goshawks were detected during protocol surveys, individuals were spotted during general avian migration and breeding surveys. Potential impacts to this species may include turbine collision-related mortality or displacement; however, the risk for this species is considered low.

Avian Species (General)

Construction Impacts. Impacts to avian species are not anticipated during construction of the proposed project. Certain species may be temporarily displaced due to construction related noise and increased traffic volume; however, permanent impacts to these species are not expected.

Operational Impacts. Potential operation-related impacts to avian species include turbine collision and displacement. Based on the exposure index derived from abundance and flight behavior, the species most likely to collide with wind turbines located at the project are red crossbills (R = 0.77), Steller's Jay (R = 0.37), common raven (R = 0.33), American Goldfinch (R = 0.29), and western bluebird (R = 0.22). The highest index for any raptor was 0.08 for red-tailed hawk, indicating a risk approximately 10 times lower than for the red crossbill. A regression analysis using data collected during avian surveys estimated a raptor/vulture fatality

rate of 0.049/MW/year, or 4–5 raptors per 100 MW per year. This fatality estimate is relatively low compared to many wind projects (Appendix B-6). Further, data collected from the project site indicate that the area is not within a major migratory pathway, at least during fall migration.

Based on the two seasons of surveys, overall use of the project site by golden eagle, northern goshawk, pileated woodpecker, prairie falcon, and willow flycatcher was very low. Adverse impacts to these species are not anticipated. Of the species that were commonly observed, turkey vultures have very low susceptibility to turbine collisions (Orloff and Flannery 1992). To date, this species has not been documented as a turbine fatality in the Pacific Northwest. Vaux's swifts, western bluebirds, and olive-sided flycatchers were commonly observed flying at rotor-swept heights, and some turbine-related mortality may occur for these species over the life of the project. These collisions would likely be rare, and it is unlikely that the Whistling Ridge Energy Project would have any negative impacts on population levels on and near the project site. Higher numbers of Vaux's swifts and western bluebirds were recorded during fall migration, whereas olive-sided flycatcher appears to primarily use the project site for breeding.

Waterfowl, waterbirds, and shorebirds were not observed using lands within the project site during this study, and mortality involving this group is expected to be rare. Based on abundance, passerines are expected to make up the largest proportion of fatalities at the Whistling Ridge Energy Project. Post-construction mortality data collected at other windfarms in Washington and Oregon indicate that less correlation between pre-construction surveys and turbine-related mortality is observed in non-raptor species. The lack of correlation may be because most fatalities are among nocturnal migrants that are not accounted for during surveys.

The avian use information for the project site is based on detections of birds seen and/or heard calling. Because songbirds are less vocal during fall, this information may be skewed toward summer use. Similarly, the level of night migration for species associated with the project site is also not known. Risk analyses presented above provide some insight into which species are most vulnerable to turbine collision; however, estimates are based on abundance, proportion of daily activity budget spent flying, and flight height of each species. Observations were made during daylight hours, and do not take into consideration flight behavior or abundance of nocturnal migrants. Further, the analysis also does not account for varying ability among species to detect and avoid turbines, habitat selection, or other factors that may influence exposure to turbine collision. As a result, actual risk may be lower or higher than indicated by these estimates (Orloff and Flannery 1992).

In addition to direct mortality through collisions, the presence of wind turbines may alter the landscape, thereby displacing wildlife away from the project facilities. Habitat for avian species may be lost through vegetation clearing for roadways construction and improvement, and in areas surrounding wind turbines. Several studies have reported on this effect and are summarized in Appendix B-6.

Bats

Construction Impacts. Impacts to bats are not expected during the construction of the proposed project.

Operational Impacts. It is likely that some bat mortality would occur during operation; however, mortality estimates are difficult due to our lack of understanding of why bats collide with wind turbines (Kunz et al. 2007, Baerwald et al. 2008). Several factors may aid in the assessment of potential impacts to bats, including site-specific habitat and topography, species composition, and activity patterns. Investigations of bat use of the project site are ongoing. Ongoing surveys would augment existing data and better define our understanding of spatial and temporal patterns of bat use of the project site. A preliminary assessment of potential impacts to bats that may result from construction or operation of the Whistling Ridge Energy Project is provided below. This assessment was completed by examining site-specific habitat features and bat acoustic data collected to date. Additional insight from investigations conducted at other wind farms is presented where relevant.

Turbine-related mortality to bats on the project site may be lower than expected based on observed bat activity levels. The majority of detected species were high-frequency species, most of which were likely from the genera *Myotis*. This genus has among the lowest recorded mortality rates at wind resource areas throughout the US, comprising only 0–13.5% of the fatalities (Arnett et al. 2008). At existing wind-energy facilities in eastern Oregon and Washington, approximately 96% of all recorded fatalities were low-frequency species. These data indicate that high-frequency species, such as *Myotis* bats, are much less susceptible to turbine collisions than low-frequency species. Ongoing studies would help to better understand whether more susceptible low-frequency species have been underestimated in surveys conducted to date.

The timing of peak bat activity on the proposed project site (July to mid-August) does not coincide with when the highest levels of bat mortality have been documented at other wind farms in the US. Fatality studies have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (Johnson 2005, Arnett et al. 2008). While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007). The highest use of the project site occurred in July and early August, prior to the time that most bat mortality occurs at wind resource areas in the Pacific Northwest as well as throughout the US.

High bat activity in July and early August is likely due to use of the project site by local bats during the reproductive season, when pups are being weaned and foraging rates are high. Activity beyond mid-August likely represents movement of migrating bats through the area. Activity by hoary bats also was substantially higher in July, and dropped off significantly beginning in early August. After August 31, activity for all bats was very low relative to earlier dates, indicating that most bats had left the area for winter hibernacula or warmer climates. These data indicate higher use of the project site by resident populations of bats, rather than by migrants passing through the area. Further, high bat activity levels during the breeding season, as seen on the project site, do not equate to high bat fatality rates. Low mortality has been documented during the breeding season at several wind farms, even when relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003).

Finally, no known large bat colonies are present near the proposed Whistling Ridge Energy Facility. The nearest known hibernaculum is located near the town of Trout Lake, nearly 20 miles north of the proposed project (B. Weiler, personal communication). The project site does not contain topographic features, such as canyons, that may funnel migrating bats toward corridors where turbines would be placed. No turbines would be constructed near wetlands or ponds, and cleared areas surrounding turbine strings would closely mimic clearcuts, where to date, recorded bat activity levels on the project site were the lowest.

Based on data collected to date on species composition, activity patterns and habitat use, significant adverse impacts to bats are not anticipated as a result of the proposed project. Data collected during 2009 surveys would improve our understanding of bat use and activity patterns, and help to refine our assessment of the degree of impacts and potential mitigation measures, if any.

Priority Wildlife Habitats

Construction Impacts. Mule deer, black-tailed deer, and elk may be displaced temporarily from winter range if the timing of construction activities coincides with use of these habitats. Construction-related displacement is expected to be of short duration.

Operational Impacts. Because data on impacts to big game as a result of wind farm operation is limited, it is difficult to predict the impact of the proposed project on wildlife using priority habitats on the proposed project site. Additional coordination with WDFW is ongoing, and would continue to address this resource.

Improved Roadways outside the Site Boundary

A total of ~~2.1~~2.5 roadway miles located outside the proposed project site would require upgrades as a result of the proposed project. ~~These roads~~This road, West Pit Road, would traverse forests of varying stand age. ~~Half~~ Much of ~~upgraded roads~~West Pit Road ~~are~~ is adjacent to areas characterized by recent clearcut harvest. Based on minimal habitat loss as a result of roadway construction and improvement, impacts to wildlife are expected to be minimal.

Temporary impacts to wildlife may occur as a result of construction-related traffic and noise. These impacts would terminate after the project is constructed, and traffic levels similar to that currently observed would resume.

3.4.3.3 Mitigation Measures

The primary mitigation goal for the Whistling Ridge Energy facility is to avoid sensitive wildlife resources when siting turbines and access roads. Because of the relatively small footprint of wind energy facilities and the flexibility of the process, it is likely that avoidance can be achieved. Wind turbines would also be sited in areas already actively managed for timber harvest. New road construction would be minimized by improving and using existing roadways. All temporarily disturbed areas would be regraded and reseeded with an appropriate mix of native plant species to restore vegetation after the construction phase is over.

Mitigation for potential impacts resulting for the proposed project includes the following sequentially-performed actions:

- Rectify the impact by repairing, rehabilitating, or restoring the affected environment in consultation with relevant wildlife agencies.

- Conduct thorough analysis of sensitive natural resources to avoid impacts and increase avoidance during micrositing.

- Implement a two year minimum post-construction mortality study

- The Applicant plans to convene a Technical Advisory Committee to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The Technical Advisory Committee would be composed of representatives from WDFW, USFWS, Skamania County, and the Applicant. The role of the Technical Advisory Committee would be to coordinate appropriate mitigation measures, monitor impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during construction and operation of the project. The post-construction monitoring plan would be developed in coordination with the Technical Advisory Committee .

- Implement project design features that would minimize project impacts, including:

  - Installing tubular steel turbine towers to eliminate perching opportunities provided by lattice towers

  - Burying electrical lines between turbines and from turbine strings to substation

  - Using the minimum amount of turbine lighting required by the FAA

  - Installing newer generation up-wind turbines

SECTION 3.5 WETLANDS AND OTHER JURISDICTIONAL WATERS (WAC 463-60-333)

3.5.1 EXISTING CONDITIONS

A wetland investigation was performed at the project site and along roads proposed to be upgraded for the project on October 26, 2006 and January 9, 2007 (CH2M Hill 2007) (Appendix C). Since the time of those surveys, a new site access route has been identified between SR 14 and the project site to be used for equipment delivery and construction and operation labor. Additional wetland field work ~~will be~~was completed in ~~performed in spring~~July 2009 along the roadways proposed for construction access and~~to~~ confirmed that no additional wetland areas are present that would be affected by construction or operation of the project.

3.5.1.1 Project Site

No wetlands or wetland indicators were identified within the study area (the turbine corridors and originally proposed access roadways). One undelineated wetland is identified to occur outside the study area perimeter west of turbines C1-C4 (Figure 3.5-1, Project Site Wetlands).[1] This wetland is labeled as "Cedar Swamp" on the USGS map and is listed as palustrine unconsolidated bottom, semipermanently flooded, impounded (PUBFh) on the National Wetland Inventory (CH2M Hill 2007). The Cedar Swamp wetland buffer does not extend into the study area.

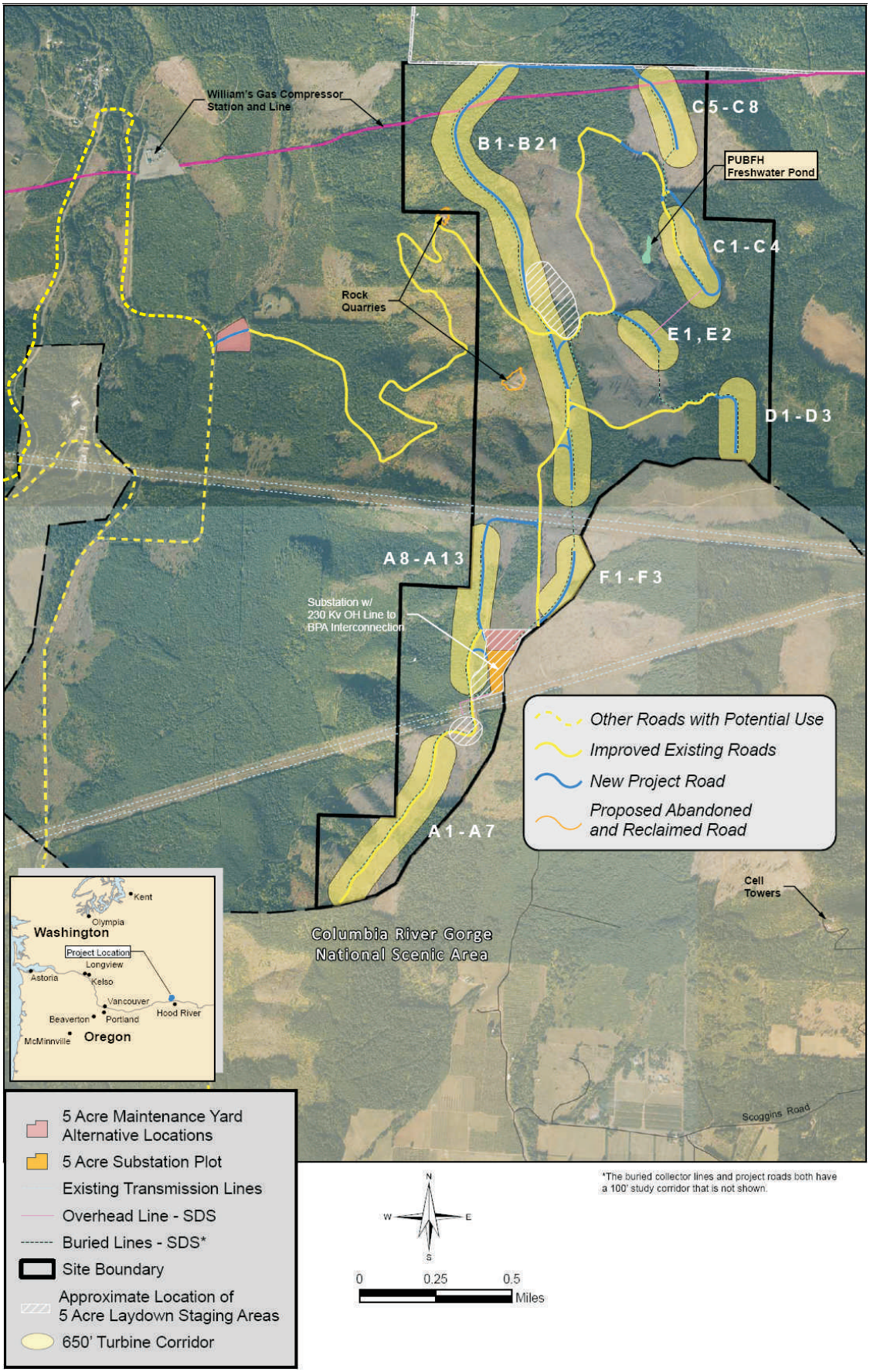
Five intermittent drainage ways that provide short duration runoff during storm events or spring snowmelt meet the Skamania County Critical Areas criteria for Class V Streams (CH2M Hill 2007). The drainage ways do not contain channels, scour marks, or other characteristics that meet the definition of waters of the US or Washington state. The planned improvements to existing roads that would occur inside the Scenic Area would cross one intermittent stream (shown on Figure 3.3-1). See Section 3.3 for a discussion of surface water.

3.5.1.2 Improved Construction Access Roadways

A preliminary review of the National Wetland Inventory indicates wetlands occur along SR 14 near White Salmon, Washington (Figures 3.5-2a and 3.5-2b, Access Route NWI Wetlands). As described in Section 4.3 Transportation, ~~very minor intersection~~no improvements to SR 14 would be required ~~but~~ and no wetland impacts are anticipated to occur. The National Wetland Inventory does not show the presence of wetlands along the local secondary and forest roads proposed to be used by the project. As the National Wetland Inventory is based on historic aerial photography interpretations, a field investigation ~~will occur in spring~~was conducted in July 2009 ~~to~~ confirmed ~~whether or not~~that wetlands ~~and other regulated waters of the US or the State may~~would not be impacted by the project.

[1] The wetland on the project site results from a constructed impoundment according to National Wetland Inventory maps and so is not regulated locally as a critical area according to SCC Title 21A.04.020(A)(1)(b).

33758687_100.cdr



Source: GeoDataScape.

Job No. 33758687

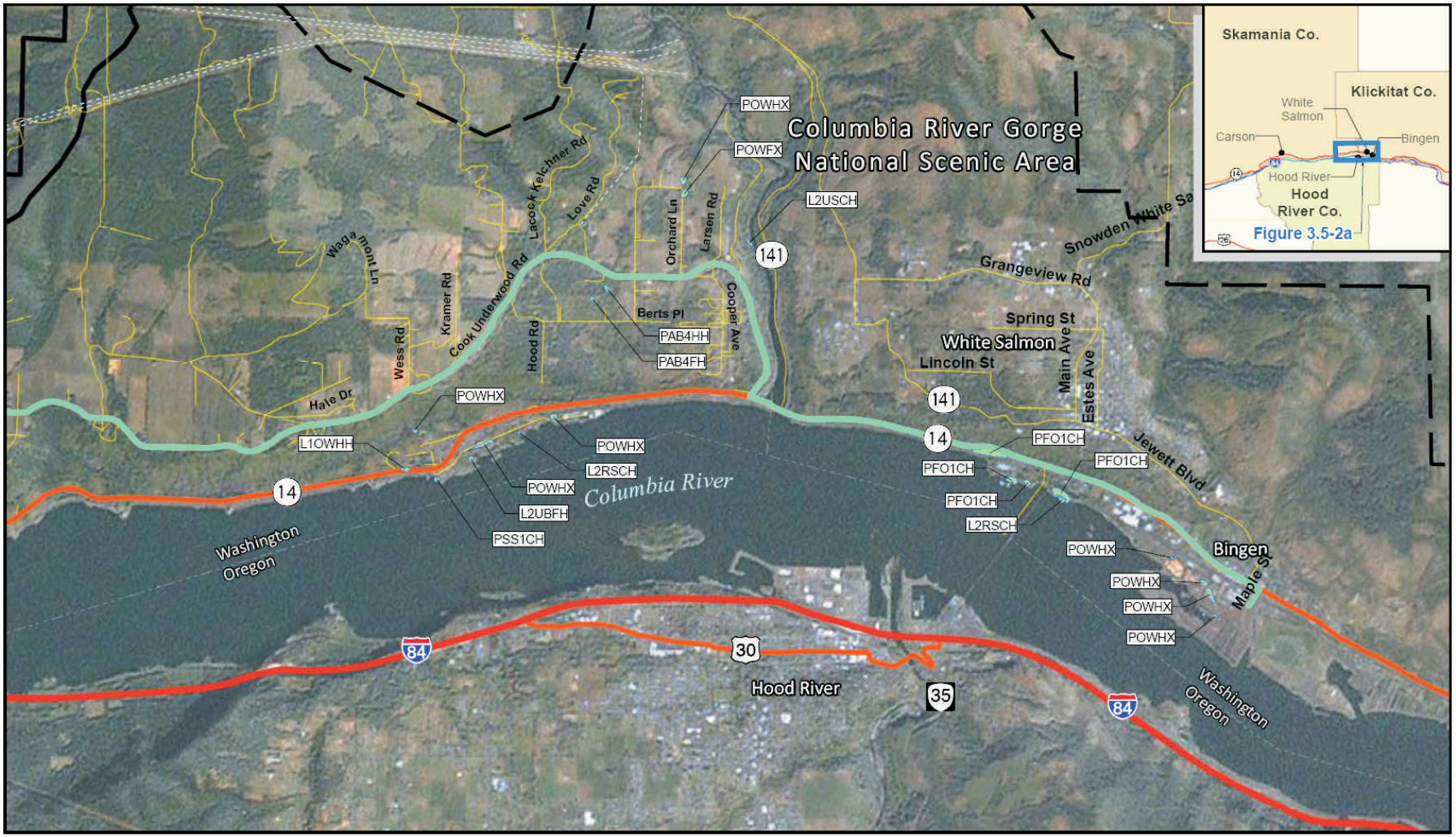
Revised Figure 3.5-1

Project Site Wetlands

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_75.cdr



Site Boundary
Columbia River Gorge National Scenic Area
Other Roads with Potential Project Use
Local Roads
National Wetlands Inventory - Wetland

Source: GeoDataScape.

N
W
E
S

0 0.5 1 Miles

Revised Figure 3.5-2a

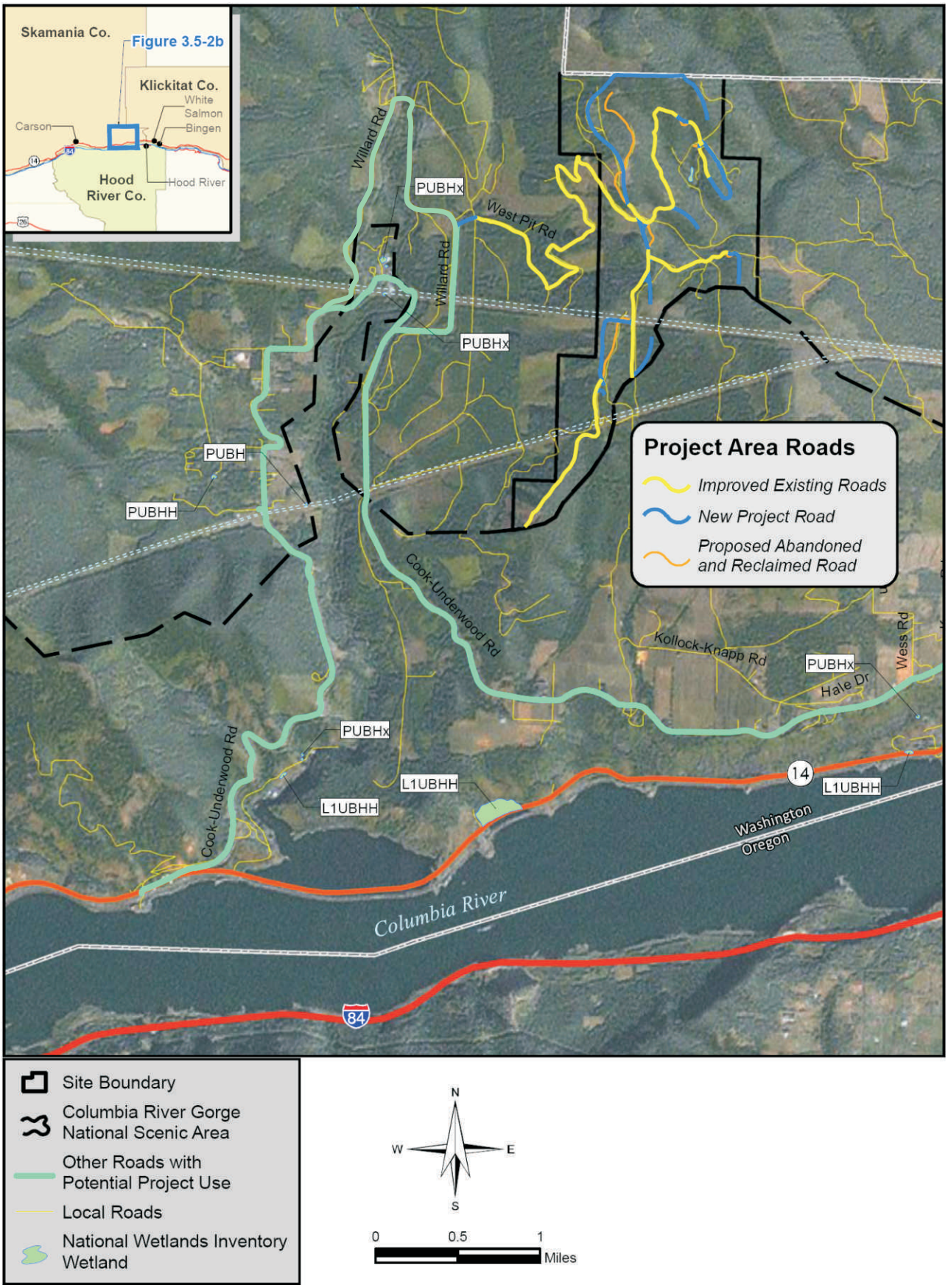
Access Route NWI Wetlands

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_106.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 3.5-2b

Access Route NWI Wetlands

URS

Whistling Ridge Energy Project
Skamania County, Washington

3.5.2 IMPACTS

3.5.2.1 Project Site

No wetlands or wetland buffers are located within the project construction or operation area. Therefore, no wetlands or buffers are expected to be impacted by construction or operation of the project.

3.5.2.2 Improved Construction Access Roadways

A review of the National Wetland Inventory indicates that wetlands may occur along SR 14 but not along County or private roads proposed for the project's construction access and turbine delivery routes. ~~Very minor~~No intersection improvements to SR 14 are anticipated to be required, and ~~with~~ no wetland-related impacts would occur. Roadway improvements to the County or private logging roads are not expected to permanently impact wetlands or waters of the US or State. This information ~~will be~~was confirmed through field investigations ~~planned for spring~~performed in July 2009.

3.5.3 MITIGATION MEASURES

No impacts to wetlands are expected to occur and therefore no mitigation measures would be required.

SECTION 3.6 ENERGY AND NATURAL RESOURCES (WAC 463-60-342)

3.6.1 INTRODUCTION

The Whistling Ridge Energy Project would consume limited amounts of energy and natural resources, primarily during construction. Operation of the project would consume very limited amounts of natural resources, as the wind turbine generators would use wind, an abundant, naturally occurring renewable resource, to generate electricity. By using wind to generate electricity, operation of the project would help reduce overall consumption of non-renewable natural resources.

Wind farms have a very high "energy payback" (ratio of energy produced compared to energy expended in construction and operation), and wind's energy payback time is one of the shortest of any electrical generation technology. It takes approximately three to eight months, depending on the wind speed at the site, for a wind farm to produce the total amount of energy used to construct the equipment and build the project. (AWEA 2008).

3.6.2 ENERGY REQUIRED

3.6.2.1 Construction

Types and quantities of energy and natural resources consumed during construction are as follows:

- 19,250 gallons of fuel (diesel and gasoline) for construction equipment
- 3,700 tons of steel for turbine towers
- 1,000 tons of steel for tower foundation reinforcement
- 100,000 yards of gravel (aggregate) for roads and crane pads
- 10,000 cubic yards of concrete for turbine foundations
- 1.7 million gallons of water for road compaction, dust control, wetting concrete, etc., assuming plain water is used for dust control (this amount could be reduced through the use of lignin or other dust palliative if permitted by EFSEC)

3.6.2.2 Operation of Facility

Operation of the project would consume limited amounts of energy and non-renewable natural resources. During operations, electrical energy would be consumed on a limited basis during times when the wind generated on site is insufficient to power FAA lights and security lights at the Operations and Maintenance and substation facilities. In addition, turbines require electrical energy to run lubrication pumps and cooling systems, electrical monitoring systems, and positioning motors even when wind speeds are below generation levels. Energy would be

generated using wind transformed into electricity by turbine generators. Types and quantities of energy and natural resources consumed during operations are as follows:

- Fuel for Operation and Maintenance vehicles (approximately 8,500 gallons annually)
- Minor quantities of lubricating oils, greases and hydraulic fluids for the wind turbine generators
- Electricity for project operations (less than approximately 600 kilowatt hours per wind turbine generator per month
- Water for use at the Operations and Maintenance facility and periodic maintenance of turbine blades (less than approximately 5,000 gpd)

3.6.3 SOURCE AND AVAILABILITY OF ENERGY AND NATURAL RESOURCES

3.6.3.1 Sources during Construction

The source of fuel for construction equipment and vehicles would be licensed fuel distributors or gas stations, as described in Section 2.9, Spill Prevention. Water for construction would be obtained from a local source, as described in Section 3.3, Water Resources. Concrete would be purchased from existing suppliers located near the project site. Electricity for construction equipment would be provided from portable generators.

3.6.3.2 Sources during Operation

Fuel used for Operation and Maintenance vehicles would be purchased from local gas stations. Lubricating oils and hydraulic fluids used for wind turbine generator maintenance would be purchased from distributors. Electricity for project operations would mostly be generated by the project itself; during periods when the wind turbines are not generating power, it would be purchased from the Skamania County Public Utility District #1.

3.6.3.3 Materials and Commodities

As described in Subsection 3.6.1, bulk materials such as aggregate gravel and sand, in addition to soils, would not be required. Any additional material would be supplied locally from existing quarries. Other building materials, equipment, and other operational commodities would be purchased from equipment and material suppliers.

3.6.4 NONRENEWABLE RESOURCES

While a wide variety of natural resources are used in the construction of a project such as the Whistling Ridge Energy Project, the amounts of most resources used are very small. The largest quantities would be steel (coming from iron ore) and concrete (coming from aggregate, sand, and cement quarries and pits). Diesel fuel and electricity also would be consumed during construction.

3.6.5 CONSERVATION AND RENEWABLE RESOURCES

The project would provide the region with low-cost, clean, renewable energy, in accordance with state and national policies and priorities. It would provide benefits because it would emit substantially lower quantities of air pollutants per unit of energy output compared to other forms of energy. The project would help maintain air quality, given that some new generation resources must be developed to meet growing energy demand and to replace generation that will be retired.

3.6.6 SCENIC RESOURCES

The project is not located inside the Columbia River Gorge National Scenic Area; ~~however, the~~nor is the proposed access road ~~for~~ to the proposed site, West Pit Road ~~is~~. ~~Conformance with the Scenic Area plan for roadway development would be followed as described in Section 2.20, Pertinent Federal, State and Local Requirements and in Section 4.2.1, Land Use~~.

State Highway 14 in this area is a recognized scenic roadway. Typically, this designation means that a scenic corridor management plan would be prepared to provide policy-level guidance in the local adoption of comprehensive plan policies, zoning, and other land use regulation. There is no scenic corridor management plan for Highway 14 and, therefore, no regulatory control of aesthetic impacts within the corridor.

3.6.7 MITIGATION MEASURES

No impacts to energy and natural resources are expected to occur and therefore no mitigation measures would be required.

SECTION 4.1 ENVIRONMENTAL HEALTH (WAC 463-60-352)

This section contains six subsections: Noise, Risk of Fire or Explosion, Releases or Potential Releases to the Environment Affecting Public Health, Safety Standards Compliance, Radiation Levels, and Emergency Plans.

4.1.1 NOISE

4.1.1.1 Fundamentals of Acoustics

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if minus 10 dB, halving) of the sound's loudness.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to sound pressure level. In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (µPa). Sound pressure level depends not only on the power of the source, but also on the distance from the source and on the acoustic characteristics of the space surrounding the source.

Hz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number

of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A weighting," and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with L_{10} typically describe transient or short-term events. For the L_{50} descriptor, half of the sounds during the measurement interval are softer than L_{50} and half are louder. Levels associated with L_{90} often describe background noise conditions and/or continuous, steady-state sound sources.

Finally, another sound descriptor known as the day-night average sound level (L_{dn}) represents the average sound level for a 24-hour day and is calculated by adding a 10 dB penalty only to sound levels during the night period (10:00 pm to 7:00 am). The L_{dn} is typically used to define acceptable land use compatibility with respect to noise. Because of the time-of-day penalties associated with the L_{dn} descriptor, the L_{eq} for a continuously operating sound source during a 24-hour period will be numerically less. Thus, for a power plant operating continuously for periods of 24 hours, the L_{eq} will be 6 dB lower than the L_{dn} value.

Sound levels of typical noise sources and environments are provided in Table 4.1-1, Sound Levels of Typical Noise Sources and Noise Environments, to provide a frame of reference.

Table 4.1-1
Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at a given distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness
Military Jet Take-off with After-burner (50 feet), Civil-defense Siren (100 feet)	140, 130	Aircraft Carrier Flight Deck	
Commercial Jet Take-off (200 feet)	120	Thunderclap	Threshold of Pain 32 Times as Loud[a]
Pile Driver (50 feet)	110	Rock Music Concert	Average Human Ear Discomfort 16 Times as Loud[a]
Ambulance Siren (100 feet), Newspaper Press (5 feet), Power Lawn Mower (3 feet)	100		Very Loud 8 Times as Loud[a]
Motorcycle (25 feet), Propeller Plane Flyover (1,000 feet), Diesel Truck, 40 Miles Per Hour (50 feet)	90	Boiler Room Printing Press Plant	Likely Damage, 8-Hour Exposure 4 Times as Loud[a]
Garbage Disposal (3 feet)	80		Possible Damage, 8-Hour Exposure 2 Times as Loud[a]
Passenger Car, 65 Miles Per Hour (25[a] feet), Vacuum Cleaner (10 feet)	70	Data Processing Center, Department Store	Reference Loudness Moderately Loud[a]
Normal Conversation (5 feet), Air-conditioning Unit (100 feet)	60	Private Business Office, Restaurant	1/2 as Loud[a]
Light Traffic (100 feet)	50	Lower Limit of Daytime Urban Ambient Sound	1/4 as Loud[a]
Bird Calls (distant)	40	Quiet Urban Nighttime	1/8 as Loud[a]
Soft Whisper (5 feet)	30	Recording Studio, Library	Very Quiet 1/16 as Loud[a]
	20	Whistling, Rustling Leaves	Just Audible 1/32 as Loud[a]
	10	Breathing	Barely Audible 1/64 as Loud
	0		Threshold of Hearing 1/128 as Loud[a]

Source: URS internal information and CDOT (1998) p. 18, Table N-2136.2
a. Relative to a reference loudness of 70 decibels.

4.1.1.2 Noise Standards

WAC 463-62-030 states that energy facilities shall meet the noise standards established in chapter 70.107 RCW, the Noise Control Act of 1974 as implemented in the requirements in 173-60 WAC.

The WAC provides the applicable noise standards for Washington State. WAC 173-60 is adopted pursuant to the Noise Control Act of 1974, in order to establish maximum noise levels permissible in identified environments, and thereby to provide use standards relating to the reception of noise within such environments.

SCC Title 8 Chapter 22: Noise Regulations identifies limits and exceptions specific to noise in Skamania County. SCC 8.22 was adopted pursuant to, and is consistent with, WAC 173-60. Environmental designations for noise abatement (EDNA) are established in Section 8.22.080 and WAC 173-60-030. These rules establish maximum permissible environmental noise levels and are based on the EDNA, which is defined as an area or zone (environment) within which maximum permissible noise levels are established. There are three EDNA classes:

- Class A: Lands where people reside and sleep (such as residential)
- Class B: Lands requiring protection against noise interference with speech (such as commercial/recreational)
- Class C: Lands where economic activities are of such a nature that higher noise levels are anticipated (such as industrial/agricultural).

4.1.1.3 Affected Environment

Existing Sound Environment

The total project area encompasses approximately 1,152 acres in Skamania County, Washington. It is approximately seven miles northwest of the City of White Salmon, outside of the Columbia Gorge Scenic Area. The southernmost wind turbine is approximately 1.7 miles north of the Columbia River and is accessible by State Road 14 and Cook-Underwood Road.

As shown on Figure 4.1-1, Noise Level Contours, the two closest residences to the wind turbine tower locations are approximately 0.48 mile (2,560 feet) southeast of Tower A1 (shown on the figure as Receiver 1 or R1) and 0.8 mile (4,265 feet) southwest of Tower B16 (shown on the figure as Receiver 2 or R2). A potential future residence (shown as Receiver 3 or R3) is approximately 0.38 mile (2,000 feet) from Tower A1. Figure 4.1-1 shows that there are many potential receivers that are more distant from the project. To help establish representative baseline ambient sound levels for the project vicinity and characterize the existing noise environment in the areas occupied by the receivers shown in Figure 4.1-1, a set of long and short-term sound level measurements were conducted from January 20 to 22, 2009. The measurement locations included a position near the intersection of Ausplund Road and Kollack-Knapp Road (ST1), and a position near the intersection of Jessup Road and Manzanola Road (ST2). For purposes of the impact analysis described in this document, these measurement locations are considered reasonably representative for each general area, and more specifically R1 and R2, respectively, on the basis of similar expected ambient sound sources despite the dissimilarity of locations. For instance, the ambient sound environment measured at ST1 likely contains the same typical identifiable sound components (e.g., distant bird song, dog barks, roadway traffic) and a generally unidentifiable "background" that one might measure at the precise geographic location of R1.

33758687_83.cdr

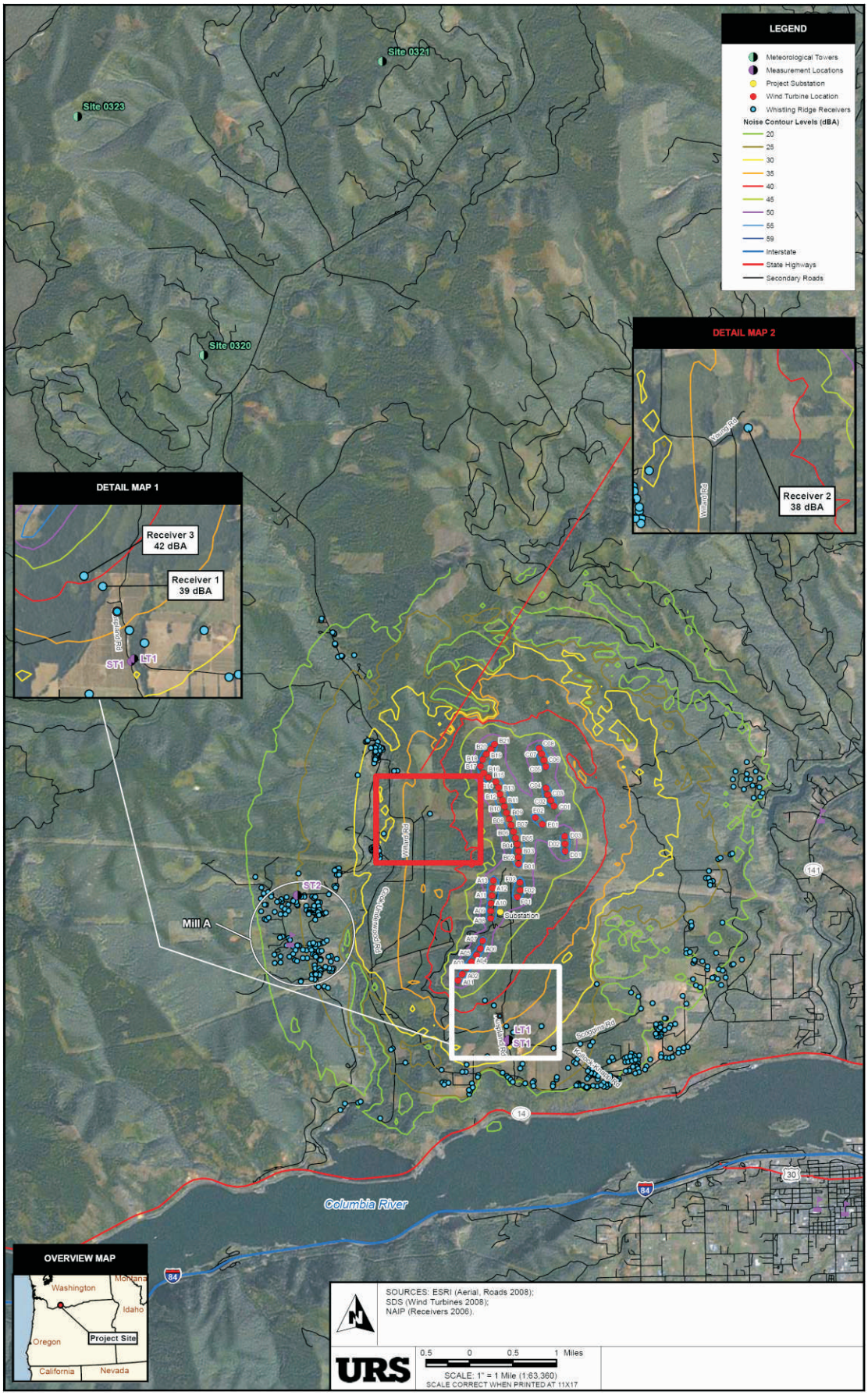


Figure 4.1-1

Noise Level Contours

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

A Bruel+Kjaer 2250 (SN: 2653963) ANSI Type-1 real-time sound analyzer, fitted with a standard microphone windscreen and mounted atop a five-foot tall tripod, was used for the short-term measurements. The instrument was field calibrated before and after each measurement period with an acoustic calibrator. All sound level measurements conducted by URS personnel were done so in accordance with ISO 1996a, b, and c. Weather conditions during the survey period were seasonally cold with overcast skies but no precipitation during the measurement periods. The air temperature varied from 30 to 44 degrees Fahrenheit, with 33 to 53 percent relative humidity. Measured ground wind speeds in the vicinity of the measurement positions were low, with averages ranging from 0 to 1 mph, and directed toward the north for all measurements. Detailed weather conditions for individual noise measurements and a summary of the short-term measurement data are included in Table 4.1-2.

A long-term measurement (LT1) was conducted at a position near the corner of Ausplund Road and Kollock-Knapp Road using a Larson Davis 720 (SN: 0436) ANSI Type 2 Integrating sound level meter. With only the windscreen-covered microphone exposed to the outdoor environment, the sound level meter was placed in a locked, weather-resistant case and secured to a nearby tree. The long-term measurement consisted of consecutive 15 or 30 minute averages conducted over an uninterrupted 24-hour period. The instrument was field calibrated before and after each measurement period with an acoustic calibrator (CAL 200 s/n: 5789). Data from the long-term measurement is presented in Table 4.1-3.

Field observations associated with the short and long term measurements are as follows:

ST1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road. There are several residential receivers located in this area.

The first short-term measurement at this location was conducted between 11:52 am and 12:12 pm on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, dogs barking in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:00 pm and 6:20 pm on January 21, 2009. The second measurement noise sources included distant aircraft, distant roadway traffic, and dogs barking in the distance. The third short-term measurement at this location was conducted between 11:32 pm and 11:52 pm on January 21, 2009. Noise sources during the third measurement included distant roadway traffic and dogs barking in the distance. The first measurement L_{eq} one-minute interval values ranged from 34 to 59 dBA, the second measurement 1-minute L_{eq} values ranged from 27 to 66 dBA, and the third measurement 1-minute L_{eq} values ranged from 25 to 49 dBA. L_{eq} for the entire duration of each of these three measurement periods appears in Table 4.1-2.

Table 4.1-2
Short-Term Noise Measurement Data Summary

Measurement Location		Measured Sound Data									
ID	Description	Time	L_{eq}, dBA	L_{10}	L_{50}	L_{90}	L_{eq}, dBA without Cars	Temp (F)	%RH	Wind Speed (mph)	Wind Direction
ST1	Corner of Ausplund Road and Kollock-Knapp Road	11:52 - 12:12	46	39	35	34	38	35	53	1	North
		18:00 - 18:20	49	36	31	28	32	32	35	1	North
		23:32 - 23:52	35	32	28	26	30	30	34	0	-
ST2	Just north of the John Schwab Memorial Tennis Courts	12:48 - 13:08	41	40	36	35	37	44	40	1	North
		18:36 - 18:56	44	40	36	35	36	32	34	1	North
		00:08 - 00:28	35	36	35	34	35	30	34	0	-

Measurements conducted on January 21 and 22, 2009

Table 4.1-3
Long-Term Noise Measurement Data Summary

Site ID	Measurement Location	Measurement Period			24-hr Measurement Results (dBA)			
		Start Date	Start Time	Duration (hh:mm)	L_{eq}	L_{10}	L_{50}	L_{90}
LT1	Corner of Ausplund Road and Kollock-Knapp Road	01/21/09	11:40 am	24:00	46	41	39	38

ST2. This measurement location was located in front of the John Schwab Memorial Tennis Courts on the corner of Jessup Road and Manzanola Road. The sound level meter was approximately 15 feet from Jessup Road.

The first short-term measurement at this location was conducted between 12:48 pm and 1:08 pm on January 21, 2009. The first measurement noise sources included distant aircraft, distant roadway traffic, children playing in the distance, and birds vocalizing. The second short-term measurement was conducted between 6:36 pm and 6:56 pm on January 21, 2009. The noise sources for the second short-term measurement included distant aircraft and distant roadway traffic. The third short-term measurement was conducted between 12:08 am and 12:28 am on January 22, 2009. Noise sources present during the third short-term measurement included distant roadway traffic. The first measurement L_{eq} one-minute values ranged from 35 to 52 dBA, the second measurement 1-minute L_{eq} values ranged from 34 to 54 dBA, and the third measurement 1-minute L_{eq} values ranged from 31 to 39 dBA. L_{eq} for the entire duration of each of these three measurement periods appears in Table 4.1-2.

LT1. This measurement location was at the corner of Ausplund Road and Kollock-Knapp Road, on the north side of the roadway. The sound level meter was placed in a tree near the side of the road.

Concurrent with these short and long term ambient sound measurements, S.D.S. Co., LLC meteorological stations 320, 321, and 323 collected data on wind speed, direction, and temperature at various elevations above grade. Average reported wind velocities from the station NRG Type 40 anemometers were quite low, and while apparently consistent with the low average wind velocities measured on the ground at the sound measurement positions, were considered potentially compromised by icy conditions due to the low recorded temperatures and high moisture content of the air.

Table 4.1-2 shows the considerable decibel differences between the L_{eq} measurements and the adjusted values when intervals containing documented automotive pass-by events (i.e., "without cars") were removed from the short-term measurement data sets. This change is unsurprising due to the proximity of the real-time sound analyzer to the roadway at ST1 and ST2. Upon removing these intervals, the remaining collected data more accurately depicts the background or a measurement position that is considerably distant from passing road traffic.

Resulting from the application of a similar interval extraction technique to the concurrent LT1 data, Table 4.1-4 presents the arithmetic average L_{eq} of ST1 and LT1.

Table 4.1-4
Average Ambient for ST1/LT1 Measurement Area

	Daytime (Leq, dBA)	Evening (Leq, dBA)	Nighttime (Leq, dBA)
Average L_{eq} without cars	(39+38)/2 = 38	(39+32)/2 = 35	(38+30)/2 = 34
Average L_{eq} with cars	(44+46)/2 = 45	(42+49)/2 = 45	(38+35)/2 = 36

The location of ST1/LT1 was selected to approximate the existing ambient sound in the vicinity of Ausplund Road and hence Receiver 1. Likewise, the location of ST2 was chosen to generally represent the ambient sound level for the Mill A community and its surroundings west of the project, on which Receiver 2 is located.

Applicable Impact Criteria

The project is sited entirely on a mixture of Commercial Forestry (GF1) Land and unzoned land (Nikki Holltitz, personal communication). Consequentially, the environmental designation is considered to be EDNA Class C. Table 4.1-5 below illustrates the Class A (Residential) receiver noise level limitations for noise generated from a Class C (Commercial) EDNA (SCC 8.88.090, 100).[1]

Table 4.1-5
Class A EDNA Receiver Noise Limits
(dBA)

Equivalent Noise Level Exposure Time (Time / Statistic)	Daytime (7 am – 10 pm)	Nighttime (10 pm – 7 am)
1 hour / L_{eq}	60	50
15 minutes / L_{25}	65	55
5 minutes / $L_{16.7}$	70	60
1.5 minutes / $L_{2.5}$	75	65

Levels shown are at the property line of the receiving property and indicative of a source that is located in a Class C EDNA

Notwithstanding the above and per 173-60-050 WAC, there are exemptions to the limits for certain noise-producing activities or source types as follows:

- Construction noise (including blasting) between the hours of 7 am and 10 pm
- Motor vehicles when regulated by 173-62 WAC ("Motor Vehicle Noise Performance Standards" for vehicles operated on public highways)
- Motor vehicles operated off public highways, except when such noise affects residential receivers

The reader should bear in mind that despite these exemptions, 173-60-50(6) WAC states, "Nothing in these exemptions is intended to preclude the Department from requiring installation of the best available noise abatement technology consistent with economic feasibility."

[1] Receiver locations 1 and 3 are in agriculturally zoned lands which would normally be classified as Class C EDNA. Receiver location 2 is residentially zoned. For the purpose of this analysis, because all 3 uses are residential, they have been classified as Class A EDNA.

4.1.1.4 Impacts

Construction

Project construction would take place over a period of 12 months between the hours of 7:00 am and 7:00 pm Monday through Friday. During construction activities, a varying number of construction equipment and personnel would occupy the project area, which would result in varying levels of construction noise. The project would use conventional construction techniques and equipment including (but not limited to), excavators, bulldozers, heavy trucks (e.g., water truck, dump truck), and similar heavy construction equipment. Specialized construction for logging and other tasks using heavy duty cranes and foundation building also may be needed.

Conventional construction activities would result in a short-term temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would be experienced primarily close to the noise source. The magnitude of the noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction phase(s), and the distance between the noise source and receiver.

Construction noise impacts associated with the project were assessed with spreadsheet-based noise calculations. User inputs include:

- Distance from source—the distance between the edge of the construction site and the considered receiver
- Duty cycle—the portion of an hour, in aggregate, that a piece of equipment is energized (stationary or mobile) and creating noise
- Quantity—the number of equipment pieces or noise-producing events over a specific time period (e.g., equipment utilization per month)
- Hours—the number of daytime hours (up to 12) that represent a typical daily work shift

These inputs allow sound propagation prediction using the following formula:

$$L_{eq} = \text{Source SPL} + 10 * \log_{10}(\text{Duty Cycle}) + 10 * \log_{10}(\text{Quantity}) + 10 * \log_{10}(\text{Hours}/12) - 20 * \log_{10}(\text{Distance from Source} / \text{Reference Distance})$$

where source sound pressure level (SPL) and reference distance describe the typical noise, associated with a single piece of equipment, measured at a pre-defined distance. For instance, a chainsaw may have a source SPL of 78 dBA measured at a distance of 50 feet from its operator. Values for source SPL and reference distance have either been reproduced from available manufacturers' data or calculated from industry-accepted formulas linking sound generation to the rated engine horsepower of the equipment. Note that for purposes of model conservatism, air and ground absorption effects are not included.

Table 4.1-6 shows the predicted construction noise levels experienced at the closest residences to the project. As per 173-60-050 WAC, construction noise between the hours of 7:00 am and 10:00 pm are exempt from the receiver noise limit guidelines. Consequently, the calculated values at the two closest receivers comply with the applicable noise standard.

Table 4.1-6
Construction Noise Levels at Receivers Closest to Project

ID	Description (distance/direction)	EDNA Classification	Construction Sound Level Limit (dBA)	Maximum Project Construction Sound Level (dBA)	Complies with Standard
Receiver 1	Residence 0.48 mile (2560') SE of Tower A1	Class A	Exempt	70	Yes
Receiver 2	Residence 0.8 mile (4265') SW of Tower B16	Class A	Exempt	66	Yes
Receiver 3	Residence 0.38 mile (2000') SE of Tower A1	Class A	Exempt	72	Yes

If it is determined to be necessary, blasting would occur during the turbine foundation portion of the construction schedule and only during daytime hours. Blasting noise could possibly be audible at a considerable distance from the construction site and noticeable at residences near the project area. Sound levels from blasting at a receiver would not be extreme, however, and the occurrence would be low in frequency, intermittent and confined to a period of one to two months. WAC 173.60.050 exempts temporary construction noise, including noise from blasting, from the State noise limits between the hours of 7 am and 10 pm.

The large distances between much of the project area and potentially affected residences, the temporary nature of construction, and the restriction of construction activities to daytime hours would serve to minimize potential noise impacts from construction activities. Based on the anticipated noise levels and the timing aspects of these impacts, construction noise impacts are expected to be insignificant.

If project construction occurred in phases, the effect on the level of noise impacts would be to extend the total duration of temporary disturbance from project construction, but to reduce the intensity or magnitude of impacts for any individual phase. Construction noise impacts would still be temporary, localized and low in magnitude, and overall project impacts during construction would remain insignificant in a phased-construction scenario.

Operation

The Cadna/A® Noise Prediction Model (Version 3.71.125) was used to estimate the project-generated sound pressure levels at the property lines and noise-sensitive receivers. Cadna/A® is a Windows® based software program that predicts and assesses noise levels near industrial noise sources based on ISO 9613-2 standards for noise propagation calculations. The model uses industry-accepted propagation algorithms and accepts sound power levels (in dB re: 1 picowatt) provided by the equipment manufacturer and other sources. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. Intervening natural and man-made topographical barrier

effects were considered as appropriate, including those from structures such as major buildings, tanks, and large equipment.

Calculations were performed using linear octave band sound power levels as inputs from each pre-defined noise source, as summarized in Table 4.1-7: Noise Model Sound Level Parameters. Given that the exact turbine model to be use for the project has yet not been determined at the time of this report, conservative but realistic and representative values for the type of equipment being considered for this project have been used. For example, the model currently uses data from an industry leading 1.8 MW 50/60 Hz Wind Turbine, at wind speeds of about six meters per second and nine meters per second at 33 feet (10 meters), in accordance with the protocol established in International Electrotechnical Commission Standard 61400-11:2002. The decibel values shown for the two wind turbine generator wind speeds in Table 4.1-7 at each octave band center frequency include a +2 dB margin, which produces an A-weighted overall that represents the top end of a range associated with the manufacturer's warranty values.

Table 4.1-7
Noise Model Sound Level Parameters

Project Component	Type of Source	Sound Power Level in dB at Octave Band Center Frequency (Hz)									Unweighted (linear)	A-Weighted	Acoustic Height (feet)
		31.5	63	125	250	500	1,000	2,000	4,000	8,000			
Wind Turbine at 6m/s wind speed	Point	82.7	88.7	95.3	99.7	101.9	100.7	97.4	88.9	82	106.8	104.7	262
Wind Turbine at 9m/s wind speed	Point	84.9	90.9	97.3	101	103.3	102.6	99.5	91.6	84.4	108.4	106.4	262
Turbine Transformers	Point	35	41	43	38	38	32	27	22	15	47	38	7
Sub Station component	Point	80	86	88	83	83	77	72	67	60	92	83	13

Source: URS internal information and Thomas Mills, personal communication

The project layout configuration (i.e., the arrangement of wind turbine generators and ancillary equipment on the site) was imported into Cadna/A® from project files provided by the client. Additional conservative measures were taken as the model assumed consistent 24-hour operation of the project. The Cadna/A model consequently predicts hourly sound levels, which would be equal at all times of day in this case. The formula used to derive the overall SPL (in dBA) from sound power level (PWL) is as follows:

$$SPL = PWL - 20 \text{ Log } (r) - 10.9 + C$$

where *r* is in meters and *C* is a dimensionless absorption constant.[2]

The predicted operational noise levels at the three closest residences to the project are supplied in Tables 4.1-8 through 4.1-11. This analysis evaluates the existing noise levels at the closest receptors, and evaluates increases in dBA at these locations. The Washington noise regulations do not require this information. The Applicant is supplying this information to fully inform EFSEC.

[2] Harris, Cyril M. 1998. *Handbook of Acoustical Measurements and Noise Control*. Third Edition. p. 3-2, Eq. 3.2a.

Figure 4.1-1 depicts these three receivers (for the 9 m/s wind speed, 10°C temperature and 70% relative humidity operation case) in two detail maps as part of a larger aerial plan on which predicted noise contours and other known receiver locations have been superimposed. The operation of the project would comply with all applicable noise regulations.

Table 4.1-8
Operational Noise Impact Assessment, Nighttime – 6 m/sec

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
1	Class A	50	34	36	38	4	Yes
2	Class A	50	35	38	40	5	Yes
3	Class A	50	35	40	41	6	Yes

Table 4.1-9
Operational Noise Impact Assessment, Nighttime – 9 m/sec

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
1	Class A	50	34	37	39	5	Yes
2	Class A	50	35	39	40	5	Yes
3	Class A	50	35	42	43	8	Yes

Table 4.1-10
Operational Noise Impact Assessment, Daytime – 6 m/sec

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
1	Class A	60	38	36	40	2	Yes
2	Class A	60	38	38	41	3	Yes
3	Class A	60	38	40	42	4	Yes

Table 4.1-11
Operational Noise Impact Assessment, Daytime – 9 m/sec

Receiver ID	EDNA Class	Sound Level Limit (dBA)	Existing (dBA)	Project (dBA)	Overall (dBA)	Increase (dBA)	Complies with Regulation
1	Class A	60	38	37	41	3	Yes
2	Class A	60	38	39	41	3	Yes
3	Class A	60	38	42	43	5	Yes

Operation of the wind turbine generators is also capable of meeting the guideline criteria with respect to increase over ambient, but it depends on the ambient sound level and time of day.

Under certain conditions, there is the potential for one or more of the following phenomena to occur that may temporarily cause a variance in the predicted sound levels:

- In the Cadna/A prediction model, all studied wind turbine generators were assumed to operate at the same speed. In reality, very slight differences in operating rotor speeds due to non-uniformities in the passing wind profile can result in intermittent constructive and destructive interference—or what one might call "beats," that can have a perceptible frequency as current research suggests.[3]

- The atmosphere can either be "stable" or "unstable," which in summary are descriptors for how layers of air mass interact. The latter of these two is usually associated with cold air near the ground that is not well coupled to higher air masses. This effect can explain why high wind speeds at wind turbine generator hub height can be substantially greater than those near ground level.[4]

- The relative humidity and ambient temperature have a substantial effect on the attenuation of outdoor sound at high frequencies and long distances through air absorption. Relative humidity and temperature effects can produce a variance of approximately +/- 2dBA.

- The uncertainty range for the sound power level of each wind turbine generator is +/- 2dBA.

- Due to the very low ground wind speeds recorded during the short term measurements, actual ambient noise levels at any receiver in the project vicinity may be higher as a result of noise generated by turbulence from wind streaming through vegetative ground cover (i.e., trees and grasses).

None of these conditions would result in the project exceeding noise regulations.

Low Frequency Sound

Low frequency sound typically ranges from 100 Hz to 20 Hz, the latter of which is the generally understood limit audible to the human ear. Low frequency noise produced by a wind turbine generator can include tonal components produced by the generator and gearbox within the nacelle downstream of the rotor hub, atop the tower mast. The source sound power levels in Table 4.1-7 already include these noise contributors. Modern wind turbine design typically includes sound attenuation features in the nacelle to help reduce the magnitude of these electro-mechanical noise components to the aggregate, so that the spectrum of sound levels at the octave band center frequencies shown in Table 4.1-7 largely describes the aerodynamic effects of the rotor blades interacting with the passing wind profile.

In earlier generations of wind turbine design, the practice of downwind rotors allowed turbulence from the tower mast to disrupt favorable aerodynamic conditions for the passing blades, causing

[3] G. P. van den Berg. 2006. The sound of high winds: the effect of atmospheric stability on wind turbine sound and microphone noise. *Rijksuniversiteit Groningen.* p. 156.

[4] Ibid., p. 158.

considerable low frequency noise. This practice has been abandoned by the contemporary upwind rotor design of virtually all wind turbine generators built in the past five years, including the models contemplated for this project. At the low frequency end of the spectrum, where ambient levels far exceed anticipated aggregate project operation noise.

The noise produced by air interaction with the rotor blades tends to be broadband noise, but is amplitude modulated as the upstream blades pass the tower, resulting in what some call a characteristic "swoosh." The blade passage frequency of this "swoosh" is only a temporal modulation of sound and should not be confused with low frequency sounds. Virtually any sound can be time-modulated without changing its pitch. Thus, low frequency modulation of audible sound does not imply the presence of infrasound, which is discussed in the following paragraphs.

Infrasound

The term infrasound describes sound with frequencies of 20 Hz or less that are generally considered below the threshold of human hearing. Such sound, if sufficiently high in magnitude, can still be perceived or even heard as induced by vibration. Natural sources of infrasound include waves, thunder, wind, and even certain species of wildlife.

A review of wind turbine noise measurement studies conducted by Jakobsen (2005) concluded that operation of contemporary wind turbine generators featuring rotors "upwind" of tubular tower masts generated infrasound in the range of 70 G-weighted decibels (dBG) at a distance of one hundred meters.[5] (The G-weighting scale, like the oft-used A-weighting scale for audible sound spectra, is a filter applied to low-frequency sound as described in ISO 7196:1995E.) Jakobsen also notes that this infrasound, usually associated with aerodynamic effects of blade passage past the tower mast, tends to ignore atmospheric sound absorption and ground attenuating effects due its very large wavelength. Hence, one could reasonably expect infrasound to attenuate only with increasing propagation distance.

Recent studies performed for the Canadian Wind Energy Association have described usage of 85–90 dBG as a criterion for human perception of infrasound and, by reasonable extension, the likely threshold for infrasound complaint.[6]

The horizontal distances of the project wind turbines to the nearest noise-sensitive receivers are at least 615 meters, which provides sufficient attenuation to offset the amount of decibels that one might add to account for the quantity of wind turbines of the project. Thus, the expected infrasound at the nearest existing receivers (i.e., R1 and R2) should remain under an estimated value of 70 dBG, which is 15 dBG less than the previously stated criteria. This estimated project aggregate wind turbine generator infrasound level is also far below what NASA studies determined (125 dB, linear) as a threshold for potential health impacts.[7] On these bases, infrasound potential impacts are considered to be either non-existent or less than significant.

---

[5] Jakobsen, Jorgen. 2005. Infrasound Emission from Wind Turbines. *Journal of Low Frequency Noise, Vibration and Active Control* 24, no. 3: 150.

[6] HGC Engineering. 2006. Wind Turbines and Infrasound. Submitted to Canadian Wind Energy Association. November. p. 3.

[7] HGC Engineering. 2006. Wind Turbines and Infrasound. Submitted to Canadian Wind Energy Association. November. p. 3.

4.1.1.5 Mitigation Measures

Construction

Construction would generally occur only during daytime hours to reduce the potential for noise impacts from this activity. Construction noise is exempt from Washington noise limits during daytime hours. To ensure that construction noise emission assumptions relied upon herein are valid and acoustical design goals are met by the project during construction, the following mitigation measures are proposed:

- All noise-producing project equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment.

- All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by a local, state, or federal agency, would comply with such regulation while in the course of project activity.

- The use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, would be for safety warning purposes only. Unless required for such safety purposes, and as allowable by applicable regulations, no construction-related public address, loudspeaker, or music system would be audible at any adjacent noise-sensitive land use.

- The EPC Contractor would implement a noise complaint process and hotline number for the surrounding community. Whistling Ridge Energy LLC would have the responsibility and authority to receive and resolve noise complaints.

Operation

The noise modeling analysis indicated that the noise levels at the three closest residences (located 0.38, 0.48 and 0.8 mile away) would be 37 to 42 dBA for the 9 m/sec wind speed case, at and above which the wind turbine generators are expected to produce the most noise. With averaged measured existing sound levels reasonably representing ambient noise levels at these nearest noise-sensitive receivers, the cumulative increase over ambient for most operating cases would remain below applicable thresholds, and would result in no need for operation noise mitigation.

4.1.2 RISK OF FIRE OR EXPLOSION

Unlike thermal power plants, wind power projects pose a much smaller risk of explosion or fire potential, as there is no need to transport, store, or combust fuel to generate power. As with any major construction undertaking, construction of the project would present some fire risks. Fire risk mitigation starts with project design, especially with electrical design which needs to comply with the National Electric Code and the National Fire Protection Agency. A strict fire prevention plan would be enforced both during construction and operations to mitigate fire risks.

4.1.2.1 Fire and Explosion Sources

The risk of unintentional or accidental fire or explosion during both construction and operations would be minimal. As the project site is located within commercial forest and rangeland, the highest expected fire risks are forest fires and brush fires during the hot, dry summer season. Fire risk potential is constantly tracked and reported during the summer fire season by the WDNR and this would be actively posted at the construction job site during the high risk season. The project site roads act as firebreaks and also would allow quick access by fire trucks and personnel in the event of a grass fire. As is the case with almost any complex machines, there is some potential for fire inside the wind turbine generators.

4.1.2.2 Mitigation Measures

The construction manager would be responsible for staying abreast of fire conditions in the project area by contacting WDNR and implementing any necessary fire precautions. A Fire Protection and Prevention Plan would be developed for EFSEC approval and implemented, in coordination with the Skamania County Fire Marshall and appropriate agencies. Table 4.1-12 lists sources of potential fire and explosion along with measures to mitigate the risk of either occurring.

Lightning-induced fires are rare in the project area and both the wind turbine generators and the substation are equipped with specially engineered lightning protection systems. With the types of modern wind turbines proposed for the project, however, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine control system detects overheating in turbine machinery, and internal fires would be detected by these sensors, causing the machine to shut down immediately and send an alarm signal to the central SCADA system, which would notify operators of the alarm by cell phone or pager.

The potential fire risks are similar in nature but lower for project decommissioning. Fire prevention measures during decommissioning would be similar to those for project construction.

Table 4.1-12
Fire and Explosion Risk Mitigation Plan

C / O[a]	Potential Fire or Explosion Source	Mitigation Measures
C & O	General Fire Protection	• All on-site service vehicles fitted with fire extinguishers • Fire station boxes with shovels, water tank sprayers, etc. installed at multiple locations on site along roadways during summer fire season • Minimum of one water truck with sprayers must be present on each turbine string road with construction activities during fire season
C & O	Dry vegetation in contact with hot exhaust catalytic converters under vehicles	• No gas powered vehicles allowed outside of graveled areas • Mainly diesel vehicles (i.e. w/o catalytic converters) used on site • Use of high clearance vehicles on site if used off-road
C & O	Smoking	• Restricted to designated areas (outdoor gravel covered areas)
C & O	Explosives used during blasting for excavation work	• Only state licensed explosive specialist contractors are allowed to perform this work – explosives require special detonation equipment with safety lockouts • Clear vegetation from the general footprint area surrounding the excavation zone to be blasted • Standby water spray trucks and fire suppression equipment to be present during blasting activities
C & O	Electrical Fires	• Use of generally high clearance vehicles on site • No gas powered vehicles allowed outside of graveled areas • All major construction equipment used is to be diesel powered (i.e. w/o catalytic converters)
C & O	Lightning	• Specially engineered lightning protection and grounding systems used at wind turbines and at substation • Footprint areas around turbines and substation are graveled with no vegetation
C	Portable Generators – hot exhaust	• Generators not allowed to operate on open grass areas • All portable generators to be fitted with spark arrestors on exhaust system
C	Torches or field welding on-site	• Immediate surrounding area would be wetted with water sprayer • Fire suppression equipment to be present at location of welder/torch activity
C & O	Electrical Arcing	• Electrical designs and construction specifications meet or exceed requirements of the National Electric Code and National Fire Protection Agency

a. Indicated risk during construction (C) and/or operations (O)

4.1.3 RELEASES OR POTENTIAL RELEASES TO THE ENVIRONMENT AFFECTING PUBLIC HEALTH

4.1.3.1 Construction

Diesel fuel would be the only potentially hazardous material used in any significant quantity during construction of the project. Construction of the project would require the use of diesel fuel for operating construction equipment and vehicles. Measures to prevent and contain any accidental spills resulting from this fuel storage and use are described in detail in Section 2.9, Spillage Prevention and Control. Construction of the project would not result in the generation of any hazardous wastes in quantities regulated by state or federal law. During construction, the primary wastes generated would be solid construction debris such as scrap metal, cable, wire, wood pallets, plastic packaging materials and cardboard. The total volume of construction wastes is expected to be less than ten tons. This waste would be accumulated on site in drop boxes until hauled away to a licensed transfer station or landfill by either the EPC contractor or the Skamania County Solid Waste Division.

4.1.3.2 Operations

Operation of the project would not result in the generation of regulated quantities of hazardous wastes. As no fuel would be burned to power the wind turbine generators, there would be no spent fuel, ash, sludge or other process wastes generated. The primary type of waste generated by operations the project would be municipal solid waste generated at the Operations and Maintenance facility, consisting of typical office wastes (paper, cardboard, food waste, etc.), which would be stored in a dumpster until it is collected by the Skamania County Solid Waste Division. Periodic changing of lubricating oils and hydraulic fluids used in the individual wind turbine generators would result in the generation of small quantities of these materials. These waste fluids would be generated in small quantities because they need to be changed only infrequently and the changing of these fluids is not done all at once, but rather on an individual basis. These waste fluids would be stored for short periods of time in appropriate containers at the Operations and Maintenance facility for collection by a licensed collection service for recycling or disposal. Procedures for collecting, storing and transporting these materials for recycling or disposal are described in detail in Section 2.9, Spillage Prevention and Control.

4.1.4 SAFETY STANDARDS COMPLIANCE

Whistling Ridge Energy LLC and its contractors would comply with all applicable local, state and federal safety, health, and environmental laws, ordinances, regulations, and standards (Appendix D). Some of the main laws, ordinances, regulations and standards that would be reflected in the design, construction, and operation of the project are as follows:

- Occupational Safety And Health Act Of 1970 (29 USC 651, et seq.) and 29 CFR 1910, Occupational Safety and Health Standards
- Uniform Fire Code
- Americans with Disabilities Act
- Uniform Fire Code Standards
- Uniform Building Code
- National Fire Protection Association, which provides design standards for the requirements of fire protection systems
- National Institute For Occupational Safety And Health, which requires that safety equipment carry markings, numbers, or certificates of approval for stated standards
- American Society Of Mechanical Engineers, which provides plant design standards
- American National Standards Institute, which provides plant design standards
- National Electric Safety Code
- American Concrete Institute Standards

- American Institute of Steel Construction Standards
- American National Standards Institute
- American Society for Testing and Materials
- Institute of Electrical and Electronic and Installation Engineers
- National Electric Code

4.1.4.1 Blade Throw

Blade throws were common in the industry's early years, but are unheard of-today because of better turbine design and engineering (AWEA 2008). While cases of blade drop/throw have occurred, these incidents are rare and have generally been linked to improper assembly or exceedance of design limits. Modern turbine braking systems, pitch controls, and other speed controls should prevent exceedance of design limits (AWEA 2008).

4.1.4.2 Tower Failure

Reasons for collapse can vary depending on conditions and tower type, but may include blade strikes, very strong winds, and improper maintenance. While structural failure is more damaging than blade failure, the consequences and risks to human health are far lower since risks are confined to within a relatively short distance from the turbine (Caithness 2006).

There is only one recorded death from a tower collapse, which occurred in Sherman County, Oregon. A six-month investigation found that the operating company "failed to properly instruct and supervise workers in the safe operation of tools and equipment. It also found that company procedures for working under potentially dangerous conditions fell short of OSHA [Occupational Safety and Health regulations" (Hill 2008). The investigation did not find any structural problems with the tower itself.

4.1.4.3 Ice Throw

Ice storms, both mild and occasionally severe, may occur within the project area (see Section 2.1.3.2, Climate). During periods of ice build-up, the exposed parts of the turbine may be coated with ice. According to the AWEA, "the moving turbine rotor is liable to accrete heavier quantities of ice than the stationary components of the wind turbine" (AWEA 2008). Most modern turbines include sensors that will shut down the turbine when ice build-up is detected.

If the ice on the moving rotor is cast off, it could pose a threat to people, animals and buildings on the ground. However, the same setbacks used to minimize noise are sufficient to protect against danger to the public. The results of a questionnaire sent to a large number of wind turbine operators found most fragments found on the ground measured approximately 0.2–2.2lbs within an area of approximately 49–328 feet from the wind turbines (Morgan et. al. 1998). Anecdotal evidence suggests that ice tends to drop off the rotor, rather than being thrown off. Also, ice tends to shed more from the blade tips, and larger pieces of ice debris tend to fragment in flight.

4.1.5 RADIATION LEVELS

Pursuant to WAC 463-60-115, Whistling Ridge Energy LLC requests a waiver of the the information required by WAC 463-60-352(5), which call for information relating to radioactivity. No radioactive materials would be used, consumed, or released during construction or operation of the project.

4.1.6 EMERGENCY PLANS

The Emergency Plan for the project would consider the actions and responsibilities of personnel and off-site assistance groups during situations that may require physical corrective actions. The plan would include procedures designed to outline preventive measures for specific conditions that could evolve into an emergency situation, and outline procedural methods for mitigating an emergency should one occur.

The fundamental objective of the plan is to provide the necessary prearrangements, directions, and organizational structure such that all plant emergencies can be effectively and efficiently resolved to safeguard the public, plant personnel, and property.

In all instances associated with this plan, the manager or designee would be responsible for taking immediate action to safeguard the public, plant personnel, the environment, and equipment. The protection of personnel, the public, and the environment would always take precedence; plant systems and equipment would be secondary. In any situation the more conservative approach would always be considered.

4.1.6.1 Responsibility and Authority

The Whistling Ridge Energy Project would be staffed with at least one on-site manager. Off-site, the project would be supported by the Project Manager under the auspices of Operations and Maintenance services, corporate regulatory services, and corporate safety.

The responsibility and authority for day-to-day operations would be delegated to the manager and, as such, the manager would have direct responsibility to ensure that all routine and emergency site operations are conducted in a manner to protect the public, the environment, personnel and equipment. Overall responsibility and authority shall remain with the manager, or designee. The manager would ensure implementation and compliance with the plan and component procedures, direct emergency response actions, account for personnel, and direct evacuation actions as appropriate.

The individual employee would be responsible for being knowledgeable of the general guidance provided in the current Emergency Plan and its component procedures, for actively participating in drills and training in support of the plan and procedures, and for complying with policies set forth in the plan and procedures. Each employee would be responsible for notifying the manager of any potentially dangerous situation of which he or she has knowledge, and of any emergency situation (e.g., fire, oil spill, vehicle accident). The manager would notify the Project Manager and others as necessary to comply with the plan and procedures.

4.1.6.2 Components of the Emergency Plan

The following procedures would be components of the Emergency Plan.

- Fire Plan
- Personal Injury Response Plan
- Safety Plan
- SWPPP
- SPCC Plan
- Hazardous Waste Management Plan

Other Emergency Situations

Meteorological. This type of emergency includes hail, high winds, thunderstorms, extreme cold weather, and any other naturally occurring weather situation that may endanger, equipment, or require adjustments to the normal operations of the facility. Depending on the specific hazard, and available information, it is the responsibility of the manager or his designee to take the appropriate action to safeguard the public, the environment, personnel, the facility and its equipment.

Geological. This type of emergency deals with seismic activity and related geological phenomena. Depending upon the specific details available, it is the responsibility of the manager or his designee to take the appropriate action to safeguard the public, the environment, plant personnel, the plant and its equipment.

Man-Made. This type of emergency includes bomb threats, civil unrest, sabotage, or any other man made threats to the facility or personnel. This type of emergency must first be validated using the following criteria:

- Source of the information
- Reliability of the information
- Ability to confirm the information

Once the information has been validated then the decision must be made whether it would impact the facility or not. Once the decision is made, it is the responsibility of the manager or his designee to take the appropriate action to protect the public, the environment, plant personnel, the plant and its equipment, or to limit the impact on these elements.

The manager would coordinate response actions with the Skamania County Sheriff's office and Whistling Ridge Energy Project personnel, and provide support as requested and available.

Equipment Failure. This type of emergency is primarily failure of equipment that may result in hazards to personnel.

4.1.6.3 Reporting Requirements to the Energy Facility Site Evaluation Council

Conditions affecting the safety of the project, including any condition, event, or action that might compromise the safety, stability, or integrity of any facility or the ability of any equipment to function safely; or that might otherwise adversely affect the life, health, or property, would be reported to EFSEC.

Any condition affecting project safety would be reported orally to the EFSEC contact by the manager as soon as practicable after that condition is discovered. A written report would be submitted to EFSEC within the time specified by the EFSEC, and would contain any information EFSEC directs, including:

1. The causes of the condition
2. A description of any unusual occurrences or operating circumstances preceding the condition
3. An account of any measure taken to prevent worsening of the condition
4. A detailed description of any damage to the facility and the status of any repair
5. A detailed description of any personal injuries
6. A detailed description of the nature and extent of any private property damage
7. Any other relevant information requested by EFSEC

4.1.6.4 Review and Updating

The Emergency Plan would be reviewed annually, and changes made during the annual review or anytime a significant change has occurred in the information contained in this plan. The manager would be responsible for scheduling the annual review and having the plan and procedures updated as needed. The procedures would also be reviewed and revised as necessary, to reflect lessons learned from accidents, emergency situations, and tests of the procedures.

4.1.6.5 Training and Drills

Site personnel involved in emergency plan procedures would be trained annually and would be documented. Training would include a review of procedures, definitions, and regulations. All new employees would receive training as part of their orientation. Staff would periodically test emergency plan procedures by either performing a table top drill or, where practicable, a field drill. If necessary, as a result of the drill(s), procedures would be revised to take advantage of lessons learned.

4.1.6.6 Agreements Related to Emergency Planning

Prior to construction of the project, Whistling Ridge Energy LLC would develop agreements related to emergency planning with Skamania County Emergency Medical Services. This agreement would be provided to EFSEC and attached to the Emergency Plan prior to implementation.

SECTION 4.2 LAND AND SHORELINE USE (WAC 463-60-362)

This section addresses the land and shoreline use issues applicable to the proposed Whistling Ridge Energy Project and includes the following subsections:

- Land Use (Section 4.2.1)
- Light and Glare (Section 4.2.2)
- Aesthetics (Section 4.2.3)
- Recreation (Section 4.2.4)
- Historic and Cultural Preservation (Section 4.2.5)
- Agricultural Crops/Animals (Section 4.2.6)

4.2.1 LAND USE

Skamania County is governed by two independent sets of development regulations. The first is a stand-alone zoning code (SCC Title 22) that regulates uses and development within the Columbia River Gorge National Scenic Area GMA and SMA. The Scenic Area Code is based on the Management Plan for the Scenic Area, which is overseen by the USFS and Columbia River Gorge Commission, as directed by the National Scenic Area Act. The remainder of unincorporated Skamania County, including Scenic Area Urban Areas, is governed by zoning regulations in SCC Title 21 and related Titles 20 Shorelines and 21A Critical Areas. The proposed project site and access road (West Pit Road) ~~is~~ are regulated by SCC Titles 20, 21 and 21A.~~, but the access roadways up to the project boundary~~ Neither of the site or West Pit Road are regulated by SCC Title 22 Scenic Area. The site and access roadways are evaluated ~~separately~~ together with respect to land use in Section~~s~~ 4.2.1.2~~ and 4.2.1.3~~.

4.2.1.1 Existing Land Uses

Existing Land Use Conditions

The project site has been in commercial forestry use for the last century. During this time, the owners and operators have logged the property over a series of approximately 50-year logging rotations. The property is permanently committed to commercial tree farming and harvesting. Regardless of whether the wind energy facility is built, the project area will be, and will remain in, commercial forestry production. Ongoing activities will include regular clearing, replanting, and harvesting. The purpose of this project is to introduce an additional and compatible land use (wind energy generation), timed and implemented in sync with ongoing commercial forestry operations and rotations. This combination of natural resource uses (logging and renewable, clean wind energy production) is intended to better diversify the use of the property and the Skamania County economy as a whole. This diversification would ensure ongoing commercial

forestry in concert with another natural resource-based land use that would better insulate the Applicant from economic cycles that have undermined similar timber operations both in the county and the Pacific Northwest as a whole, compelling multiple, large, irreversible conversions to residential, resort, and other uses.

The project would be sited within an existing utility corridor. There are two large, lattice electrical towers, four high-voltage transmission lines, two communications towers, a natural gas pipeline, and a rock pit to supply materials for forest road maintenance and construction within the project's immediate vicinity (see Figure 2.1-1 in Section 2.1). The proposed Whistling Ridge Energy Project would be connected to the existing BPA transmission lines and would be consistent with existing utilities and commercial timber operations.

To maximize the project's compatibility with ongoing timber harvest and other forestry operations, a number of design features have been incorporated into the project. For example, some of the turbine corridors would be sited on ridgelines to minimize clearing while maximizing wind exposure; existing private forest roads would be used for access to minimize new construction; and forest rotation length and tree heights have been factored into the design life of the project so that it would be compatible with tree growth rates in surrounding forest blocks. As noted above, the project would help diversify the income potential from these forest lands while minimizing conversion to other uses.

Other uses permitted within the For/Ag-20 ~~and R-10 zones~~ include telecommunication facilities, log storage and sorting areas, scaling stations, temporary crew quarters, forest industry storage and maintenance facilities, farm use, single-family dwellings for farm or forest operators, home occupations, rooftop wind turbines, small-scale solar energy systems, and management of fisheries, biological areas, and conservations areas. Further, Washington's Forest Practices Act allows timber harvest and surface mining as part of commercial forest practices.

The proposed alternative 5-acre Maintenance and Operations facility would be located on land zoned Residential 5 (R-5), a zoning requiring a minimum of 5 acre sites. In addition to residential, other non-residential uses permitted outright in the R-5 zone include commercial and domestic agriculture, forestry, and public facilities and utilities. Non-residential uses allowed by conditional use approval include surface mining, recreational facilities, professional services, geothermal energy facilities, semi-public facilities, small and large-scale recreational vehicle parks, and child day care centers.

Land Uses within 25 Miles of the Site

To consider the proposed land use of wind energy in a broader context, land uses within 25 miles of the site were considered. The area encompassing a 25-mile radius of the site is transected east-west by the Washington-Oregon border, Columbia River Gorge, Columbia River Gorge National Scenic Area , SR 14, BNSF Railway, the Columbia River, and I-84 (on the Oregon side of the Columbia River). The Gifford Pinchot National Forest is located north of the project in Washington State (Figure 4.2-1, Land Uses within 25 Miles of Site).

33758687_31.cdr

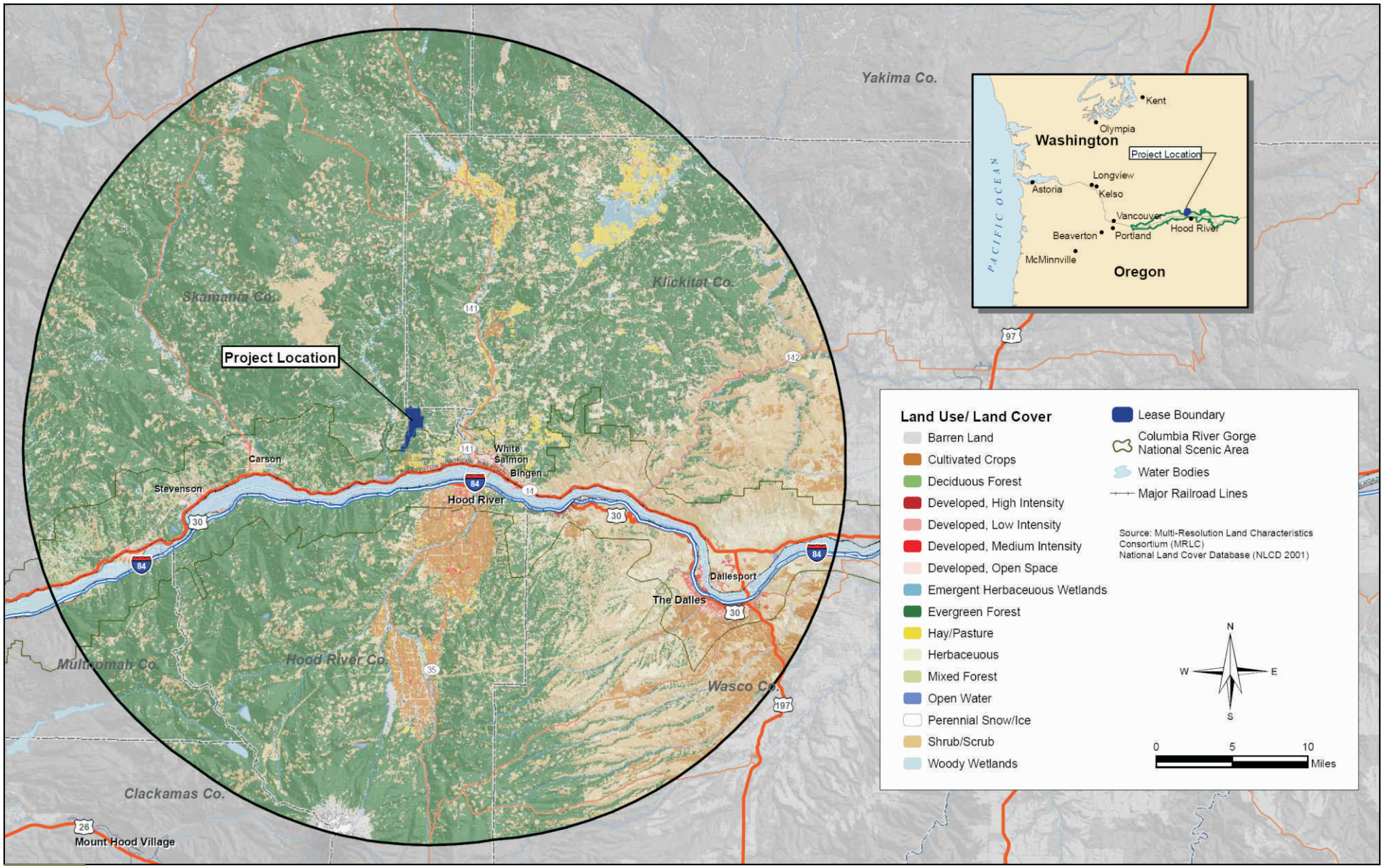


Figure 4.2-1

Land Uses Within 25 Miles of Site

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

On the Washington side of the Columbia River, land use is predominantly commercial forestry and residential in numerous small, unincorporated communities. There is some limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards, within the Scenic Area. On the Oregon side of the Columbia River land use in the Scenic Area is predominantly commercial timber production and residential. South of the Scenic Area, on the Oregon side, land uses include commercial forestry, agriculture, and some residential. The primary Oregon orchard crops are pears, apples, and cherries. The project is not located near or on any shorelines of State, County or other significance.

The project is located in Skamania County, but is adjacent to Klickitat County to the north. The incorporated cities of White Salmon and Bingen are located approximately 7 miles southeast of the site on and near the Columbia River. The Skamania County seat is located in the incorporated city of Stevenson, approximately 15 miles southwest along the Columbia River. Directly south and across the Columbia River from Bingen is the city of Hood River, Oregon. These incorporated cities have mixed urban uses, but their populations remain low, as do the overall populations of Skamania and Klickitat Counties (Table 4.2-1).

Table 4.2-1
Populations of Counties and Incorporated Cities in the Vicinity of the Proposed Whistling Ridge Energy Project

City	Population (2000 U.S. Census)
Skamania County	9,872
Klickitat County	19,161
Bingen, WA	672
White Salmon, WA	2,193
Hood River, OR	5,831
Stevenson, WA	1,200

The Scenic Area extends 85 miles along the Columbia River and includes portions of three Oregon and three Washington counties. The project site is located roughly north of the center of the Scenic Area on the north side of the Columbia River. The National Scenic Area Act designated for special protection 292,500 acres on both sides of the Columbia River from the outskirts of the Portland-Vancouver metropolitan area in the west to the semi-arid regions of Wasco and Klickitat counties in the east. Although both the project site and the access road are located completely outside the Scenic Area, the proposed Whistling Ridge Energy Project does extend up to its outermost boundary~~, and access is through the Scenic Area~~. ~~Scenic Area access roads already exist, but require improvement for the delivery of components and related equipment into the project site (See Section 4.3 Transportation for further details on road improvements).~~

Recreation facilities in the vicinity of the development are discussed in Section 4.2.4.

Impacts to Existing Land Uses

Construction

During construction at the development site, earth movement and construction-related traffic would generate noise and dust that would impact nearby businesses. Impacts and mitigation related to dust, noise, and traffic during construction are addressed in Sections 3.2, 4.1, and 4.3, respectively.

Operation

The Whistling Ridge Energy Project would provide approximately 75 MW of renewable energy resources. Wind energy has been proven to be a safe, effective, and efficient use of alternative energy. No negative impacts to existing or planned land uses are anticipated.

On the Washington side of the Columbia River, land use is predominantly commercial forestry and residential in numerous small, unincorporated communities. There is some limited agriculture, mostly pear and apple orchards recently augmented with some wine grape vineyards, within the Scenic Area. On the Oregon side of the Columbia River land use in the Scenic Area is predominantly commercial timber production and residential. South of the Scenic Area, on the Oregon side, land uses include commercial forestry, agriculture, and some residential. The primary Oregon orchard crops are pears, apples, and cherries. The project is not located near or on any shorelines of State, County or other significance.

The wind turbines would likely be painted a non-reflective flat neutral gray or light color to blend in with the natural setting and the sky. Visual impacts are addressed in Section 4.2.3.

The project's electrical system would consist of two key elements: 1) a collector system, which would collect energy generated at 575 volts from each wind turbine, transform the voltage to 34.5 kV using a pad-mounted transformer, and deliver the energy via underground collector cables to 2) the project substation, which would further transform the energy delivered by the underground collector system from 34.5 kV to 230 kV and deliver it to the adjacent BPA transmission line and into the regional transmission system. If unforeseen physical constraints prohibit underground placement of all lines, aboveground lines would be required.

Permanent Operations and Maintenance facilities would be constructed on an approximately ~~3.1~~5-acre ~~area~~ site located either adjacent to the substation, or west of the project area along West Pit Road. Facilities would likely include office and workshop areas, a kitchen, bathroom, shower, and utility sink. At least one structure would be constructed of sheet metal, and would be approximately 16 feet tall (to the roof peak) and enclose approximately 3,000 square feet. A graveled parking area for employees, visitors, and equipment would be located adjacent to the building. The entire area would be fenced and have a locked gate.

Security lighting would be minimized and directed downward and toward the facilities to protect from light spill over onto adjacent properties.

The project would operate in compliance with applicable Washington State Environmental Noise Levels, Chapter 173-60 WAC.

If the project were terminated, the necessary authorization from the appropriate regulatory agencies would be obtained to decommission the facilities in accordance with the approved Site Restoration and Decommissioning Plan. All aboveground facilities would be removed from the site, and unsalvageable material would be disposed of at authorized sites. To avoid environmental damage and unnecessary land disturbance, the underground collector cables likely would be retired in place, and turbine foundations would be removed to a depth of approximately four feet bgs, with the remainder likely retired in place.

The soil surface would be restored as close as reasonably possible to its original condition. Reclamation procedures would be based on site-specific requirements and forest management techniques commonly employed at the time the area is to be reclaimed, and would include regrading, adding topsoil, and replanting of all disturbed areas. Decommissioned roads would be reclaimed or left in place based on landowner preference, and right of way would be surrendered to the landowner.

4.2.1.2 Relationship of Project Site to Existing Land Use Plans and Policies

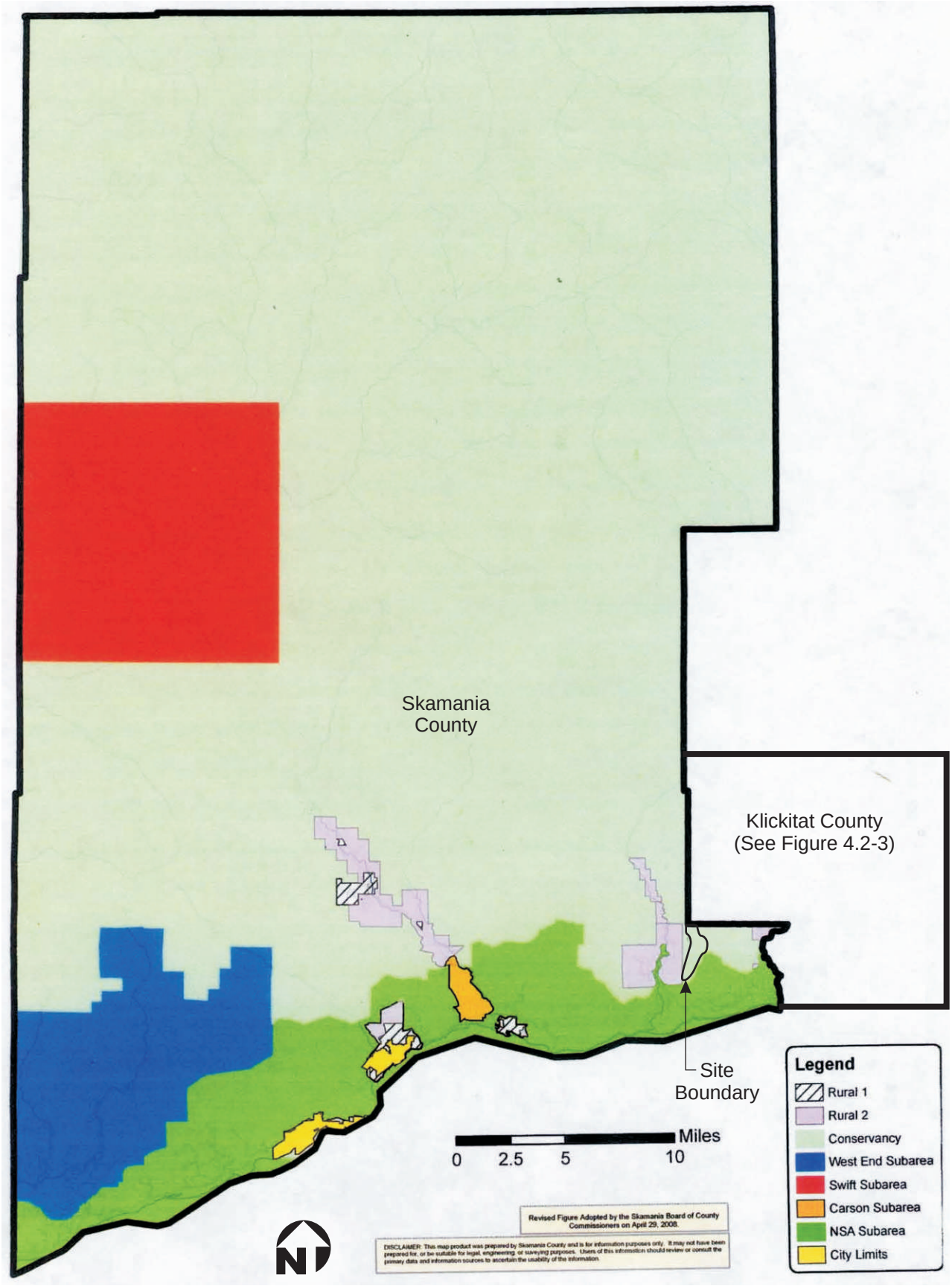
2007 Comprehensive Plan

The proposed Whistling Ridge Energy Project site is located within Skamania County. On July 10, 2007, Skamania County adopted its current Comprehensive Plan, which includes three Subarea Plans (Figure 4.2-2 Comprehensive Plan Designations). The project site is not located in one of these subareas. There are three land use designations outside of the specific subarea plans: Rural I, Rural II, and Conservancy. The project area is designated as "Conservancy." Table 2-1 of the Comprehensive Plan identifies zones that are consistent with the Conservancy designation, including: Residential 10 (R-10), Rural Estates 20 (RES-20), Forest Land 20 (FL 20), Commercial Resource Land 40 (CRL 40), Natural (NAT) and Unmapped (UNM). The project site is located in the FL 20~~, R-10,~~ and UNM zones, ~~all~~ both of which are consistent with the Conservancy designation. The alternative Operations and Maintenance facility site would be located in the R-5 zone, a zone shown as consistent with the Rural II designation. The project site also is located adjacent to (but not within) southwestern Klickitat County (see Figure 4.2-3, Klickitat County Land Use Designations). In a letter to EFSEC, dated May 4, 2009, Karen Witherspoon, Skamania County Community Development Department Director, found that the proposed project is consistent with the Skamania County Comprehensive Plan, and resource maps. A similar letter has been requested regarding the alternative location of the Operations and Maintenance facility.

The overall Skamania County comprehensive plan vision statement is:

> *"Skamania County is strongly committed to protecting our rural character and natural resource based industries while allowing for planned future development that is balanced with the protection of critical resources and ecologically sensitive areas, while preserving the community's high quality of life."*

33758687_19.cdr



Source: Skamania County.

Job No. 33758687

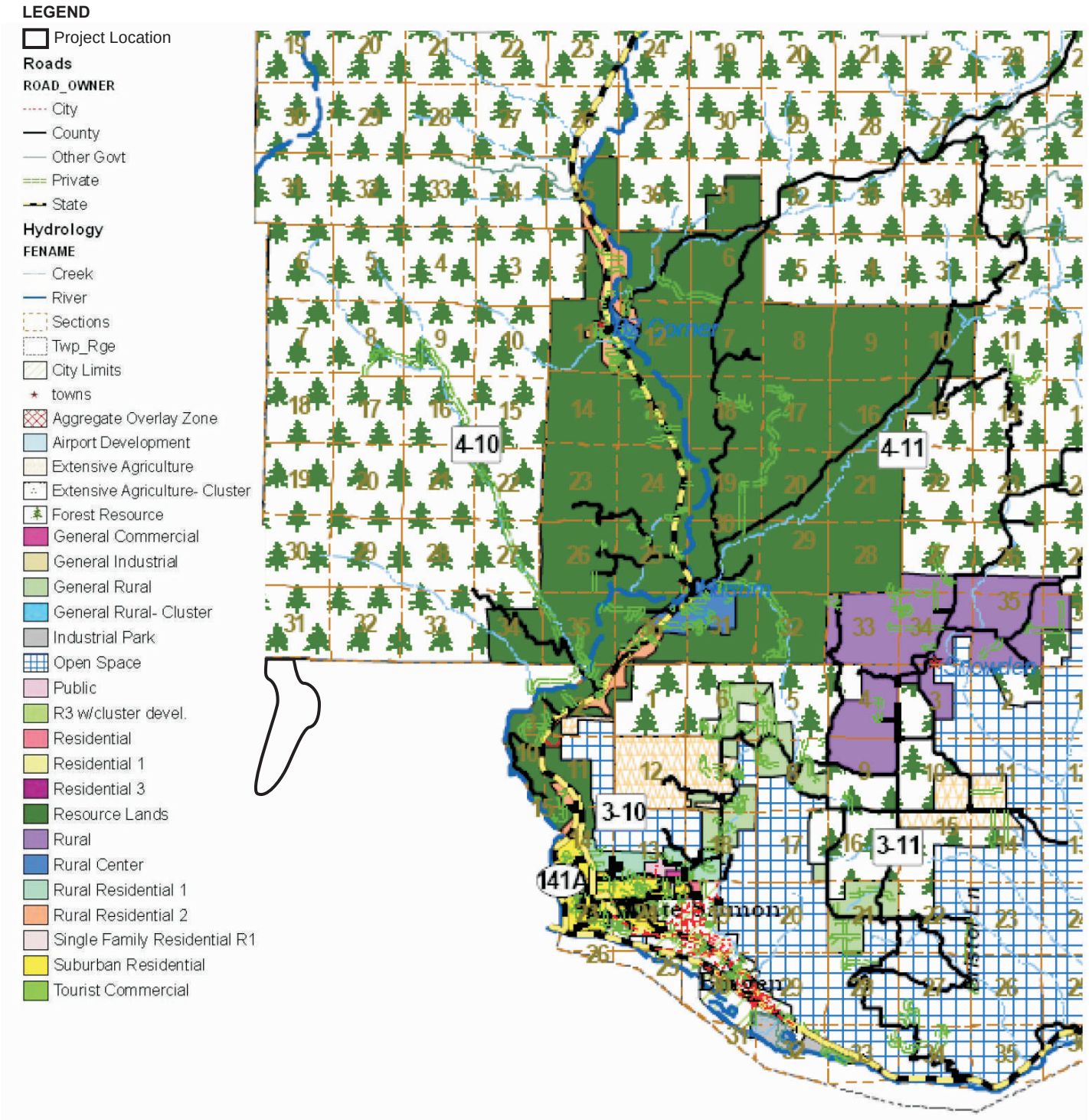
Figure 4.2-2

Comprehensive Plan Designations

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_32.cdr



Source: *Klickitat County.*

Job No. 33758687

Figure 4.2-3

Southwestern Klickitat County Land Use Designations

URS

Whistling Ridge Energy Project
Skamania County, Washington

Natural resources based industry is further encouraged in the Conservancy land use designation. Beginning on page 25 of the Comprehensive Plan is a description of the intent of the Conservancy designation:

> *"The Conservancy land use area is intended to provide for the conservation and management of existing natural resources in order to achieve a sustained yield of these resources, and to conserve wildlife resources and habitats. Much of the Conservancy land use area is characterized by rugged terrain, steep in slope, and unsuitable for development of any kind. Logging, timber management, agricultural and mineral extraction are main use activities that take place in this area. Recreational activities of an informal nature such as fishing, hunting, and hiking occur in this area, although formal recreational developments may occur from time to time. Conservancy areas are intended to conserve and manage existing natural resources in order to maintain a sustained resource yield and/or utilization."*

The land proposed for the project is in an area of rugged terrain and steep slopes. The land is used primarily for logging and timber management. Informal recreation activities take place in the area of the proposed project, although access to the project site for these activities is limited by the Applicant. The Whistling Ridge Energy Project would be consistent with the Comprehensive Plan vision and the Conservancy designation, in that it would conserve and manage existing natural forest and wind resources to maintain a sustained yield and utilization of both.

Among the uses identified by the 2007 Comprehensive Plan as appropriate in the Conservancy designation are: public facilities, utilities, utility substations, forest management (including temporary logging and mining camps), and surface mining (by conditional use). Wind energy facilities are consistent with the Conservancy designation because they are utilities. The project would provide an alternative source of electrical energy generation that is not reliant on either fossil fuels or hydropower, while allowing forest management activities to continue around the turbine corridors. The Whistling Ridge Energy Project would be a utility consistent with the Conservancy designation's appropriate uses.

The use of Rural II land is described beginning on page 24 of the Comprehensive Plan:

> *"The Rural II land use area is intended to provide for rural living without significant encroachment upon lands used for agriculture and timber. This land use area is the middle developmental range level suggested by this plan. The lower density will help to protect agricultural and timber lands from dense residential type development, and should maintain the rural character of this designation."*

The Operations and Maintenance facility would include an approximately 3,000 square foot building, located on a 5-acre parcel in an area designated as Rural II in the Comprehensive Plan. The facility would be similar in size to a larger single family home. Among the non-residential uses identified in the 2007 Comprehensive Plan as appropriate in the Rural II designation are: public facilities, utilities, utility substations,

telecommunication facilities, hospitals, meeting halls, agriculture, forest management, including temporary logging and mining camps, and surface mining.

The project would not be in conflict with any of the goals or policies expressed in the 2007 Comprehensive Plan. A number of these specifically encourage projects similar to the Whistling Ridge Energy Project:

Land Use (beginning on page 26 of the Comprehensive Plan)

Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).

> *Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possible by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.*

Goal LU.2: To provide for orderly future physical development of Skamania County.

> *Policy LU.2.4: Encourage new commercial enterprises to locate within or near existing commercial areas to avoid further scattering and to better serve the public.*

Goal LU.3: To coordinate public and private interests in land development.

> *Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.*

Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.

> *Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.*

Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.

> *Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.*
>
> *Policy LU.5.6: Encourage commercial development that is convenient, safe and pleasant to the general public by: requiring that new establishments provide off-street parking adequate for its needs. Encourage pooled or joint use parking areas for adjacent developments may be utilized; Regulate access points for vehicular traffic for commercial areas to prevent unsafe conditions; the design of commercial sites, buildings,*

and signs should be compatible with surrounding areas; and, landscaping may be required as a buffer when commercial use adjoins residential or farm property.

Environmental (beginning on page 43)

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water, and energy resources.

Transportation, Public Facilities and Services (beginning on page 58)

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.2: Continue the priority of increasing safety of the Skamania County rural 2-lane road system. The majority of the Public Works Department's future efforts will be to reduce the accident rate with Skamania County.

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Archeology and Historic Preservation (beginning on Page 68)

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance.

Goal AHP.2: Increase recognition of historic, archaeological, and cultural resources.

Goal AHP.3: Protect historic, archaeological and cultural resources through a comprehensive planning approach.

Skamania County Code, Title 21 Zoning

At the time of this Application, the existing SCC Title 21 remains in effect. However, extensive updates have been proposed for adoption, but they are under appeal by local interest groups and so are indefinitely on hold. The project site's relationship to the existing Title 21 zoning is discussed in this section. ~~Even though not in effect or even in a final form, a discussion of the project site's relationship to the most recent version of the proposed Title 21 zoning update is presented in Appendix E to demonstrate the Whistling Ridge Energy Project would be consistent with both.~~ In a letter to EFSEC, dated May 4, 2009, Karen Witherspoon, Skamania County Community Development Department Director, found that the proposed project is consistent with SCC Title 21 Zoning Code, SCC 21A Critical Areas, Title 24 Clearing and Grading, the Comprehensive Plan, and resource maps.

Approximately 400 acres of the 1,152-acre site ~~are~~ is within areas zoned Resource Protection (For/Ag-20) ~~and Residential 10 (R-10)~~ by Skamania County. Turbine corridor A1-A7 with approximately seven turbines is proposed in these areas. The proposed alternative Operations

and Maintenance facility located along West Pit Road would be within an area zoned Residential 5 (R-5). The existing SCC Title 21 would require a conditional use permit for both ~~this~~ the A1-A7 turbine corridor and the alternative location along West Pit Road for the Operations and Maintenance facility. A letter similar to the County's May 4, 2009 Certificate of Land Use Consistency has been requested regarding the alternative location for the Operations and Maintenance facility and will be provided to EFSEC.

The remainder of the project site is in the UNM zone. In UNM zones wind energy facilities would be outright permitted uses (Figure 4.2-4 Skamania County Zoning). *"In the UNM zone all uses which have not been declared a nuisance by statute, resolution, ordinance or court of jurisdiction are allowable. The standards, provisions, and conditions of this title [SCC Title 21] shall not apply to unmapped areas (SCC 21.64.020)."* SCC 8.30.010 enumerates the sum total of the nuisances established by the Board of County Commissioners by resolution and ordinance.

Neither the RCW nor the WAC includes statutes designating wind energy facilities as a nuisance. Such facilities have not been designated a nuisance in any court of jurisdiction.

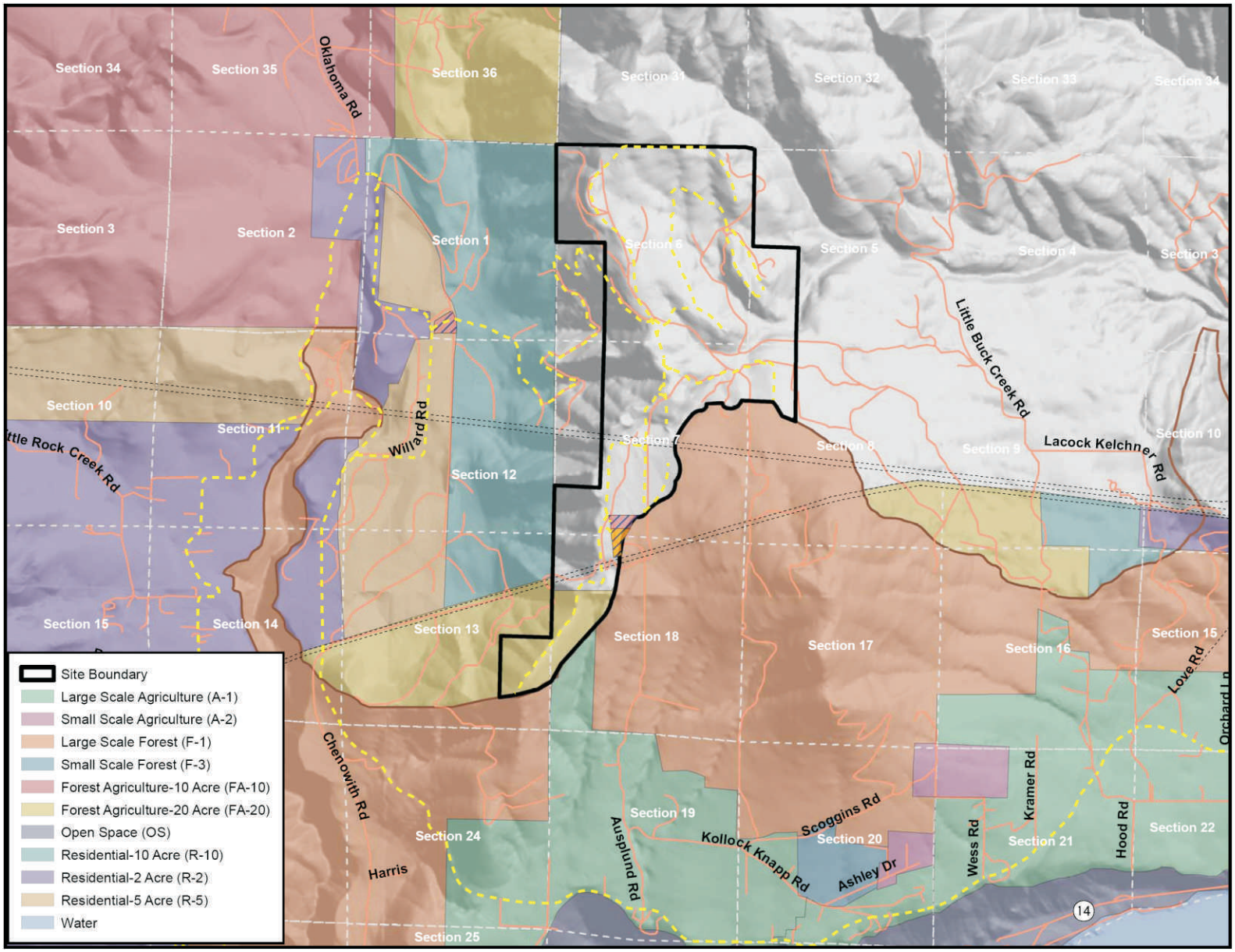
The project would conform to the purpose and intent outlined in current zoning code for each of the three zones in which it would be located. The purpose of each applicable zone is listed below:

- ~~Residential 10 (R-10) – *"The R-10 zone classification is intended to provide a transition zone of low density rural residential development which will maintain the rural character of areas within the rural II and conservancy land use areas of the county comprehensive plan" (SCC 21.40.010).*~~

- Residential 5 (R-5) – *"To provide a transition zone of medium to low density residential development which will maintain a rural character of the area in the Rural II Land Use Area of the County Comprehensive Plan A." (SCC21.36.010).*

- Resource Production (For/Ag-20) - *"To provide land for present and future commercial farm and forest operations in areas that have been and are currently suitable for such operations, and to prevent conflicts between forestry and farm practices and nonresource production uses by not allowing inappropriate development of land within this zone classification" (SCC 21.56.010[A]).*

- UNM – "*The provisions of this chapter shall apply to all zone classifications (except for the unmapped classification) unless otherwise noted in a particular zone classification" (SCC 21.70.010).*



Source: GeoDataScape.

Job No. 33758687

Revised Figure 4.2-4

Skamania County Zoning

URS

Whistling Ridge Energy Project
Skamania County, Washington

In the surrounding area between Underwood Mountain and the Little White Salmon River, the predominant land use is commercial forestry. East of the Little White Salmon River, there is some land zoned Residential (R-2, R-5, and R-10). However, all of the R-10 and R-5 lands, and most of the R-2 lands, are currently being used for commercial timber production under ownership by S.D.S. Co., LLC, Broughton Lumber Company, and Washington State. The Washington State lands are managed by WDNR for commercial harvest to support the State's schools.

West of the Little While Salmon River are the unincorporated rural communities of Mill A and Willard. Mill A is located at least 1.5 miles from the nearest turbine corridor and Willard is at least 2.25 miles north of the nearest turbine corridor. Both Mill A and Willard are predominantly zoned Residential (R-2 and R-5).

Skamania County has been updating its comprehensive plan and existing Title 21 zoning since 2005. In July 2007, the County adopted a moratorium on unincorporated UNM-zoned lands outside the Swift Subarea. The moratorium does not prohibit all development in UNM lands. Rather, it restricts three types of land uses: 1) issuance of building permits on lands created by deed since January 2006 that are 20 acres or larger; 2) land divisions (short plat and subdivision); and 3) acceptance of SEPA checklists in support of converting land to non-forestry uses. The project is not sited on lands created by deed since January 2006 and does not involve any land division. Because of EFSEC's well-established preemptive role in permitting wind energy facilities, including acting as Lead Agency for associated SEPA review, the County's moratorium on acceptance of SEPA checklists for forest practices conversions does not affect the project.

Conditional Use Approval

The R-~~10~~ 5 and For/Ag-20 zones list semi-public utilities as conditional uses under SCC ~~21.40.030(G)~~21.36.031(G) and SCC 21.56.030(C), respectively. Semi-public utilities are defined in SCC 21.08.010 as *"facilities intended for public use which may be owned and operated by a private entity."* Thus, the proposed Whistling Ridge Energy Project would be a semi-public utility under SCC Title 21 with turbine corridor A1-A7, located ~~partially in the R-10 and partially~~ in the For/Ag-20 zone~~s~~ and the alternative Operations and Maintenance facility along West Pit Road located in the R-5 zone (Figure 4.2-~~3~~4, ~~Klickitat County Land Use Designations~~Skamania County Zoning). Absent EFSEC review, the A1-A7 ~~this~~ turbine corridor and the alternative location for the Operations and Maintenance facility along West Pit Road would be subject to the conditional use provisions outlined in SCC 21.16.070, as amended in Ordinance 2007-02. The zoning code would require a determination of whether the proposed use is compatible with existing or permitted uses in the specific area according to six criteria. Conditions may be imposed based on the health, safety, and general welfare of the public, any environmental standards in force, and provisions of SCC Title 21. The conditional use permit criteria that would be relevant to the project are included in SCC 21.16.070(A)(1) and are listed and analyzed below.

a. Be either compatible with other uses in the surrounding area or is no more incompatible than are other outright permitted uses in the applicable zoning district;

Response: The project site and the site proposed for the alternative Operations and Maintenance facility along West Pit Road ~~is~~ are used for commercial timber operations and construction characterized by regular timber management activities, including timber cutting and heavy equipment usage. The project site has been harvested for many years, based on established harvest schedules using an approximate 50-year rotation. In the surrounding area, between Underwood Mountain and the Little White Salmon River, the predominant land use is commercial forest production. Immediately east of the Little White Salmon River, there is some land zoned Residential (R-2, R-5, and R-10). However, most of this land is currently being used for commercial timber production and is owned by S.D.S. Co., LLC, Broughton Lumber Company, or WDNR. Only one 40-acre parcel adjacent to the east project boundary is owned by a private individual not involved in the project. This parcel is in commercial forest production and contains no residential structures.

~~Only~~ The proposed turbine corridor A1-A7 would be subject to a conditional use permit. The nearest residence outside the National Scenic Area, on lands zoned R-2, R-5 or R-10, is located at least 0.5 mile from this proposed corridor (Figure 4.1-1, Noise Level Contours). The rural communities of Mill A and Willard are located west of the Little While Salmon River. Mill A is approximately 1.5 miles from proposed turbine corridor A1-A7 and Willard is approximately 2.25 miles north.

The proposed alternative site along West Pit Road for the Operations and Maintenance facility would also be subject to a conditional use permit. The nearest residence is located along Young Road, approximately 0.25 mile from the facility site (Figure 4.1-1, Noise Level Contours).

The project has been designed to be compatible with commercial forest use. For example, some turbines are proposed on ridgelines, existing private forest roads would be used for access, and forest rotation schedules and tree heights have been considered so that the design life of the project would be compatible with the growth rate of the trees in surrounding forest blocks. The Applicant has established a replanting and timber management profile to provide the maximum ongoing use of the project site for commercial forestry operations, minimizing the need for permanent or temporary conversion to non-forestry uses (Figure 2.3-2, Forest Management).

The project would help diversify the income potential for the landowner while minimizing conversion of timber lands to other uses. The project site and vicinity are within an existing utility corridor already characterized by massive electrical transmission facilities operated by BPA, a natural gas pipeline, two cellular communication towers, and rock pits for forest operations. There are large lattice electrical towers and four high-voltage transmission lines crossing turbine strings A and B (Figure 2.1-1, Location of Proposed Whistling Ridge Energy Project). Allowable administrative and conditional uses that would be permitted within the R-~~10~~ 5 and For/Ag-20 zones are shown in Table 4.2-2. These uses are subject to standards in the R-~~10~~ 5 and For/Ag-20 zones according to SCC 21.~~40~~36.050 and SCC 21.56.050, respectively, as well as code sections specified for particular listed uses.

Table 4.2-2
Uses by Class Which Are, or May Be Authorized Subject to Standards in the R-~~10~~ 5 and For/Ag 20 Zones under Existing SCC Title 21

Class of Use	R-~~10~~5	For/Ag 20
Allowable Uses	Single-family dwellings	Forestry practices and associated management activities of any forest crop in accordance with Washington Forest Practices Act of 1974 including timber, Christmas trees, nursery stock, and surface mining
	Commercial and domestic agriculture	
	Forestry	
	Public facilities and utilities	
	Cottage occupation	Commercial and domestic agriculture
	Light home industry	Orchards and vineyards
	Residential care facilities	Horticulture
	Family day care home	Cottage occupation
	Safe home	Light home industry
	Accessory equipment structures	Management of unique biological areas
	Attached communication facilities on BPA towers	Water resources management facilities
		Storage of explosives, fuels and chemicals
		Accessory uses normally associated with an allowable use
		Public and private conservation areas or structures for retention of water, soil, open space, forest or wildlife resources
		Log sorting and storage areas, scaling stations, temporary crew quarters, forest industry storage and maintenance facilities
		Up to one individual single-family dwelling units used as the principal residence for the farm or forestry operator
		Family day care home
		Residential care facilities
		Farm labor housing
		Accessory equipment structures
		Attached communication facilities not located on BPA towers
Administrative Review Uses	Child mini-day care center (subject to 21.83.030)	Attached communication facilities not located on BPA towers
	Attached communication facilities not located on BPA towers (subject to 21.70.160)	Communication towers
	Communication towers	Co-location of communication towers
	Co-location of communication towers	
Conditional Uses	Recreational facilities	Single-family residences not in conjunction with forest or farm management
	Geothermal energy facilities	Recreational facilities
	Public displays	Semi-public facilities and utilities
	Professional services	Sawmills, shake and shingle mills, chippers, pole and log yards
	Surface mining	Geothermal energy facilities
	Cluster developments	Aircraft landing fields
	Semi-Public facilities	Cluster developments
	Small and large-scale recreational vehicle parks	Child mini-day care center
	Child day care center	Child day care center

Standards in SCC 21.~~40~~36.050 and 21.56.050 include limitations as to lot size, density, and setbacks; a 35-foot building height limit; off-street parking requirements; and prohibition of building location within easements. In the R-~~10~~ 5 zone, minimum lots size is ~~10~~ 5 acres with a

maximum density of one single family dwelling unit per ~~10~~ 5 acres. Setbacks in this zone are as follows:

- Front Yard: 50 feet from the centerline of the public road right of way or ~~34~~ 35 feet from the centerline of a private road, or 20 feet from the front property line, whichever is greater
- Side Yard: 20 feet from all side property lines
- Rear Yard: 20 feet from the rear property line

In the For/Ag-20 zone, minimum lot size is 20 acres with each single-family dwelling unit requiring at least an acreage amount equal to the required minimum lot size. Setbacks in this zone are as follows:

- Front Yard: Same as R-~~10~~ 5 zone
- Side Yard: 25 feet from all side property lines
- Rear Yard: 25 feet from all rear property lines

As proposed, the project would meet all these requirements.

Washington's Forest Practices Act allows timber harvest and surface mining as part of commercial forest practices. The turbine corridor proposed within the For/AG-20 ~~and R-10~~ zone~~s~~ would be visible from Mill A and Willard. However, they are no more incompatible with the surrounding area than other uses permitted in the County's zoning code (Table 4.2-2) and by Washington's Forest Practices Act. The project would in no way impair the use of any of the surrounding lands in accordance with applicable zoning codes and land use plans. The wind turbine generators also would be compatible with the other major electrical and communications systems already present in the project vicinity. Information contained in this Application, and the EIS to be prepared for the project, will fully consider the potential project impacts including visual impacts, noise, and impacts to wildlife.

b. Not materially endanger the health, safety, and welfare of the surrounding community to an extent greater than that associated with other permitted uses in the applicable zoning district;

Response: A Geotechnical Report has been prepared to analyze existing soil and subsurface conditions and to determine the appropriate foundation design (see Section 3.1 and Appendix A). Turbines are designed to meet industry standards in all wind conditions, including shutting down during certain wind conditions. The wind turbine corridors are proposed at a minimum distance of, 4,265 feet (0.8 mile) from any residences on R-2, R-5 or R-10 lands, and 2,000 to 2,560 feet (0.38–0.48 mile) from the nearest residence in the Scenic Area (Figure 4.1-1, Noise Level Contours).

Vegetation clearing around each proposed turbine corridor would allow for safe construction, and would reduce the potential for growing trees to interfere with the wind resource on the site during the commercial life of the project (at least 30 years). Typically, a permanently cleared area would extend 50 feet in all directions from each turbine. Between 50 feet and 150 feet from the base of the turbines, tree heights would be limited to 15 feet above the turbine base elevation. Extending from 150 feet to 500 feet from the base of the turbines, a tree-height restriction of 50 feet in height would be maintained for trees located within an area formed by a 90 degree angle centered on the prevailing wind direction (Figure 2.3-4, Turbine Timber Buffer).

In addition to the clearing around turbines, there would be a 50-vertical-foot limitation placed on trees along any overhead electrical cable corridors, or such other height as may be required by BPA. Where underground cables are not installed along existing roads, no trees would be planted within 5 feet from the centerline of the cable trenches.

Improvements to forest roads for construction and access would provide improved access for fire and other emergency response vehicles in an emergency situation. As documented in Section 4.1.1 Noise, the project would comply with Washington's applicable noise standards. As discussed in that Section and in Section 4.2.2 Light and Glare, no glare impacts are anticipated.

c. Not cause the pedestrian and vehicular traffic associated with the use to conflict with existing and anticipated traffic in the neighborhood to an extent greater than that associated with other permitted uses in the applicable zoning district;

Response: Access to the project area is provided via County roads that extend north from SR 14. From SR 14, access is provided via County roads (Cook-Underwood Road to ~~Kollock-Knapp~~Willard Road ~~onto Scoggins Road~~) and via a new connection to West Pit Road, an ~~network of~~ existing private logging roads. ~~The private logging roads are~~West Pit Road is on S.D.S. Co., LLC and Broughton Lumber Company property, and would provide access to most areas where project facilities are proposed.

Constructing the project would require 2.4 miles of new construction and ~~5.1~~5.4 miles of improvements to existing private logging roads outside the Scenic Area. All these improved and constructed roads would continue to be used during the project's operational phase.

Within the project area and its access roads, both pedestrian use and traffic volumes are currently very low, and would remain so during project construction and operation. During the 12-month construction period, an average of 143 workers would be employed. Peak work force would be 330 workers. Labor and equipment access would be via existing logging roads. Because the project is proposed on land that would remain in the commercial forest operator's ownership, the use of private forest roads for project construction would be easily coordinated to minimize impacts to forest operations.

When the project is operational, eight to nine permanent full-time and/or part-time employees are proposed as Operations and Maintenance staff. This number is similar to, or less than, staff numbers currently involved in on-going timber management.

Further information regarding the transportation impacts of the project is presented in Section 4.3 Transportation.

d. Be supported by adequate service facilities and would not adversely affect public services to the surrounding area;

Response: The construction period is anticipated to last 12 months and employ up to 330 workers. Not all workers would be on site during the same period. The work force at the site would average 143 workers per day, and peak at 265 workers. Because of the site's commuting proximity to the Vancouver, Washington and Portland, Oregon labor pools, it is not anticipated that there would much of a demand for temporary housing or school enrollment in the immediately-surrounding communities (Section 4.4, Socioeconomics). The construction management plan would include provisions for site security and on-site initial emergency response (see Section 2.16). Whistling Ridge Energy LLC would negotiate with existing service providers to ensure there would be adequate response from potential emergency service needs during the construction period.

A well and on-site septic system would be installed to provide potable water for the Operations and Maintenance facilities. The anticipated demand for fire and police services is estimated to be low, and similar to other commercial operations in the project vicinity (Section 4.4 Socioeconomics).

e. Not hinder or discourage the development of permitted uses on neighboring properties in the applicable zoning district as a result of the location, size or height of the buildings, structures, walls, or required fences or screening vegetation to a greater extent than other permitted uses in the applicable zoning district;

Response: All property immediately east of the project is owned by the Applicant and is in the UNM zone. There are no neighboring off-project properties located within the For/Ag-20 zone. Adjacent off-project lands to the north are located in Klickitat County and are under State ownership, managed by WDNR for timber production.

There are ~~seven~~ six properties adjacent to the west project boundary that are zoned R-10. Of these, only ~~three~~ two are owned by a person or entity other than the Applicant. Two are owned by the State and managed by WDNR~~, and one totaling 40 acres is in private ownership~~. All these neighboring properties are managed as commercial forest land with no residential structures. The nearest residence to the alternative Operations and Maintenance facility site is approximately 0.25 mile away. It is located in an area zoned R-10.

There are five adjacent off-project properties to the south located within the Scenic Area. These are primarily zoned GMA large-scale agricultural (GMA Ag-1) or commercial forest (GMA F-1). Of these five properties, only one totaling 29 acres is owned by someone other than the Applicant. The 29-acre parcel is primarily managed as forest and orchard lands with 1 acre used for residential purposes. The owners of this property have been vocal opponents of the proposed wind energy facility. They submitted a Scenic Area application, and received approval from Skamania County, to re-locate their existing home to within 50 feet of their north property line. This new location would bring the residence to within 2,000 feet of the closest proposed turbine

corridor. Except for this parcel, all adjacent lands to the south are in commercial timber production.

Approximately ~~three~~ seven turbines are proposed within the For/Ag-20 zone~~, and approximately four are proposed in the R-10 zone~~ (those that require a conditional use permit). These turbines proposed in corridor A1-A7 would be in a somewhat isolated part of the For/Ag-20~~ and R-10~~ zone~~s~~. Washington's Forest Practices Act allows timber harvest and surface mining as part of commercial forest practices. Other uses permitted within the ~~R-10 and~~ For/Ag-20 zones are listed in Table 4.2-2.

The turbines in the corridor proposed in the ~~R-10 and~~ For/Ag-20 zone~~s~~ would be approximately 426 feet tall (measured to the blade tip). Their height and visibility would not hinder or discourage the development of any of the uses identified in Table 4.2-2. Impacts related to commercial resource production and harvesting are considered part of the existing working landscape. The proposed turbines would be taller than other structures permitted outright in the For/Ag-20 zone; however, they would be considerably quieter than other uses allowed in the zone, such as some forestry or surface mining operations. Except for areas to be cleared for the proposed project, regular timber harvest would continue within the project site.

Neighboring forest lands are subject to regular harvest, which is generally accomplished through clear cutting. After timber harvest, areas not converted to a non-forestry use must be re-planted within a time frame specified in Washington Forest Practices rules. Project retirement is likely to coincide with the regular harvest cycle on the project property. The project would in no way hinder the use or development of surrounding properties in accordance with existing land use planning and zoning. Further, the project would create an additional revenue stream for the Applicant, which would encourage continued use of the site for commercial timber harvest. Thus, the owner would be better able to weather timber industry economic down-cycles, and the project would create disincentives for potential conversion to other uses such as residential.

f. Not be in conflict with the goals and policies expressed in the current version of the County's comprehensive plan.

Response: See above for a detailed discussion of the project's relationship to, compliance with, Skamania County's 2007 Comprehensive Plan.

Skamania County Code, Title 21A, Critical Areas

Title 21A only applies outside the Scenic Area. It regulates development in areas identified by the Washington State Legislature in RCW 36.70A.060 as being critical to the ongoing health of the state's natural and built environment. These critical areas include:

- Wetlands
- Areas with a critical recharging effect on aquifers used for potable water
- Fish and wildlife habitat conservation areas

- Frequently flooded areas
- Geologically hazardous areas
- Ponds and lakes
- Streams, creeks, and rivers

The project is not located within any critical recharge areas, frequently flooded areas, ponds and lakes, or rivers. Portions of the project site would be located near geologically hazardous steep slopes classified as Class II and III Landslide Hazard Areas (See Section 2.15 for a detailed discussion of hazards). There are wetlands, fish and wildlife habitat conservation areas, streams, and creeks on the site[1].

No new construction would occur within wetlands, streams, or their buffers. The proposed access road, West Pit Road, crosses one unnamed drainage in the Lapham Creek watershed. This stream had observed flow through the existing culvert under West Pit Road at the time of the July 2009 field visit. However, the surface flow and the channel disappear downstream of the culvert.~~The planned improvements to existing roads that would occur inside the Scenic Area would cross one stream~~ (shown on Figure 3.3-1 Waterways in the Project Vicinity). This stream has no defined channel ~~and carries water only during runoff events~~downstream of the culvert. It is classified as a Class V stream under SCC 21A~~.04.020(B)~~ Appendix C. Buffers are established for Class V streams. However, expansion of existing uses is allowed within these water resource buffers. Development review would be required under SCC 21A.05 and SCC 21A.06 in Fish and Wildlife Protection Areas and Geologically Hazardous Areas in consultation with WDFW. However, existing roadways would be allowed without review so long as any expansion is 100% or less of the original footprint. The road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold. For a full discussion of fish, wildlife, their habitats, and project impacts to these, please see Section 3.4 Habitat, Vegetation, Fish and Wildlife.

In a letter to EFSEC, dated May 4, 2009, Karen Witherspoon, Skamania County Community Development Department Director, found that the proposed project is consistent with SCC Title 21A Critical Areas. A similar letter will be requested of the County to address the new access road and the alternative location for the Operations and Maintenance facility.

~~4.2.1.3Relationship of Project Site Access Route to Existing Land Use Plans and Policies~~

~~Skamania County Code, Title 22, Columbia River Gorge National Scenic Area~~

~~The Project is proposed adjacent to the Scenic Area. Access to the site would be through the Scenic Area. The National Scenic Area Act expressly states: "*Nothing in Sections 544 to 544p of this title shall - *** establish protective perimeters or buffer zones around the scenic area or*~~

[1] The wetland on the project site results from a constructed impoundment according to National Wetland Inventory maps and so is not regulated locally as a critical area according to SCC Title 21A.04.020(A)(1)(b).

~~*each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas (16 USC § 544(o) Section 17(a)(10).*" Thus, siting the project up to the Scenic Area boundary is acceptable under the Act as approved by the United States Congress.~~

~~The Scenic Area is comprised of three land use classifications: GMAs, SMAs, and Urban Areas. SMAs, which contain the most sensitive resources, are managed by the US Forest Service. GMAs include a mixture of historic land uses such as farming, logging, residential, and cattle grazing. Development on GMA lands is administered by five of the six Gorge Counties and the Columbia River Gorge Commission. Both SMAs and GMAs are subject to local Scenic Area codes deemed consistent with the Scenic Area Management Plan by the Columbia River Gorge Commission and the US Secretary of Agriculture prior to adoption. In Skamania County, Scenic Area development regulations are codified in SCC Title 22.13. Urban Areas (including Cascade Locks, Hood River, Mosier, and The Dalles in Oregon, and North Bonneville, Stevenson, Carson, Home Valley, White Salmon, Bingen, Lyle, Dallesport, and Wishram in Washington) are exempt from Title 22 Scenic Area regulations.~~

~~The Act has two purposes (16 USC § 544(a) Section 3):~~

> ~~*1."To establish a national scenic area to protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge; and*~~
>
> ~~*2.To protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development in a manner that is consistent with paragraph (1)", the Act's first purpose*.~~*"*

~~The project would be located entirely outside the Scenic Area, not just in an exempt Urban Area. As a result, the project itself would not conflict with the Act's first purpose of protecting scenic, cultural, recreational, and natural resources in the Scenic Area.~~

~~Improvements to 2.1 miles of private road (CG2930) would be required to access the project. This road crosses lands that are in the GMA but outside the project boundary. These lands are zoned large-scale agriculture (GMA A-1) and commercial forest (GMA F-1). Improvement of the existing access road CG 2390 through the Scenic Area would fulfill the Act's second purpose by supporting the Columbia River Gorge economy in areas exempt from Scenic Area regulations. Further, the road improvements within the Scenic Area would be designed to comply with applicable provisions of SCC Title 22.~~

~~As indicated in Section 4.3 Transportation, the proposed CG2930 private road improvements would require a haul route agreement and negotiated road approach permit. These also would cover required improvements to four existing County right-of-way intersections in the Scenic Area GMA, which are described in detail in Section 4.3. Intersection improvements would be subject to review under Title 22.~~

GMA Ag-1 and F-1 Standards

The GMA Ag-1 zone does not impose further restrictions on road construction, reconstruction and modification (SCC 22.14.010). However, fire safety provisions (22.14.030(A)) and siting criteria (22.14.030(B)) apply to this review use in the GMA F-1 zone (SCC 22.14.030[E][1][h]).

Scenic Resource Protection Standards

GMA scenic resource protection provisions require the Administrator to make *"a determination of compatibility with the landscape setting based upon information submitted in the site plan (SCC 22.18.020[A][4])."* Landscape settings in the Scenic Area are *"designated on a map entitled 'Landscape Settings' adopted on October 15, 1991"* as part of the Management Plan for the Columbia River Gorge National Scenic Area (Management Plan) (SCC 22.18.040[A]). According to the Landscape Settings map, the proposed road improvements are located in the Coniferous Woodland landscape setting, which is governed by standards in SCC 22.18.040(C).

Additional scenic resource standards apply to new developments topographically visible from key viewing areas (KVAs) SCC 2.18.030. The Management Plan designates "important public roads, parks, and other vantage points providing public scenic viewing opportunities" as KVAs (GMA Policies Part I-1-6). Designated KVAs are listed in the Management Plan's glossary of terms (Glossary-11). The proposed road improvements would be potentially visible from the KVAs listed in Table 4.2-3.

Table 4.2-3
KVA Locations from Which the Road Improvement Area is Likely Visible

KVA	Length of KVA Segment from which Road CG2930 is Visible	Length of CG2930 Segment Visible from KVA
I-84, including rest stops	1.11 miles	236 ft
SR 14	1,333 ft	571 ft
Panorama Point Park	Not Applicable	1,395 ft
Dog Mountain Trail	468 ft	1.06 miles
Cook-Underwood Road	3,051 feet total from 3 segments of 1,256 feet, 1,144 feet, and 651 feet, respectively, from east to west	1.64

If a subject site is topographically visible from any KVA (see Figure 4.2-27, Key Viewing Areas and Recreational Facilities Within Approximately 25 Miles of the Site in Section 4.2.4.1), the Administrator would make findings of factors influencing potential visual impact (SCC 22.18.030[C][1]) and may apply conditions pertaining to siting, retention of existing vegetation, design, and new landscaping (SCC 22.18.030(C)(2) according to SCC 22.18.030(E) through SCC 22.18.030(I).

Existing vegetation would be retained to the maximum extent practicable along improved Scenic Area roadways, and any disturbed areas would be re-vegetated to maximize vegetative screening of the site from KVAs where topographic screening is not possible. It is likely that most, if not all, of the proposed road improvements would be fully screened from KVAs by a combination of existing and planted vegetation and topographic screening. Visual impacts are discussed in detail in Section 4.2.3.

Natural Resource Protection Standards

SCC 22.20.010 requires evaluation of all uses against the Practicable Alternatives Test, which is satisfied by the alternatives analysis in Section 2.19. Natural resource protection provisions in SCC 22.20 apply to all uses "in a water resource or its buffer" (22.20.020), review uses "within 1,000 feet of a sensitive wildlife area or site" (SCC 22.20.030), and review uses "within 1,000 feet of a sensitive plant" (SCC 22.20.040). Figure 3.3-1 Waterways in the Project Vicinity shows all water resources in the vicinity of the proposed Scenic Area road improvements. Figures included in Section 3.4 show sensitive wildlife areas and sites, and sensitive plants. The project crosses one water resource zone, but does not lie within 1,000 feet of sensitive wildlife areas or sites, or sensitive plants. SCC 22.20.020 applies, but SCC 22.20.030 through SCC 22.20.040 do not.

The existing CG2930 road in the Scenic Area crosses one seasonal stream located roughly in the middle of its length (Figure 3.3-1 Waterways in the Project Vicinity). This stream does not support any resident or anadromous fish species (Section 3.4). Expansion of existing roadways is allowed within water resource zones or their buffers so long as the Practicable Alternatives Test is satisfied and the proposed expansion does not exceed 100% of the original footprint or encroach further on the water resource or its buffer.

Cultural Resource Protection Standards

SCC 22.20 contains standards for cultural resource protection. According to SCC 22.22.010(A), all cultural resource information is confidential and exempt from public records requests according to § 6(a)(1)(A) of the Act. Cultural reconnaissance surveys are required and have been performed (see Section 4.2.5). All proposed uses must follow SCC 22.22.060 "when cultural resources are discovered during construction activities" and SCC 22.22.070 "when human remains are discovered during a cultural resource survey or during construction." These standards would be followed in the event of any such discovery.

Recreational Resource Protection Standards

SCC 22.24 applies only to resource-based recreation uses, development, and facilities. The proposed road improvements are not associated with any recreation uses, developments or facilities whether resource-based or not. Hence, SCC 22.24 does not apply.

~~4.2.1.4~~4.2.1.3 Relationship of State of Washington to Existing Land Use Policies and Plans

At the option of the Applicant, the siting of energy facilities such as Whistling Ridge Energy Project is regulated at the state level by EFSEC, under Chapter 80.50 RCW (Energy Facilities - Site Locations) and Title 463 WAC. Applicants for certification from EFSEC are required to submit detailed information on the proposed development and the impacts the development may have on the natural and built environments. The applicant is also required to describe the means to be utilized to minimize or mitigate possible adverse impacts on the physical or human environment (WAC 463-60-085). Further, the applicant is required to set forth insurance, bonding, or other arrangements proposed in order to mitigate for damage or loss to the environment (WAC 463-60-075). Whistling Ridge Energy LLC has requested the jurisdiction of EFSEC for the project.

Chapter 80.50 RCW operates to preempt all state and local matters relating to energy facility sites that are under the jurisdiction of EFSEC. Certification pursuant to Chapter 80.50 RCW is given in lieu of any permit, certificate, or similar document that might otherwise be required. Procedures to be followed by EFSEC in determining whether or not to recommend that the state pre-empt local land use plans or zoning ordinances for a site or portions of a site for an energy facility are set forth in WAC 463-28. In a letter to EFSEC, dated May 4, 2009, Karen Witherspoon, Skamania County Community Development Department Director, found that the proposed project is consistent with SCC Title 21 Zoning Code, SCC 21A Critical Areas, Title 24 Clearing and Grading, the Comprehensive Plan, and resource maps.~~The Applicant anticipates that the project would be consistent with applicable local land use plans, zoning ordinances, and other local development regulations.~~ A similar letter will be requested from the County addressing the West Pit Road for project access and the alternative location for the Operations and Maintenance facility. To the extent the application may be inconsistent with local land use plans, zoning ordinances, and other local development regulations, the Council has the statutory authority to recommend that the Governor exercise preemption. The Applicant does not anticipate such action in these proceedings.

~~4.2.1.5~~4.2.1.4 Mitigation Measures

No impacts to land use are anticipated, and no mitigation measures are required.

See Sections 2.15 Protection from Natural Hazards, 3.2 Air Quality, 3.3 Water, and 3.6 Energy and Natural Resources for a description of the measures included in the project design to ensure the proper management of the natural environment.

See Sections 2.7 Characteristics of Aquatic Discharge Systems, 2.15 Protection from Natural Hazards, 3.3 Water, 3.4 Habitat, Vegetation, Fish and Wildlife, and 3.5 Wetlands for a description of the measures included in the project design to enhance water quality and protect environmentally sensitive areas.

See Sections 2.15 Protection from Natural Hazards and 3.1 Earth for a description of the measures included in the project design to minimize the loss of life and property from landslides, seismic, volcanic, or other naturally occurring events, and minimize or eliminate land use impacts on geologically hazardous areas.

See Sections 3.3 Water, 3.4 Habitat, Vegetation, Fish and Wildlife, and 3.5 Wetlands for a description of the measures included in the project design to protect fish and wildlife habitats.

4.2.2 LIGHT AND GLARE

4.2.2.1 Existing Environment

Ambient Light Levels

At present, the project site and surrounding area are relatively dark at night with low levels of ambient lighting. Primary light sources are from the small residential areas nearby and ambient light from cities and towns and industry along the Columbia River Gorge. The major sources of light come from outdoor lights at the residential properties and headlights on the surrounding roads. These are considered minor light sources because of their low density.

Glare

Currently no reflective objects or facilities exist in the project area that could provide a source for glare. Occasional timber harvest activities such as truck movement and potential helicopter harvest could be considered a source for glare. Beyond these activities no other manufactured sources of glare exist within the project area.

Shadow Flicker

The existing changes in light intensity in the project area consist of movement of the sun through the trees and other vertical land forms. This light reflects and changes in intensity as the sun moves to differing quadrants, which are seasonally different and are considered slow in movement and intensity. Beyond these changes in light intensity from natural sources, no shadow flicker exists in the area.

4.2.2.2 Impacts to Ambient Light Levels

Construction

Most construction would occur during daylight hours; however, minimal lighting would be used on the site at night for safety purposes. Impacts would be negligible or minimal and construction or short-term related.

Operation

In response to the FAA aviation safety lighting requirements, the wind turbines must be marked with lights for nighttime lighting. Under recently released guidelines, the FAA no longer requires daytime lighting of the turbines if the turbines are painted a non-reflective flat neutral gray or light color. Whistling Ridge Energy LLC is proposing to paint the turbines a non-reflective flat neutral gray or light color, and is not proposing to install white daytime aviation warning lights unless required by FAA as part of the No Hazard Determination.

Nighttime lighting would be limited to the minimum allowed by the FAA, which would likely consist of two lights on the first and last turbine of every string, and two lights on turbines located every 1,000 to 1,400 feet between the ends of the strings (Patterson 2005). The number of red nighttime aviation warning lights would consist of approximately 24 lights based on these parameters. The flashing red lights would add a new visual element into the project area's nighttime landscape. The flashing red lights would be most noticeable within one mile of the project and would be visible at night from residential properties in these areas, including some residents on or near the hillside east of the site, and some residents across the Columbia River in Oregon.

Other project facilities that would require outdoor lighting at night for operational safety and security include the proposed Operations and Maintenance facility and substations. These facilities would create sources of light in areas where there is no nighttime lighting other than vehicle headlights and would contribute to the overall increase of nighttime illumination in the project area. Sensors and switches would be used to keep lights turned off when lighting would not be required. All lights would be hooded and directed to minimize backscatter and illumination of areas outside the Operations and Maintenance area and the substation sites.

The facility is expected to make a slight contribution to overall ambient light levels in the immediate vicinity, which would constitute a minimal change to residents within one mile of the site.

4.2.2.3 Impacts from Glare

Construction

Most construction would occur during daylight hours, minimizing construction lighting at during hours of darkness. With the proposed daytime construction hours, and the relative remoteness of the project site, glare impacts during construction are not anticipated.

Operation

As a safety requirement, the Operations and Maintenance building would be illuminated at night. Because the building is located away from commercial or residential development, and there are few neighboring properties, light and glare impacts on are expected to be negligible.

During the day, potential glare impacts would be minimal because of the planned use of non-reflective earth-tone/light paint colors on exterior building or facility surfaces. There would be

no anticipated glare impacts to vehicular drivers using I-84, SR 141, SR 14, or local access roads.

Proposed mitigation measures are outlined in Section 4.2.2.5. These measures include restricting lighting at the Operations and Maintenance facilities and substation to the minimal required lighting, and assuring that all lighting is appropriately hooded and directed downward into the areas where it is needed. With these measures in place, the potential for the buildings to create skyglow or backscatter would be limited and considered a negligible impact.

4.2.2.4 Impacts from Shadow Flicker

Construction

No shadow flicker impacts are expected to occur during construction.

Operation

Shadow flicker caused by wind turbines is defined as alternating changes in light intensity as the moving blade casts shadows on the ground and objects (including windows at residences). Analyses previously conducted at other wind energy facilities approved by EFSEC (Kittitas Valley Wind Power Project and the Wild Horse Wind Power Project) examined the potential effects of shadow flicker for residents near the proposed projects and recommended certain measures for minimizing these effects. However, due to the significant distance of the project to residences, shadow flicker is not anticipated to be noticeable for this project.

Shadow flicker, or strobe imparts, can only occur if the location of the turbine is close to a receptor that is in a position where the blades interfere with very low-angle sunlight. As the Council found in the Kittitas Valley Wind Power Project, as the distance between the wind turbine generators and residences increases, the perception of shadow flicker decreases or attenuates. The impact of shadow flicker at a particular residence depends on the location of the residence and the position of features of the home (e.g., windows) in relation to the wind turbines. At a distance beyond 2,500 feet, shadow flicker is considered to be imperceptible. The project is not expected to result in any shadow flicker effects due to the distance of more than 2,500 feet to the nearest existing residence (Figure 4.1-1 Noise Level Contours shows locations of closest residences.) This distance is beyond the distance of which shadow flicker can cause an impact. Moreover, the topography of the project site in relation to the existing residences, orientation of residences, and the tree cover between residences and the wind turbine generators are expected to further eliminate any risk of perception of shadow flicker. Even if shadow flicker were a proven impact (as the Council found in the Kittitas Valley Wind Power Project case) for proven significant impacts, operational controls can be implemented to completely eliminate this perceived impact.

4.2.2.5 Mitigation Measures

Mitigation measures for light and glare would be as follows:

- Most construction would occur during daylight hours, minimizing construction lighting at during hours of darkness
- Turbines and blades would be painted with a non-reflective gray finish to blend in with the background, and to eliminate the need for white daytime aviation warning lights
- To prevent glare, non-reflective earth-tone/light paint colors would be used on exterior surfaces of buildings or other facilities
- The facility lights outside the Operations and Maintenance area and the substation sites would be hooded and directed downward to minimize backscatter and illumination of off-site areas
- Lights would be the minimum wattage required for safety
- Sensors and switches would be used to keep lights turned off when lighting is not required

See Section 4.2.3.4 for a discussion of recommended mitigation measures for visual impacts.

4.2.3 AESTHETICS

This section describes the existing visual environment in and around the project area. It assesses the potential for visual impacts using accepted methods of evaluating visual landscape quality and predicts the type and degree of changes the project would likely have on the sensitivity of those attributes. Additionally, this project would incorporate previous project lessons and experience including design principles and the latest aesthetic design refinements. This section also identifies mitigation measures designed to minimize those impacts.

Each landscape has a specific quality that gives a geographic area its visual and cultural image, and consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. An existing landscape character may range from a predominantly natural landscape to landscapes that are heavily culturally influenced. The existing scenic quality of an existing landscape includes the natural scenic attributes of the landscape in combination with the existing land use patterns. The list of attributes includes naturally evolving, natural appearing, pastoral, agricultural, or even urban landscapes and generally are at the broadscape or landscape level of the analysis but can be analyzed for each specific viewpoint at a project level.

The sensitivity of a landscape or view of that landscape is based on the scenic integrity of the landscape and the types of viewers. A landscape that has a high degree of integrity is a landscape that has a sense of wholeness, intactness, or being complete. Its scenic quality is near-

perfect, with no evident discordant elements or deviations from the existing character, making it highly sensitive to most changes and to the perceptions of the viewer types.

The consideration of the alteration of the landscape by the introduction of wind turbines, and the visual impacts of wind turbines on the landscape is a complex issue, and factors other than the attributes described above play a major role in the observer's reaction or perception of the visual impacts or change. Moreover, in an era when Washington and the United States are mobilizing to address the perils of climate change, the aesthetic impacts of renewable energy raises critical policy issues of statewide and national significance.

Surveys have been taken of viewers of existing wind projects. The findings showed that some viewers had a positive reaction in that they saw wind projects as a progressive step in fighting climate change. Those who had a negative reaction were more concerned with the localized perceived visual "clutter" and "unattractiveness" of the facilities on any landscape (Thayer and Freeman 1987). Understanding the types of viewers in, around, and through the project area is important in making sure that these types of perceptions are considered in the visual sensitivity assessment for this project. This analysis establishes an analytical framework and data for evaluation of the Application. It does not come to the conclusions of environmental impact or the balancing of environmental and policy considerations that are inherent in the SEPA process. How these perceptions and impacts are addressed and balanced against competing policy issues is ultimately an issue for the Siting Council and the Governor.

4.2.3.1 Methodology

The visual impact assessment used the Scenery Management System defined in *Landscape Aesthetics, A Handbook for Scenery Management* (USFS 1995) and *Visual Impact Assessment for Highway Projects* (FHWA 1988). The study is also designed to respond to the provisions of WAC 463-42-362, Built Environment – Land and Shoreline Use, which specify the analysis of aesthetic and light and glare issues as part of the EFSEC process.

The analysis of the visual effects of changes that might occur with implementation of the proposed wind energy facility is based on field observations and review of wind energy facilities visual effects, public perception, design measures to reduce visual impacts, and local planning documents. Additionally, project maps, drawings, technical data, and computer generated maps provide an assessment of areas where the project would be visible and generated visual simulations representing the contrast from the existing conditions if the project is implemented. The analysis includes systematic documentation of the visual setting, evaluation of visual changes associated, and measures designed to mitigate the visual effects. These measures include restoration or enhancement activities to areas that have been disturbed during construction.

Scenic Quality Assessment

To assess the scenic quality of the landscapes potentially affected by the proposed project, the analyses of views toward the project site from selected viewpoints includes an overall rating of the scenic quality prevailing in the existing views. Scenic quality ratings were developed based on observations in the field, photographs of the affected area, methods for assessment of visual

quality, and research on public perceptions of the environment and scenic quality ratings of landscape scenes. The final assessment of scenic quality was made based on professional judgment that took a broad spectrum of factors into consideration, including:

- Natural features, including topography, watercourses, rock outcrops, and vegetation
- The positive and negative effects of human alterations and built structures on visual quality
- Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape, defined as follows:
  - Vividness refers to the memorability of the visual impression received by the viewer from contrasting landscape elements as they combine to form a striking and distinctive visual pattern
  - Intactness is the integrity of visual order in the natural and human landscape, and the extent to which the landscape is free from visual encroachment
  - Unity is the degree to which the visual resources of the landscape join together to form a coherent and harmonious visual pattern

Each viewpoint was assigned a final rating based on the rating scale shown in Table 4.2-4. This rating scale incorporates landscape assessment concepts developed by USFS and U.S. Department of Transportation.

Table 4.2-4
Landscape Scenic Quality Scale

Rating	Explanation
Outstanding Visual Quality 6	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as "picture postcard" landscapes. People are attracted to these landscapes to view them.
High Visual Quality 5	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.
Moderately High Visual Quality 4	Landscapes that have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to human or natural features contained within the landscape, to the arrangement of spaces in the landscape, or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high.
Moderate Visual Quality 3	Landscapes that are common or typical landscapes with average scenic value. They usually lack significant human or natural features. Their scenic value primarily results from the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average.
Moderately Low Visual Quality 2	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant human alterations, but these features do not dominate the landscape. They often lack spaces that people perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low Visual Quality 1	Landscapes that have below average scenic value. They may contain visually discordant human alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness unity, and intactness are below average.

Source: Buhyoff et al. (1994), FHWA (1988), and USFS (1995)

Visual Sensitivity Assessment

Assessing visual sensitivity involves predicting the general impact on the quality of views from a given viewpoint. A combination of three factors determines how sensitive a landscape scene is:

- The number and type of viewers
- The viewing conditions
- The quality of the view

Residential areas with unobstructed views of a regionally important and memorable scene would be very sensitive to objects or structures that would impede views. A view from a seldom-traveled rural road where motorists have only distant, oblique views of wind turbines in an unremarkable setting would likely qualify as an area of low sensitivity.

The principal types of viewers in the project area who have predictably high levels of sensitivity to visual impacts include:

- Resident viewers
- Roadway viewers (drivers and passengers)
- Recreating viewers such as hikers, water recreationists, and mountain bikers

This analysis of visual sensitivity defines three levels as follows:

- ***Low 1.*** Viewer types representing low visual sensitivity include agricultural and industrial/warehouse workers. Compared with other viewer types, the number of viewers is generally considered small and the duration of view is short. Low levels of sensitivity are assigned to areas 5 miles or more from the closest turbine, where a wind power project would be a distant and a relatively minor element in the overall landscape.

- ***Moderate 2.*** Viewer types representing moderate visual sensitivity consist of highway and local travelers. The number of viewers varies depending on location; however, on average they tend to be moderately large, based on overall densities of surrounding areas and highway commuters. Viewer awareness and sensitivity are also considered moderate because destination travelers often have a focused orientation. Moderate levels of sensitivity were assigned to areas where turbines would be visible from 0.5 mile to 5 miles within the primary view of residences and roadways. The primary view refers to the central area that the eye can see clearly without moving and is surrounded by the peripheral vision. In distinguishing between moderate and low levels of sensitivity in the 0.5-mile to 5-mile zone, contextual factors were also considered, including the viewing conditions in the immediate foreground of the view.

- ***High 3.*** Residential, recreational, and viewers congregating in public gathering places (churches, schools, trails, etc.) are considered to have comparatively high visual sensitivity. The visual setting may in part contribute to the enjoyment of the experience. Views may be of long duration and high frequency. High levels of sensitivity are generally assigned in those cases where turbines would be potentially visible within 0.5 mile or less from residential properties, heavily traveled roadways, or heavily used recreational facilities.

These criteria were used to establish the sensitivity levels of each view using a systematic approach based on the distance of the project from the viewpoint, the number of turbines or percentage of the project area that could be viewed from this viewpoint, and the dominant viewer types for each view. Through this process, an overall sensitivity rating was established for each existing landscape view.

Preparation of Visual Simulations

The visual simulations were developed using photographs taken with a 35 mm digital SLR camera. Various focal lengths from 40 to 70 mm were used with the intent to capture the maximum pixels and resolution for the simulation. Visual Nature Studio, widely used 3D GIS software, was used to model the turbine locations on terrain built from USGS digital elevation model data. The photo locations were camera matched in the software to render the turbines from the same viewpoint as the photographs taken on the ground. The resulting rendered turbine images were then photo composited into the photographs to create the simulations. Existing topographic and site data provided the basis for developing the initial digital model.

Site plans and digital data for the proposed wind turbines were used to create three-dimensional digital models of the planned turbine placements. These models were combined with the digital terrain model to produce a complete computer model of the wind farm. For each viewpoint, a render camera was placed in the Visual Nature Studio software. The aspect ratio of each render was then matched to the corresponding photograph and the rendered terrain was visually matched to the photographed terrain to confirm scale. Finally the resulting turbine images are matched in perspective, scale, and aspect ratio, are photo composited into the original digital photo base using Adobe Photoshop. This process produces accurate portrayals of how the given turbine models and placements would look on the given terrain and from the specified viewpoints after construction. Seasonal conditions including weather, air quality, vegetation (foreground and background) and color impact the quality of the compositions. These compositions are a representative example of the area without subjectivity.

4.2.3.2 Existing Environment

The existing visual resources are the natural and built features open to view in the project landscape. The combination of land, water, and vegetation patterns represent the natural landscape features that define an area's visual character, while built features such as buildings, roads, and other structures reflect human or cultural modifications to the landscape. These natural and built landscape features or visual resources contribute to the public's experience and appreciation of the environment. This section describes the broad scale regional and local

landscape settings that were used to establish appropriate viewpoints from which the project would be visible.

Regional Landscape Setting

The project is set in two distinct landscapes. One landscape is the areas were the turbines would be sited along ridges located on the northern plateau of the Columbia River Gorge on Underwood Mountain (Figure 2.1-1 Location of Proposed Whistling Ridge Energy Project). The other landscape is the Columbia River Gorge National Scenic Area which is outside the project but within the viewshed looking into the project area.

The Scenic Area extends 85 miles along the Columbia River, and includes portions of three Oregon and three Washington counties. Formed by ancient volcanoes and sculpted by floods, the Columbia River Gorge carves a corridor through the Cascade Mountains in Oregon and Washington as the river journeys to the Pacific Ocean.

The National Scenic Area Act designated for special protection 292,500 acres on both sides of the Columbia River from the outskirts of Portland-Vancouver in the west to the semi-arid regions of Wasco and Klickitat counties in the east. The Scenic Area is categorized into three areas: SMAs, GMAs, and Urban Areas:

- SMAs, which contain the most sensitive resources, total 114,600 acres and are managed by the USFS.

- GMAs, with 149,400 acres, include a mixture of historic land uses such as farming, logging, and cattle grazing. The Columbia River itself is currently designated as a GMA as well. Development on GMA lands is administered by the Gorge Counties and the Gorge Commission.

- Thirteen Urban Areas in the Gorge are exempt from any Scenic Area regulations: Cascade Locks, Hood River, Mosier, and The Dalles in Oregon, and North Bonneville, Stevenson, Carson, Home Valley, White Salmon, Bingen, Lyle, Dallesport, and Wishram in Washington. The Act's second purpose is to protect and support the economy of the Gorge by encouraging growth in existing Urban Areas and by allowing future economic development in a manner that is consistent with protection and enhancement of resources.

The project area is outside of the Gorge Plan and no visual quality objectives or management designations have been established for the area. Areas south of the project within the Scenic Area are designated as Urban or GMA. The views from the Gorge into the project area were examined through viewpoint selection. This area of the Gorge, closest to the project, is considered to have a high visual quality with a moderate sensitivity based on the vividly memorable, and although the area is not free of visual encroachment, the visual resources join together with a moderate degree of unity.

Local Landscape Setting

The project site is on land managed for commercial forestry by S.D.S. Co., LLC and Broughton Lumber Company. All of the parcels on which the project is located are managed for a continual cycle of growth, harvest, and replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the project is proposed. Many of the stands of trees on the sections of land that would have turbines on them are recently harvested and reforested. S.D.S. Co., LLC and Broughton Lumber Company implemented timber harvest plans on approximately 50 acres during 2003. Additional harvests covering approximately 100 acres are planned.

In areas that have not been recently harvested or that are not planned to be harvested before project construction surrounding the proposed wind turbines, trees would be harvested and most of the land would be replanted with seedlings. This clearing would allow for safe construction, and would reduce the potential for tree growth to interfere with the wind resource on the site during the commercial life of the project.

No visual quality objectives have been established in the project area beyond the harvest size and configuration requirements of the Washington Forest Practices Act. These cleared areas are considered a "forest conversion" under the Forest Practices Act and have no established visual quality objectives. These openings, to the extent feasible, would be reforested in accordance with typical commercial forestry management practices.

S.D.S. Co., LLC and Broughton Lumber Company own this commercial property in Skamania County, Washington. While the project is not located inside the Scenic Area, the access road for the proposed site is located in the Scenic Area. The Scenic Area requirements are addressed in Sections 2.20 and 4.2.1. In relationship to the visual quality of the area, there are views from the Scenic Area into the project area. The viewpoints and viewer types in relation to the roadway improvements within the Scenic Area have been considered in this analysis for consistency with the Scenic Area guidance and conformance.

SR 14 in this area is a recognized scenic roadway. Typically, this designation means that a scenic corridor management plan would be prepared to provide policy-level guidance in the local adoption of comprehensive plan policies, zoning, and other land use regulation. There is no scenic corridor management plan for SR 14 and, therefore, no regulatory control of aesthetic impacts within the corridor. However, the scenic roadway designation carries an additional level of care and scrutiny in the review of potential aesthetic impacts based on recognition, but not regulation.

The local landscape visual appearance is of moderate visual quality with a moderate level of sensitivity. The levels of vividness (memorable), intactness (free from visual encroachment), and unity are average within the broader landscape.

Viewpoints

To analyze the project's effects on visual resources, viewpoints were selected to characterize the aesthetic character of the project area and the differing landscapes in or near the project. The existing views from these viewpoints are described below and illustrated with photographs.

Most of the viewpoints are at publicly accessible locations where most people would view the project. Individual viewpoints were chosen as being the most representative views for the different roads, population areas, and recreation areas where views of the wind turbines would occur. Figure 4.2-5 Locations of Simulation Viewpoints shows the locations of these viewpoints from outside and within the project area, and the distance and visible turbines from each viewpoint. Because the focus is on locations that are publicly accessible and would have the largest number of viewers (including residences), not every residential location has been studied. Residences from 5 miles to 1 mile of the project site are depicted on Figure 4.1-1.

Each viewpoint was assessed using the methodology described in Section 4.2.3.1, Methodology, as well as for its scenic quality and viewer sensitivity, and a rating was applied to provide an overall average for the area. This process established the existing conditions for each of the individual viewpoints from which the visual contrast or impacts of the project on these parameters could be measured. Viewpoints 6 and 9 were eliminated from additional analysis due to changes in the distribution of the turbine strings and inability to view the project from these viewpoints. Viewpoint simulations can be found on Figures 4.2-6 to 4.2-26.

Pucker Huddle - Viewpoint 1 – Figure 4.2-6

Scenic Quality

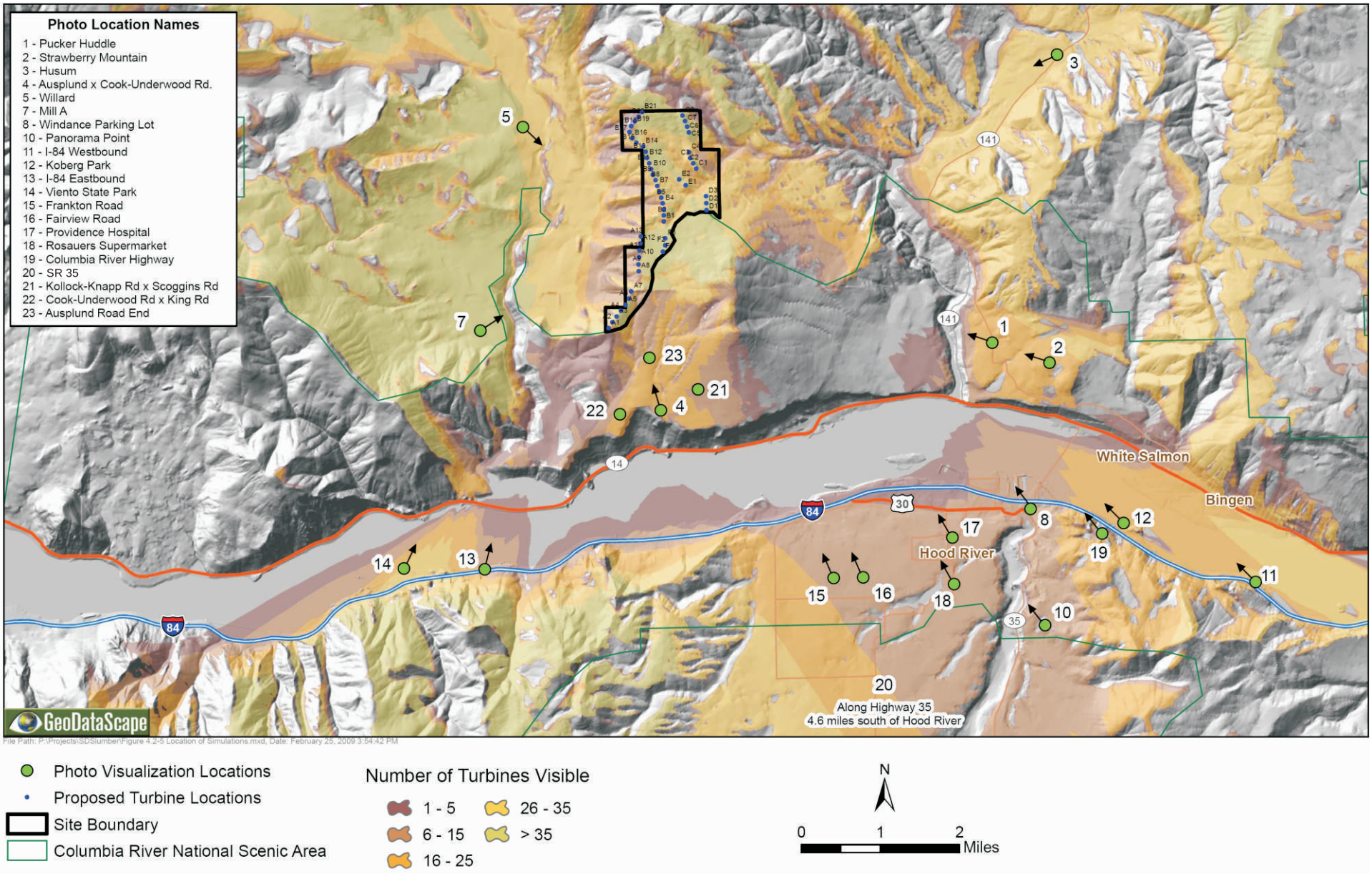
Viewpoint 1 is taken from SR 141, which is approximately 4 miles from the project and is a small connector providing access to the Indian Heaven Wilderness in the Gifford Pinchot National Forest. This highway also allows access to several rural communities including White Salmon, Husum, and Pucker Huddle. Most areas are unincorporated and several of the residences are recreational in nature with some year-round residences. As discussed in the review of the regional and local landscapes, no public roads pass through or are immediately adjacent to the project. Viewpoint 1 is a wide panoramic view of Underwood Mountain from SR 141 adjacent to the Pucker Huddle area.

The view encompasses the east side of the project area and the ridged lines of forest management areas are visible in the middleground of the viewshed. Natural openings are prevalent from this viewpoint with several natural appearing features of openings and vegetation that provide an interesting view. The BPA transmission lines bisecting the project area on the north and south ends can be seen from this viewpoint. The quality of the views from this viewpoint along SR 141 was rated as moderate, reflecting the fact that the landscape visible is relatively common in the region and has average scenic value. The ridge line along Underwood Mountain, which is in the area of the project, provides a degree of topographic interest when viewed with the other natural appearing features. The landscape visual scenic quality from this viewpoint is moderate.

Viewer Sensitivity

Traffic volumes along SR 141 are minimal and used for local traffic and recreating traffic in the summer months. Considering the distance of the project from this viewpoint (less than 5 miles), the minimal use of the highway, and the portion of the project that is visible from the viewpoint, the level of view sensitivity is considered low. This is based on the duration of the view from SR 141 and the low level of residential viewers from this viewpoint and the scenic quality rating.

33758687_20.cdr



Source: GeoDataScape.

Job No. 33758687

Figure 4.2-5

Locations of Simulation Viewpoints

URS

Whistling Ridge Energy Project
Skamania County, Washington



Photo Date/Time:
8/8/2007 2:15 PM

Focal Length:
70

Camera Direction:
WNW

Visible Turbines:
B11-B15, B20, C1-C5
D1-D3, E1-E2

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-6

Viewpoint 1 - Pucker Huddle

URS

Whistling Ridge Energy Project
Skamania County, Washington



Photo Date/Time:
8/8/2007 2:24 PM

Focal Length:
67

Camera Direction:
WNW

Visible Turbines:
B5-B16, B20, C1-C5,
D1-D3, E1-E2

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-7

Viewpoint 2 - Strawberry Mountain

URS

Whistling Ridge Energy Project
Skamania County, Washington



Photo Date/Time:
8/8/2007 2:41 PM

Focal Length:
68

Camera Direction:
WSW

Visible Turbines:
B1-B16, C1-C5, D1-D3, E1-E2, F2-F3

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-8

Viewpoint 3 - Husum

URS

Whistling Ridge Energy Project
Skamania County, Washington





Photo Date/Time:
8/8/2007 3:05 PM

Focal Length:
70

Camera Direction:
NNW

Visible Turbines:
A1-A13, F1-F3

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-9

Viewpoint 4 - Ausplund Road and Cook-Underwood Road

URS

Whistling Ridge Energy Project
Skamania County, Washington

Before



Photo Date/Time:
8/8/2007 2:15 PM

Focal Length:
70

Camera Direction:
WNW

Visible Turbines:
B11-B15, B20, C1-C5, D1-D3, E1-E2

After



Source: GeoDataScape.

Job No. 33758687

Figure 4.2-10

Viewpoint 5 - Willard

URS

Whistling Ridge Energy Project
Skamania County, Washington



Photo Date/Time:
8/8/2007 3:43 PM

Focal Length:
67

Camera Direction:
ENE

Visible Turbines:
A1-A13, B1-B16, B20,
E1-E2, F1-F3



Source: GeoDataScape.

Job No. 33758687

Figure 4.2-11

Viewpoint 7 - Mill A

URS

Whistling Ridge Energy Project
Skamania County, Washington





Photo Date/Time:
5/27/2007 5:32 PM

Focal Length:
50

Camera Direction:
WNW

Visible Turbines:
A1-A13, B1-B16, B20,
E1-E2, F1-F3

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-12

Viewpoint 8 - Windance

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_28.cdr





Photo Date/Time:
8/8/2007 5:27 PM

Focal Length:
50

Camera Direction:
NW

Visible Turbines:
A1-A7, C2-C5

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-13

Viewpoint 10 - Panorama Point

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_29.cdr





Photo Date/Time:
8/8/2007 5:52 PM

Focal Length:
55

Camera Direction:
WNW

Visible Turbines:
B9-B16, B20, C1-C5,
D1-D3, E1-E2

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-14

Viewpoint 11 - I-84 Westbound

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_33.cdr





Photo Date/Time:
8/8/2007 6:58 PM

Focal Length:
70

Camera Direction:
WNW

Visible Turbines:
B10-B16, B20, C1-C5, D1-D3, E1-E2

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-15

Viewpoint 12 - Koberg Beach State Park

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_34.cdr





Photo Date/Time:
8/8/2007 7:15 PM

Focal Length:
60

Camera Direction:
NNE

Visible Turbines:
A1-A5, B15-B16

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-16

Viewpoint 13 - I-84 Eastbound

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_35.cdr

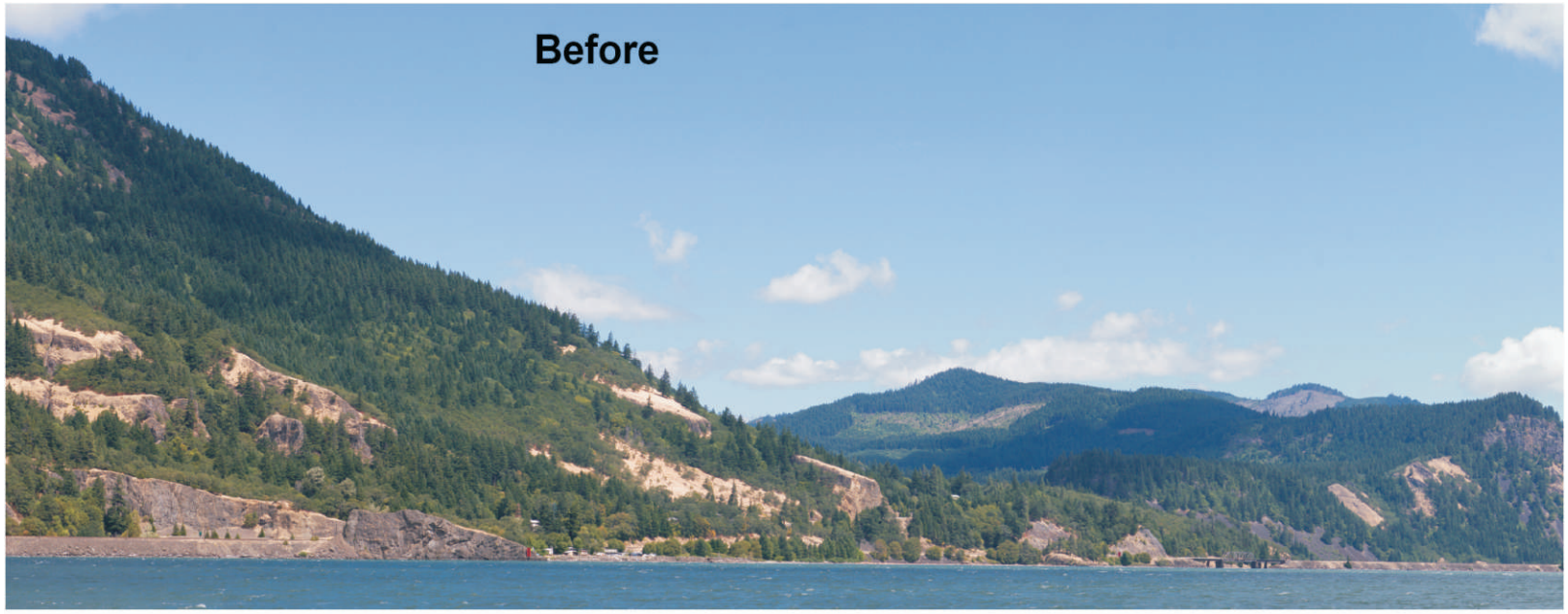


Photo Date/Time:
8/8/2007 13:33 PM

Focal Length:
64

Camera Direction:
NE

Visible Turbines:
A1-A13, B1-B9



Source: GeoDataScape.

Job No. 33758687

Figure 4.2-17

Viewpoint 14 - Viento State Park

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_36.cdr





Photo Date/Time:
9/12/2007 8:31 AM

Focal Length:
50

Camera Direction:
NNW

Visible Turbines:
A1-A10

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-18

Viewpoint 15 - Frankton Road

URS

Whistling Ridge Energy Project
Skamania County, Washington





Photo Date/Time:
9/12/2007 8:28 AM

Focal Length:
50

Camera Direction:
NNW

Visible Turbines:
A1-A8

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-19

Viewpoint 16 - Fairview Road

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_38.cdr





Photo Date/Time:
5/27/2008 5:19 PM

Focal Length:
51

Camera Direction:
NW

Visible Turbines:
A4-A5

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-20

Viewpoint 17 - Providence Hospital

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_39.cdr





Photo Date/Time:
5/27/2008 5:06 PM

Focal Length:
50

Camera Direction:
NW

Visible Turbines:
A5-A7

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-21

Viewpoint 18 - Rosauers

URS

Whistling Ridge Energy Project
Skamania County, Washington





Photo Date/Time:
5/27/2008 3:49 PM

Focal Length:
40

Camera Direction:
WNW

Visible Turbines:
B16-B17, C1-C5, D1-D3

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-22

Viewpoint 19 - Columbia River Highway

URS

Whistling Ridge Energy Project
Skamania County, Washington





Photo Date/Time:
5/27/2008 4:12 PM

Focal Length:
40

Camera Direction:
NNW

Visible Turbines:
A1-A13, F1-F3

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-23

Viewpoint 20 - State Route 35

URS

Whistling Ridge Energy Project
Skamania County, Washington



Photo Date/Time:
9/10/2008 1:32 PM

Focal Length:
48

Camera Direction:
NW

Visible Turbines:
A1-A3

Source: GeoDataScape.

Job No. 33758687

Figure 4.2-24

Viewpoint 21 - Kollock-Knapp and Scoggins Road

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_43.cdr



Photo Date/Time:
9/10/2008 2:12 PM

Focal Length:
48

Camera Direction:
N

Visible Turbines:
A1-A8



Source: GeoDataScape.

Job No. 33758687

Figure 4.2-25

Viewpoint 22 - Cook-Underwood and King Road

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_44.cdr



Photo Date/Time:
9/10/2008 1:59 PM

Focal Length:
34

Camera Direction:
NNW

Visible Turbines:
A1-A7



Source: GeoDataScape.

Job No. 33758687

Figure 4.2-26

Viewpoint 23 - Ausplund Road End

URS

Whistling Ridge Energy Project
Skamania County, Washington

Strawberry Mountain- Viewpoint 2 – Figure 4.2-7

Scenic Quality

Viewpoint 2 is an elevated view of the project from Strawberry Mountain east of the project area. The viewpoint encompasses the view that many of the residence would see from an elevated position above SR 141. This view is similar to Viewpoint 1 except that the man-made lines and features from forest management and power transmission are more prevalent. Several natural appearing features, including openings and vegetation, provide an interesting view in the middle ground with Underwood Mountain in the background. The quality of the views from this viewpoint above SR 141 was rated as moderate, reflecting the fact that the landscape visible is relatively common in the region and has average scenic value.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 5 miles) and the portion of the project that is visible from the viewpoint, the viewer types (residential/ recreational), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Husum - Viewpoint 3 – Figure 4.2-8

Scenic Quality

This viewpoint captures the view from SR 141 northeast of the project area. This viewpoint would be the first view of the project from travelers moving south into the project area. The viewpoint encompasses the northern portion of the project from the highway, which is the closest viewing area from that vantage point. The foreground of the viewpoint is pastoral with a middle ground view of the hillsides and a background view of Underwood Mountain and the project area. The view is natural appearing with moderate to high levels of vividness, unity, and intactness in the foreground, middle ground, and background of the photo. The quality of the view from this viewpoint was rated moderately high because of the above-average quality and the unity of the man-made and natural features on the landscape.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 5 miles), the duration of the view (roadway travelers), the portion of the project that is visible from the viewpoint, the viewer types (minimal residential/recreational), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Auplund Road and Cook-Underwood Road - Viewpoint 4 – Figure 4.2-9

Scenic Quality

This viewpoint captures the view from the Ausplund, Cook-Underwood Roads where they meet and provide residential, agricultural, and forest management access to the area. These roads are connector and feeder roads that can be accessed from SR 14. This area is elevated from the

Columbia River Gorge National Scenic Area but is within its boundaries. The area has a mix of uses including agriculture, forest management, and some recreation. The foreground from the roadway is an agricultural setting with the middle and background views of forest vegetation and forest management areas. The view is natural appearing with moderate levels of vividness, unity, and intactness. The quality of the view from this viewpoint was rated moderate because of the average or typical views of this type in the project area.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (0.5 to 5 miles), the viewer types (roadway travelers), the portion of the project that is visible from the viewpoint, the viewer types (residential/roadway), and the scenic quality rating, the level of visual sensitivity is considered moderate.

Willard – Viewpoint 5 – Figure 4.2-10

Scenic Quality

This viewpoint captures the view from the small residential community of Willard. This area is accessible by a county road from SR 14 and used by residential and private forest management users. The view looks southeast into the project area and provides a panorama of the longest string of turbines. The foreground is a mixture of mixed conifer second growth stands and the middle ground is of mixed timber harvest openings and a transmission corridor. The background view is similar and the mixture of vertical and horizon lines and formations detracts from the overall vividness and unity of the view. The intactness of the views is moderated by the changes in line and form. The quality of the view from this viewpoint was rated moderately low to moderate.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Mill A – Viewpoint 7 – Figure 4.2-11

Scenic Quality

This viewpoint captures the view from the old mill property west of the project area. This area is accessible from Willard Road and has a mixture of uses. The view is looking northeast into the southern end of the A turbine string. The foreground view is obstructed by the vertical lines of transmission towers. The middle ground view is of transmission corridors and extensive timber harvest openings. Many of the residential views are partially screened from the valley floor. There is a visual discord with the man-made alterations. The vividness, unity, and intactness appear uninviting and of moderate to low visual quality. The scenic quality rating for this viewpoint is moderately low.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (0.5 to 5 miles), the duration of the view (foreground screening), the portion of the project that is visible from the viewpoint, the viewer types (minimal residential), and the scenic quality rating, the level of sensitivity is considered moderate.

Windance – Viewpoint 8 – Figure 4.2-12

Scenic Quality

This viewpoint captures the view from the parking lot of the Windance Sailing Shop in Hood River. This area is across the Columbia River looking south into the project area from within the Scenic Area. Foreground views are of the City of Hood River and the middle ground captures portions of the Columbia River and the northern bank. The background is of Underwood Mountain and the project area. Beyond the foreground elements in the view the levels of vividness, unity, and intactness are considered average or above average in the context of the setting. The scenic quality rating for this viewpoint is moderate.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway, residential, urban area, and river recreation), and the scenic quality rating, the level of sensitivity is considered low to moderate.

Panorama Point – Viewpoint 10 – Figure 4.2-13

Scenic Quality

This viewpoint captures the view from above Hood River at the Panorama Point within the Columbia River Gorge National Scenic Area looking north across the Columbia River into the project area. Foreground views are a composition of vegetation and residential dwellings. The middle ground encompasses the Hood River and the Columbia River area with the Underwood Mountain in the background. The levels of vividness, unity, and intactness are considered above average with the combinations of man-made structures and natural features in harmony with the view. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (8–10 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway, residential), and the scenic quality rating, the level of sensitivity was rated low.

I-84 Westbound – Viewpoint 11 – Figure 4.2-14

Scenic Quality

This viewpoint captures the view from I-84 traveling westbound towards the project area from the east. I-84 is along the Columbia River Gorge National Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of the highway and other corresponding structures the view is generally intact with average or above vividness, unity, and intactness. Viewers traveling along this corridor have multiple line of sight transitions and this is considered to be average within those views. The scenic quality rating for this viewpoint was rated moderate.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (8–10 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway), and the scenic quality rating, the level of sensitivity was rated moderate.

Koberg Park – Viewpoint 12 – Figure 4.2-15

Scenic Quality

This viewpoint captures the view across the Columbia River from Koberg Park. The foreground view of the river is a complete composition indicative of the area and the middle and backgrounds have a high level of vividness, unity, and intactness. The rail-line that bisects the view in the middle ground tends to blend into the scenery without distraction. This view is considered to be above average for the types of views that are throughout the Scenic Area. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (8–10 miles), the portion of the project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated moderate.

I-84 Eastbound – Viewpoint 13 – Figure 4.2-16

Scenic Quality

This viewpoint captures the view from I-84 traveling eastbound towards the project area from the west. I-84 is along the Scenic Area and views along this portion of the highway are generally directed towards the river and the distant scenery. Beyond the foreground view of transmission structures the view is generally intact with average or above-average vividness, unity, and intactness. Viewers traveling along this corridor have multiple line of sight transitions and this view is considered to be above average within the context of those multiple views. The scenic quality rating for this viewpoint was rated moderately high.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (3 to 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway travelers with fleeting views), and the scenic quality rating, the level of sensitivity was rated as moderately low.

Viewpoint 14 – Viento State Park – Figure 4.2-17

Scenic Quality

This viewpoint captures the view from Viento State Park, a popular recreation and rest area along the Columbia River. Landscape features are diverse and intact and the contrasts of the features have a high level of unity. This view is the open waters of the Columbia River in the foreground with rock features and vegetation in the middle ground and a background of mountains which provides an overall pleasing composition that is inviting to the viewer. This view is one of the less common views along the Gorge and has an above average scenic value. The scenic quality rating for this viewpoint was rated moderately high to high.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated as moderate to high.

Viewpoint 15 and 16 – Frankton Road and Fairview Road – Figures 4.2-18 and 4.2-19

Scenic Quality

The viewpoints represent the view from the higher elevation residential areas west of Hood River. These views are across the Columbia River looking into the project area. Both of these roads are local access roads and traffic is considered low. Residential dwellings in these areas have developed based on the topographic and the views both north and south. Many of the views are screened to the north and take advantage of the view south into Oregon. Both of the photos have residential development in the foreground, which is common along these roadways. The middle ground is vegetation, some agriculture, and some forest management. The background is the ridge along the project area. These types of views are relatively common and of average scenic value when compared to the broader area. Vividness, unity, and intactness are moderate to high levels. The scenic quality rating for these viewpoints is moderate.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (residential), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoints 17 and 18 – Providence Hospital and Rosauers Parking Lot Hood River – Figures 4.2-20 and 4.2-21

Scenic Quality

The viewpoints represent the north and south views of the project from the City of Hood River. The foreground is an urban setting with a middle ground of vegetation that screen the background to some degree, providing a diverse composition of features. The views have a somewhat vivid appeal based mostly on the man-made features; however, the unity and intactness are below average and are visually discordant. This detracts from the background view. Viewers would generally be more focused on the business of the urban environment. The scenic quality of these viewpoints was rated moderately low.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (urban/residential), and the scenic quality rating, the level of sensitivity was rated as low.

Viewpoint 19 – Columbia River Highway – Figure 4.2-22

Scenic Quality

This viewpoint represents the view of the roadway traveler on the Columbia River Highway (Highway 30) southeast of the project area. This view has a higher scenic quality and is more representative of the high quality views within the Columbia Gorge area. The foreground, middle ground, and background all have an above average arrangement of spaces in the landscape. The view appears intact and has a unity with the road and even the transmission line that is visible in the middle ground. The landscape provides diversity but not to the extent of clutter. This view is rated moderately high for scenic quality.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway travelers/sightseers), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 20 – State Route 35 – Figure 4.2-23

Scenic Quality

This viewpoint represents the view from SR 35, which is 4.6 miles south of Hood River. The viewpoint position is somewhat inferior with the industrial complex in the foreground. The middle and backgrounds looking into the project area from the southeast have an average scenic quality. The scenic quality rating for this viewpoint is moderately low.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (greater than 10 miles), the portion of the project that is visible from the viewpoint, the viewer types (roadway travelers/sightseers), and the scenic quality rating, the level of sensitivity was rated as low to moderate.

Viewpoint 21 – Kollock-Knapp Road intersection with Scoggins Road – Figure 4.2-24

Scenic Quality

This viewpoint represents the view from local area roadways at specific intersections where local area travelers might converge. These roads are old logging roads that have been upgraded to meet the local residential use. However, they are still used for logging and would be used in the construction portion of this project. This would include upgrading and in some instances widening the roads, which can have an effect on visual quality. The viewpoint position is somewhat inferior with the orchard fence in the foreground. The middle and backgrounds views are lost due to the foreground screening. The scenic quality rating assigned to this view is moderately low.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (1.5 miles), the portion of the project that is visible from the viewpoint, the viewer types (local area workers and minimal residences), and the scenic quality rating, the level of sensitivity was rated as low to moderate.

Viewpoint 22 – Cook-Underwood Road intersection with King Road – Figure 4.2-25

Scenic Quality

This viewpoint represents the view from local area roadways at specific intersections where local area travelers and workers might converge. These roads are old logging roads that have been upgraded to meet the local residential and commercial use. However, they are still used for logging and would be used in the construction portion of this project. This would include upgrading and in some instances widening the roads, which can have an effect on visual quality. The view from this intersection is very pastoral with a feeling of unity and intactness. Beyond the orchard in the middle ground, which adds some diversity to the composition, the view is above average for the area. The scenic quality rating assigned to this view is moderately high.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (1.5 miles), the portion of the project that is visible from the viewpoint, the viewer types (local area workers and minimal residences), and the scenic quality rating, the level of sensitivity was rated as moderate.

Viewpoint 23 – Ausplund Road End – Figure 4.2-26

Scenic Quality

This viewpoint represents the view from local area roadways at specific intersections where local area travelers might converge. These roads are old logging roads that have been upgraded to meet the local residential use. However, they are still used for logging and would be used in the construction portion of this project. This would include upgrading and in some instances widening the roads which can have an affect on visual quality. This view is from the end of the Ausplund Road, which would be used to access the area for construction and maintenance. Very few viewers beyond those associated with the project would see this viewshed. Taking out the vehicles in the foreground, the scenic quality rating assigned to this view is moderate.

Viewer Sensitivity

When considering the distance of the project from this viewpoint (less then 1 mile), the portion of the project that is visible from the viewpoint, the viewer types (local area workers and residence), and the scenic quality rating, the level of sensitivity was rated as low to moderate.

4.2.3.3 Impacts

This analysis examines potential direct aesthetic impacts during the construction, Operations and Maintenance, and decommissioning phases of the proposed project. Indirect impacts are not anticipated because the project is not expected to substantially induce regional growth to the extent that would result in significant changes to the offsite visual landscape.

For the proposed project, the primary concern is the potential aesthetic impacts of the proposed wind turbines. The project would consist of up to 50 wind turbines. Because of the heightened activity in the wind energy industry, pricing and availability of turbines are highly variable. Consequently, the specific turbine type and manufacturer has not been selected. However, it is likely that the turbines would be in the 1.2- to 2.5-MW range, and would measure approximately 426 feet in height (262-foot hub height and 164-foot radius blades). The diameter of the blade would be approximately 230 to 265 feet, depending on which turbine is selected. Each turbine's three rotor blades would be made of laminated fiberglass. Turbine "strings" would include three to 21 turbines placed at approximately 350 to 500 foot intervals.

It is the ability of the landscape in question to accommodate both the size and density of the wind turbines that would determine the resulting visual impacts. Given its dimensions, there are few measures, other than the wind turbine color, that can be implemented to mitigate the visual impact of a wind turbine. Being available to the wind requires the turbines to be in a location that is open and highly visible.

The visual impact assessment was based on evaluating the changes to the existing visual resources that would result from construction and operation of the project. These changes were assessed, in part, by evaluating the "after" views provided by the computer-generated visual simulations and comparing them to the existing visual environment. Consideration was given to the following factors in determining the extent and implications of the visual changes:

- Changes in the affected visual environment's composition, character, and valued qualities
- The affected visual environment's context, including distance
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
- The number of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the changes
- The distance factor was considered in the sensitivity rating for establishment of baseline and therefore becomes a factor in the impact assessment

Levels of impact were classified as high, moderate, and low:

- ***High Level of Impact.*** High levels of impact were assigned in situations in which turbines would be highly visible in areas with a high number of sensitive viewers, and would greatly alter levels of vividness, unity, and intactness, decreasing the level of visual quality. This is the largest number of viewers from that key viewpoint. The assessment does account for the number of viewers and would add that into the discussion.
- ***Moderate Level of Impact.*** Moderate levels of impacts were assigned in situations in which turbines would be visible in areas with moderate levels of visual sensitivity and viewers in which the presence of the turbines would moderately alter levels of landscape vividness, unity, and intactness.
- ***Low Level of Impact.*** Low levels of visual impact were found in situations where the project would have relatively small effects on overall landscape level attributes or where existing levels of landscape aesthetic quality are low or where there are low levels of visual sensitivity and a low number of viewers.

Much of the public input and comments received on the proposed project (made in various public forums prior to filing this Application) indicates that for some viewers, the presence of the wind turbines represents a negative impact because it alters the appearance of the rural landscape over a large area. The flashing of FAA aviation lights on the tops of turbines at night would similarly be considered a negative impact. For purposes of this analysis, the term "significant" may be defined as levels of visual impact that are rated "moderately high" to "high" from any given viewpoint. This does not mean that a particular location or the project as a whole poses a "significant" impact for the purposes of SEPA review. Moreover, while a particular viewpoint

may be characterized as having a "high" impact, that impact may be experienced by a relatively small number of individuals, or relate to a small portion of the project,[2] and it does not account for the overall benefits of the project. Definition of the term "significant" in this context, however, is subjective and depends on many factors. For example, the degree to which impacts are adverse depends on the viewer's location, the orientation of structures (such as homes), personal sensitivity, and the impact on view quality. In the final analysis, it is the comparative number of viewers most affected by the project that determines the overall impact. A project that significantly affects a small number of viewers may be offset by the fact that it may have a relatively low impact on a large number of viewers.

Construction

During construction, large earth-moving equipment, trucks, cranes, and other heavy equipment would be highly visible from nearby areas. At times, small, localized clouds of dust created by road building and other grading activities may be visible at the site. Because of construction-related grading activities, areas of exposed soil and fresh gravel that contrast with the colors of the surrounding undisturbed landscape would be visible.

In close-up views, particularly those seen by travelers on the segment of the local highway that passes around the project site and those seen from the closest residences, the visual changes associated with the construction activities would be highly visible and would have a moderate to high visual impact. From more distant locations, the visual effects would be relatively minor and would have little or no impact on the quality of views and are considered short-term.

Operation

Using the visual simulation, the potential levels of visual impacts from key project viewpoints have been evaluated and are summarized on Table 4.2-5. A detailed description for each viewpoint follows the summary table.

The project has the potential to create low to moderate levels of visual impact at key viewpoints. Not every potential view receptor in the project area has been documented. Selected viewpoints are representative of a variety and range of views in the project area. The photos used for the simulations show the worst-case seasonal conditions for visual contrast between the wind turbines and the primarily green and brown landscape backdrop. The period with the least visual contrast is anticipated to occur when there is snow cover and gray skies.

[2] Additionally, for reasons related to commercial viability and engineering feasibility, the project is proposed as an integrated whole, not a series of separate components where parts of the whole may be removed due to subjective, perceived visual effects.

Table 4.2-5
Summary of Existing Scenic Quality Assessment and Project Visual Impacts

Viewpoint	Existing Scenic Quality		Anticipated Level of Visual impact
	Visual Quality	Visual Sensitivity	
Viewpoint 1: State Highway 141/Pucker Huddle (Figure 4.2-6)	Low	Moderate	Low to Moderate
Viewpoint 2: Strawberry Mountain (Figure 4.2-7)	Moderate	Moderate	Low to Moderate
Viewpoint 3: Husum, Highway 141 north (Figure 4.2-8)	Moderate to Moderately High	Moderate	Moderate
Viewpoint 4: Ausplund Road, Cook-Underwood Road (Figure 4.2-9)	Moderate	Moderate	Moderate
Viewpoint 5: Willard (Figure 4.2-10)	Moderately Low to Moderate	Moderate	Moderate
Viewpoint 7: Mill A (Figure 4.2-11)	Moderately Low	Moderate	Low to Moderate
Viewpoint 8: Windance (Figure 4.2-12)	Moderate	Low to Moderate	Low
Viewpoint 10: Panorama Point (Figure 4.2-13)	Moderately High	Low	Low
Viewpoint 11: I-84 Westbound (Figure 4.2-14)	Moderate	Moderate	Moderate to Low
Viewpoint 12: Koberg Park (Figure 4.2-15)	Moderately High	Moderate	Moderate
Viewpoint 13: I-84 Eastbound (Figure 4.2-16)	Moderately High	Moderately Low	Moderate to Low
Viewpoint 14: Viento State Park (Figure 4.2-17)	Moderately High to High	Moderate to High	Moderate
Viewpoint 15: Frankton Road (Figure 4.2-18)	Moderate	Moderate	Moderate
Viewpoint 16: Fairview Road (Figure 4.2-19)	Moderate	Moderate	Moderate
Viewpoint 17: Providence Hospital (Figure 4.2-20)	Moderately Low	Low	Low
Viewpoint 18: Rosauers Parking Lot (Figure 4.2-21)	Moderately Low	Low	Low
Viewpoint 19: Columbia River Highway (Figure 4.2-22)	Moderately High	Moderate	Low
Viewpoint 20: Highway 35 (Figure 4.2-23)	Moderately Low	Low to Moderate	No change
Viewpoint 21: Kollock-Knapp Road intersection with Scoggins Road (Figure 4.2-24)	Moderate to Low	Low to Moderate	Moderate
Viewpoint 22: Cook-Underwood Road intersection with King Road (Figure 4.2-25)	Moderate to High	Moderate	Moderate
Viewpoint 23: Ausplund Road End (Figure 4.2-26)	Moderate	Moderate	Moderate

Atmospheric haze varies by location, season, time of day, and weather patterns. In creating photo composite visual simulations the aim is to match the haze level on the rendered turbines to the observable haze present in the photograph. This is done visually by comparing the haze effects on the photographed terrain near the turbines to the rendered haze effects on the rendered terrain. This is then translated into a worst case (lower than expected) haze visibility setting for the turbine renders. The result is that the turbines would be slightly more visible in the final

composites than they would actually be if an observer were standing on the ground viewing them from the exact place, date, and time that the photos were taken.

Viewpoint 1: Pucker Huddle

From Viewpoint 1, approximately 25 turbines would be visible on the ridge tops at distances of 0.8 to 3 or more miles. Figure 4.2-6 illustrates the simulated views from Viewpoint 1 on SR 141 above Pucker Huddle, looking west into Underwood Mountain for the most conservative scenario of a 50-turbine project, with 426-foot high turbines. At the distance depicted in the photo, the visual clutter of more turbines has more impact than the considerable scale of the larger turbines. The composition would be silhouetted against the sky, increasing their visual impact. However, the distance and the line of sight from the residential areas would minimize the contrast. The presence of the turbines would reduce the scene's degree of intactness by introducing a large number of highly visible engineered vertical elements.

The potential visual impact from Viewpoint 1 would range from low to moderate.

Viewpoint 2: Strawberry Mountain

From Viewpoint 2, approximately 22 turbines would be visible on the ridge tops at distances greater than five or more miles. Figure 4.2-7 illustrates the simulated views from Viewpoint 2 on SR 141 above Pucker Huddle, looking west into Underwood Mountain for the most conservative scenario of a 50-turbine project, with 426-foot high turbines. At the distance depicted in the photo, the background is silhouetted against the sky, increasing the impact of the number of turbines as opposed to the size of the large turbines. The introduction of vertical structures in the background of the view would add to the horizontal and vertical disruptions already within the existing view. The intactness would be compromised minimally with the addition of these features.

The potential visual impact from Viewpoint 2 would range from low to moderate.

Viewpoint 3: Husum

From Viewpoint 3, approximately 27 turbines would be visible on the ridge tips at a distance greater than five miles. Figure 4.2-8 illustrates the simulated views from SR 141 traveling south into the project area. Travelers moving along this highway are generally using the road to access recreation areas or for leisurely drives. Residential viewers would be screened to some degree from the view based on vegetation, landscaping, and the line of sight from the valley floor. Introduction of these vertical structures in the background of this view would decrease the intactness of the landscape, based on the numbers of turbines that would be visible. The composition of the view would be altered with the introduction of these engineered structures and would be apparent on the horizon to the travelers and residence in the area. Due to the low levels of viewers, duration of the views, and viewer awareness, the visual impact from Viewpoint 3 is considered moderate.

Viewpoint 4: Ausplund and Cook-Underwood Roads

From Viewpoint 4 approximately 14 turbines would be visible looking northwest from the roadway. Figure 4.2-9 illustrates the simulated view from the roadway at the intersections of Ausplund and Cook-Underwood Roads. Because of the position of this viewpoint (direct line of sight) and its distance from the turbines, the turbines apparent scale would be visible and apparent. The presence of the turbines would likely have a moderate effect on the vividness of the existing view and a moderate impact on the overall sense of unity and intactness by the roadway and residential viewers.

The potential visual impact from Viewpoint 4 would be moderate.

Viewpoint 5: Willard

From Viewpoint 5, approximately 24 turbines in turbine strings A and B would be visible from screened views from residences in the area of Willard. Figure 4.2-10 shows the simulated view from Viewpoint 5 in the northern portion of the project looking southeast. These turbines would be located in the ridge tops at distances ranging from 1 to 3 miles from this viewpoint. Because the turbines would be seen against the sky at medium range and screened in many residential views, they would still be visible in the background. This would reduce the visual unity and intactness minimally when compared to the existing components in the landscape. The wind turbines would be arrayed uniformly along the ridgeline and would create a moderate change in the setting's existing low to moderate visual quality.

The potential visual impact from Viewpoint 5 would be moderate.

Viewpoint 7: Mill A

From Viewpoint 7, approximately 35 turbines in strings A and B would be visible in the foreground, middle ground, and background of this view. The ridgeline is located 1.5 miles or more from Viewpoint at Mill A. Figure 4.2-11 shows the simulated view. The turbines would be seen against the sky. The presence of the long line of turbines may create a slight increase in the vividness of this view. The unity of the view would be decreased further by the long turbine line and the intactness of the view would be moderately compromised compared to the existing view.

The potential visual impact from Viewpoint 7 is considered to be low to moderate.

Viewpoint 8: Windance

From Viewpoint 8, fewer than seven turbines can be seen in the background of the landscape and more than 5 miles from the viewpoint. Figure 4.2-12 shows the simulated view. The scenic quality with advent of the turbines when seen from this distance is expected to minimally decrease the level of vividness, unity, or intactness of the landscape view. Recreational users in the Gorge area are water related and their line of sight is generally along the river and river banks. Although the turbines would be visible on the far horizon it is not expected to decrease the existing quality of this view.

The potential visual impact from Viewpoint 8 is considered to be low.

Viewpoint 10: Panorama Point

From Viewpoint 10, approximately 11 turbines can be seen in the distant background of the view. Figure 4.2-13 shows the simulated view. Although the turbines would be visible on the far horizon it is not expected to decrease the existing quality of this view. However, because of their relatively small size at this viewing distance, they would not likely detract from views across the Columbia River Gorge National Scenic Area. The visible turbines would have little effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 10 would be low.

Viewpoint 11: I-84 Westbound

From Viewpoint 11, approximately 19 turbines would be visible in the distance background to roadway travelers looking west into the project area from I-84. Figure 4.2-14 shows the simulated view. Although the turbines would be visible to travelers on the far horizon, their presence is not expected to decrease the existing quality of this view, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 11 was rated as moderate to low.

Viewpoint 12: Koberg Park

From Viewpoint 12, approximately 17 turbines would be visible in the distant background to recreational users of the park and river. The view looks west into the project area. Figure 4.2-15 shows the simulated view. Although the turbines would be visible to the viewers on the far horizon it is not expected to decrease the existing quality of this view to a great degree, because of their relatively small size at this viewing distance. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness.

The potential visual impact from Viewpoint 12 was considered to be moderate.

Viewpoint 13: I-84 Eastbound

From Viewpoint 13 approximately eight turbines would be visible in the background to roadway travelers looking west into the project area from I-84. Figure 4.2-16 shows the simulated view. This view for travelers would be of short duration. Although the turbines would be visible to travelers on the horizon it is not expected to decrease the existing quality of this view because of the number of turbines visible and the partial screening from the middle ground ridgeline. The visible turbines would have a minimal effect on this view's vividness, unity, and intactness for these reasons.

The potential visual impact from Viewpoint 13 was rated as moderate to low.

Viewpoint 14: Viento State Park

From Viewpoint 14, approximately 20 turbines in the background would be visible to the recreational users of the area. Figure 4.2-17 shows the simulated view. Although the water-related recreational activities would have the line of sight more related to the water and river banks, the recreational users moving through this area would be affected by this contrast in the view. The vividness of the scenic quality may be positively or negatively affected, depending on the user perception of turbines in the background. The unity and intactness of the existing view would be moderately compromised and the visible turbines would have a moderate effect on the view's scenic quality compared to existing conditions, due to the distance from the State Park and activities in the foreground and middle ground.

The potential visual impact for Viewpoint 14 was considered to be moderate.

Viewpoints 15 and 16: Frankton and Fairview Roads

From Viewpoints 15 and 16, approximately 10 and eight turbines can be seen, respectively. Figures 4.2-18 and 4.2-19 show the simulated view. At a distance of 5 miles or more this contrast would have a minor effect on the overall visual impact. Consequently, because the prominence of the turbines in the view would be low, the turbines would have a minor effect on the vividness, unity, and intactness from this viewpoint.

The potential visual impact from this viewpoint would be moderate.

Viewpoints 17 and 18: Province Hospital and Rosauers Parking Lots Hood River

From Viewpoints 17 and 18, only two and three turbines can be seen, respectively, and they are diminished by the distance. Figures 4.2-20 and 4.2-21 show the simulated views. At this distance, viewers would have to scan the horizon to find the turbines. Consequently, minor effect or negligible effects to the scenic quality is expected to be low and was rated as low.

Viewpoint 19: Columbia River Highway

From Viewpoint 19, approximately nine turbines are visible in the distant background. Figure 4.2-22 shows the simulated view. Although the turbines would be visible in the background the viewer would have to have a focused orientation to see them in the landscape. The amount of turbines and the limited prominence based on the distance is expected to have a minimal effect on the scenic quality from this viewpoint.

The potential visual impact from this viewpoint would be low.

Viewpoint 20: State Route 35

From Viewpoint 20, approximately 20 turbines could potentially be seen. Figure 4.2-23 shows the simulated view. Given the distance of more than 10 miles from the viewpoint to the wind turbines, it would be difficult to see them out on the horizon unless the conditions and lighting were perfect. Implementation of the project is not expected to change the scenic quality from this viewpoint.

The potential visual impact from this viewpoint would not change from existing.

Viewpoint 21: Kollock-Knapp Road at the intersection with Scoggins Road

From Viewpoint 21, approximately three turbines can be seen. Figure 4.2-24 shows the simulated view. This area would be within 1.5 miles of the project and the turbines would be highly visible at these intersections. However, minimal use of these roads beyond a few residences and workers reduces the viewer types. Regardless, the impacts of the turbines on the landscape would affect the scenic quality of the view.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 22: Cook-Underwood Road at the intersection with King Road

From Viewpoint 22, approximately seven of the 22 turbines can be seen. Figure 4.2-25 shows the simulated view. This area would be within two miles of the project and the turbines would be highly visible at these intersections. However, minimal use of these roads beyond a few area residences and workers reduces the viewer types and the viewer numbers. Regardless, the impacts of the turbines on the landscape would affect the scenic quality of the view for those viewers.

The potential visual impact from this viewpoint would be moderate.

Viewpoint 23: Ausplund Road End

From Viewpoint 23, approximately eight turbines can be seen. Figure 4.2-26 shows the simulated view. This area would be within one mile of the project and the turbines would be highly visible at the end of this project access road. However, very minimal use of these roads beyond workers associated with forest management reduces the viewer types. Regardless, the impacts of the turbines on the landscape would affect the scenic quality of the view.

The potential visual impact from this viewpoint would be moderate.

As noted above, visual impacts relate to the subjective perceptions of viewers. For many viewers, the location of the project, including the limiting effect of topography, tree cover, the relatively significant distance to surrounding residences, and the orientation of the project vis-à-vis viewers, minimizes visual impacts. However, the project is proposed in a location with a robust wind resource and relatively easy and close access to consumers of renewable energy. Consequently, the project would be seen and perceived by many viewers, and it would alter the landscape. Opportunities to minimize and mitigate visual impacts are limited. Simulations have been prepared to compare the impacts of different colors for the turbines. Although a brown turbine color would reduce visual contrast in views where the turbines are seen against a landscape backdrop, it would accentuate the visibility of the turbines in views where they would be seen against the sky. In addition, the brown color would have a greater contrast when snow is on the ground. Because the turbines are most frequently seen against the sky, particularly in close-range views where visual concerns are the greatest, a non-reflective flat neutral gray or light color is recommended as the better choice for minimizing aesthetic impacts.

Decommissioning Impacts

Decommissioning would consist of removing aboveground equipment, such as turbine and meteorological towers and their associated foundations, to a depth of 3 feet bgs. Wind turbine foundations below 3 feet would remain. The ground surface would be regraded to natural contours and revegetated to a natural condition.

For several years after decommissioning, site disturbance would be visible upon close examination. The visual impacts of those aboveground elements that are not removed would remain. During the decommissioning process, similar impacts to those experienced during construction would occur but to a lesser extent because less construction material would be removed than was delivered to the wind turbine sites.

4.2.3.4 Mitigation Measures

Because the turbines are most frequently seen against the sky, particularly in close-range views where visual concerns are the greatest, a non-reflective flat neutral gray or light color is recommended to minimize aesthetic impacts.

4.2.4 RECREATION

4.2.4.1 Inventory of Facilities

The primary recreation activities within Skamania County are camping, hiking and fishing. The USFS maintains numerous campgrounds, hiking trails and wilderness areas. Congress created the Mount St. Helens National Volcanic Monument, located in the northwest corner of Skamania County, following the 1980 eruption of the volcano. The Lewis and Clark Trail Highway follows the Columbia River through Skamania County. The Columbia River Gorge National Scenic Area is located south of the project site area. Informal recreational activities such as hunting, hiking and mountain biking exist subject to landowner approval.

Recreational facilities or activities available closest to the project site are as follows:

- Hiking and horseback riding along Buck Creek Trail
- Husum Hills Golf Course
- BZ Corners Boat Launch
- Underwood Park/Community Center
- Drano Lake Boat Ramp

Summer recreational activities include water sports such as fishing, swimming, boating, river rafting, kayaking, water skiing, and wind surfing; as well as camping, biking, hiking, horseback riding, hunting, picnicking, and other outdoor sports. Some of these activities continue into the winter, weather permitting. Sightseeing is a popular year-round activity in the Columbia River Gorge.

Table 4.2-6 lists recreational facilities and activities available within a 25-mile radius of the project site or beyond; the radius is centered somewhat near the middle of the project site (Figure 4.2-27 Key Recreation Viewing Areas and Recreational Facilities within Approximately 25 Miles). This study area covers forests and wilderness areas, wildlife areas, boat launches, state parks, county parks, city parks, trails, campsites, and museums.

Table 4.2-6
Public Park and Recreation Facilities within 25 Miles

National Scenic Areas and Trails
Columbia River Gorge National Scenic Area
Lewis and Clark National Historic Trail
Oregon Trail National Historic Trail
Washington State Parks
Columbia Hills State Park
Doug's Beach State Park
Oregon State Parks/Campgrounds/Trails
Lindsey Creek State Park
Starvation Creek State Park
Viento State Park
Wygant State Park
Seneca Fouts State Park
Koberg Beach State Park
Memaloose State Park
Mayer State Park
Lang Forest State Park
Wyeth Campground
Historic Columbia River Highway State Trail - Twin Tunnels Segment (Mosier Twin Tunnels)
USFS Parks/Trails/Boat Launches
BZ Corners Boat Launch
Balfour-Klickitat Park
Dog Mountain Trail
Herman Creek Trail
Washington State Department of Natural Resources
Buck Creek Trail
Skamania County Parks/Campgrounds/Launches
Home Valley Campground
Underwood Park/Underwood Community Center
Big Cedars County Park
Wind River Boat Ramp
Drano Lake Boat Launch
Skamania County Fairgrounds
Rock Creek Community Center

Klickitat County Parks
Klickitat County Park
Hood River County Parks
Tucker Park
Panorama Point County Park
Tollbridge County Park
City of White Salmon
Jewett Creek Park
White Salmon City Park
City of Hood River
Eliot Park
Waucoma Park
Golf Courses
Husum Hills Golf Course
Indian Creek Golf Course
Hood River Golf and Country Club
Carson Hot Springs Golf Course and Resort
Skamania Lodge Golf Course
The Dalles Country Club
Northwest Aluminum Golf Club
Museums and Sightseeing
Hood River County Museum
Western Antique Aeroplane & Automobile Museum
International Museum of Carousel Art
Gorge Heritage Museum
Columbia River Gorge Interpretive Center
Bonneville Lock and Dam Visitor Complex
Columbia Gorge Discovery Center
Wasco County Historical Museum
Fort Dalles Museum
Sternwheeler Cruises

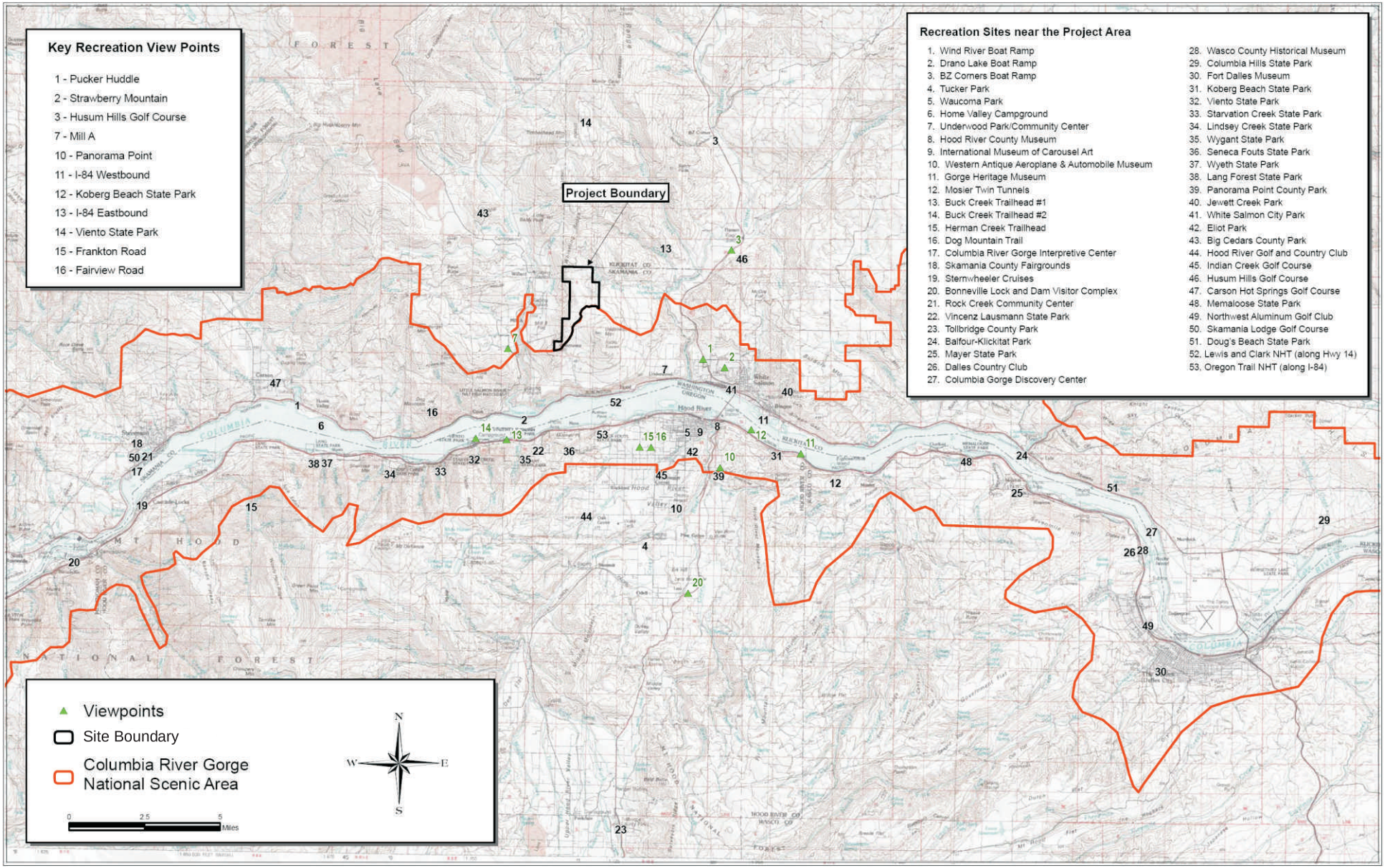


Figure 4.2-27

Recreation Facilities and Key Viewpoints Within Approximately 25 Miles

Source: GeoDataScape.

Job No. 33758687

URS

Whistling Ridge Energy Project
Skamania County, Washington

No Skamania County recreation facilities are within five miles of the proposed project. The closest County facility would be the Underwood Park and Community Center, located near Underwood just off of Cook-Underwood Road (approximately 6 miles south). The community center has a large gymnasium, stage, kitchen, and meeting room; while the park has soccer fields, a pavilion, and a playground.

A notable recreational facility is Doug's Beach State Park, located approximately 20 miles east of the site. Doug's Beach is heavily used by windsurfers in the summer and is considered by many to be the premier expert windsurfing site in the Gorge and perhaps the entire western United States (Columbia River Gorge National Scenic Area 1992).

Two national trails, the Lewis and Clark National Historical Trail and the Oregon Pioneer National Historic Trail, are located within five miles of the proposed facility. These trails roughly follow Highway 14 and Interstate 84, respectively. ~~There are no national trails located within 5 miles of the proposed facility.~~ Within five miles, the White Salmon River is designated as a wild and scenic river, and within 25 miles, the Klickitat River is also designated.

The Gifford Pinchot National Forest, which includes Mount St. Helens National Volcanic Monument, is located approximately 10 miles west and north of the site. The Mount Hood National Forest is located approximately 20 miles south of the site. The Columbia River Gorge National Scenic Area is located immediately south of the site. The Scenic Area is a popular visitor tourist destination. Recreation activities in the Scenic Area include hiking, mountain biking, windsurfing, camping, fishing, boating, wildlife/bird watching, wildflower viewing, photography, picnicking, and rock climbing.

4.2.4.2 Established Plans and Policies

Skamania County completed a Parks and Recreation Master Plan in 2001. This plan outlines goals, policies, objectives, and important background information in order to guide recreational development in the County. There are no County Parks within five miles of the proposed facility.

The Scenic Area encompasses portions of six counties within Oregon and Washington. In 1987, the States of Washington and Oregon entered into the bi-state compact to form the Columbia River Gorge Commission. In 1991, the Columbia River Gorge Commission adopted the National Scenic Area Management Plan, which acts as the comprehensive plan within the Scenic Area.

The goals, objectives, policies, and guidelines for the Scenic Area provide a framework for guiding actions of the various public and private recreation providers in the Scenic Area. Overall goals, objectives, and policies include:

- Protection of the resources
- Scenic appreciation and scenic travel corridors
- River access and protection of the treaty rights

- Interpretation/education
- Trails and pathways
- Transportation
- Coordination

The Recreation Development Proposals List was originally created in 1992 as part of the Recreation Development Plan in the Management Plan for the Columbia River Gorge National Scenic Area. This list highlights selected sites and proposed projects at those sites that, when implemented, would best achieve the recreation goals and objectives of the Management Plan. The proposed projects would be funded by local, state and federal funds; however, it is unknown if any of these projects are funded or have been completed. The following sites identified as proposed improvement projects in the plan are within approximately 25 miles of the site:

- ***Wind River:*** develop river access park on the site emphasizing day-use activities
- ***Drano Lake:*** expand the existing facility and provide an additional launch lane, a dock, and vault toilets
- ***Spring Creek Hatchery:*** create a coordinated and cooperative plan, design, and management program
- ***White Salmon River:*** develop small to moderate-sized day-use facility emphasizing bank fishing opportunities
- ***Klickitat River County Park:*** improve campsites, trail/river access, and signage
- ***Doug's Beach State Park:*** conduct cultural resource investigations at the site
- ***Mayer State Park:*** develop overnight camping, day-use parking, picnicking, and limited interpretive facilities
- ***Hudson Hill:*** acquire property by the USFS and develop a walking path and viewpoint
- ***Mosier Waterfront:*** develop a water-oriented, multipurpose day-use facility with windsurfing rigging/launching area, a swimming beach, picnic area, and a moderate to large parking area
- ***Historic Columbia River Highway State Trail, Twin Tunnels Segment:*** develop overnight camping area, bicycle parking, viewpoints, and picnicking

There are no new parks or recreation facilities planned within a five-mile radius of the site. There are no existing Skamania County ordinances or regulations that would require a dedication of land for recreation facilities, or money in lieu thereof, as a result of the proposed development. Although ordinances of this type could be adopted in the future, it is unlikely that Skamania County would assess such requirements against the development.

No federal recreation regulations apply to the site, nor are there federal or state plans for recreation facilities in the site.

4.2.4.3 Impacts

Construction Impacts

A majority of the construction workers are expected to be within daily commuting distance of the site. At peak construction periods, some workers may seek temporary housing in apartments or motels, or may make private arrangements for recreational vehicles. Existing limits on the length of stay in public camping areas would minimize any potential impacts on park users. Workers would be more likely to use the facilities on weekdays rather than busy weekends, so minimal impacts to park and recreation facilities are expected from construction workers.

Operational Impacts

In addressing the impacts to the Scenic Area and recreation opportunities in proximity to the project area we evaluated how the project would affect the overall goals, objectives, and policies listed above.

- ***Protection of Resources.*** The project would not decrease any resources within the Scenic Area. No recreation resources would be lost in the Scenic Area and only a small portion of an existing road would be affected by this project through upgrading of the road for access.

- ***Scenic Appreciation and Scenic Travel Corridors.*** Impacts to scenic areas and highway are listed in Section 4.2.3. Key viewing areas for recreation and the visual impacts are also found in Section 4.2.3 and disclose the distance of these areas from the project. The assessment for how the recreation visitor would view the project is assessed from these viewpoints. The project would have minor to moderate effects on the visual quality of the area as viewed from these recreation areas.

- ***Resource Based Recreation.*** No resource based recreation within the Scenic Area is expected to be affected by the project. No resources are within or in proximity to the project area.

- ***River Access and Protection of Treaty Rights.*** This project is on private lands outside of the Scenic Area and would have no effect on River Access and Treaty Rights.

- ***Interpretation/Education.*** An opportunity to provide alternative energy interpretation and education could be included in this project and further the goals of the Scenic Area.

- ***Trails and Pathways.*** The project would not affect any trails or pathways in the Scenic Area. There may be some distant views of wind turbines from trails. Key recreation and trails viewpoints are assessed in Section 4.2.4.

- ***Transportation.*** Use of ~~the portion of the~~SR 14 and portions of Cook-Underwood Road ~~road~~ that ~~is~~ are within the Scenic Area to access the project ~~would be upgraded but~~ would have no effect on movement of recreational travel or access. ~~It may increase the ability to access areas outside of the Scenic Area.~~

- ***Coordination***. Coordination with the development of any of the projects set forth above within the Scenic Area would be ongoing throughout the timeframes of the project through construction and maintenance to assist in meeting overall goals, objectives, and policies

Based on these factors, it is expected that the project would not "unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area" (Wild and Scenic Rivers Act, 16 USC 1271-1287), so no impacts to wild and scenic rivers would occur. The project would not have a direct impact on any recreation area in the sense of impairing access, diminishing use, or restricting planned installations and improvements. The project would affect the visual experience of visitors in some locations (Figure 4.2-27 Key Recreation Viewing Areas and Recreational Facilities within Approximately 25 Miles). See Section 4.2.3 Aesthetics for more information about visual and aesthetic qualities and impacts.

4.2.4.4 Mitigation Measures

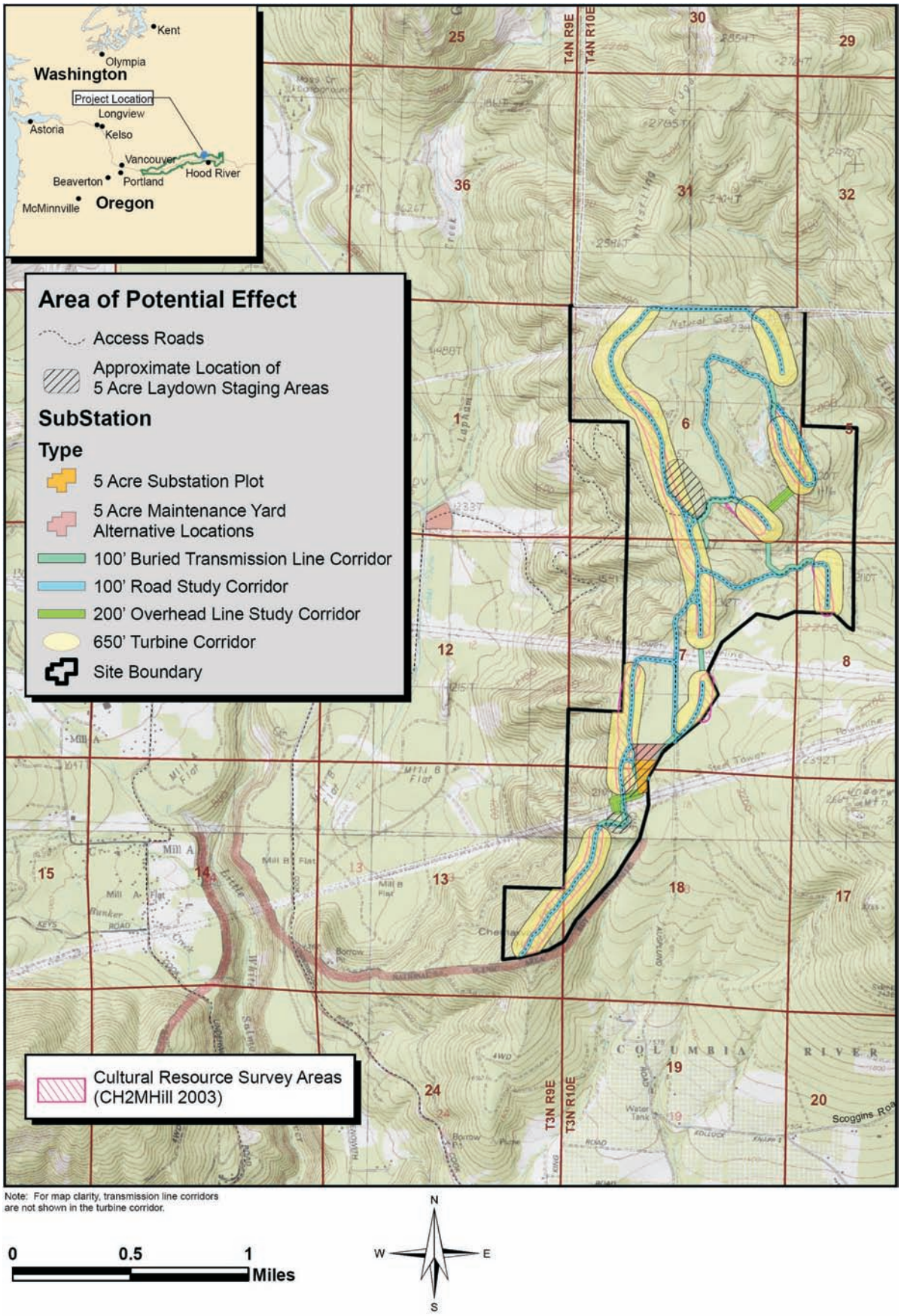
Impacts to recreation users during the construction phase would primarily result from dust and noise from construction equipment. While the project would not affect any trails or pathways in the Scenic Area, there may be some distant views of wind turbines from trails during operations. Because they are high on the ridge, no mitigation measures are proposed other than painting the turbines a flat gray. See Section 2.11 Emission Control and 4.1 Environmental Health for mitigation measures proposed for air quality and noise during construction. See Section 4.2.3 Aesthetics for a discussion of visual and aesthetic impacts and mitigation measures.

4.2.5 HISTORIC AND CULTURAL PRESERVATION

4.2.5.1 Introduction

In 2003, CH2M Hill conducted a cultural resources survey at the proposed location for the Whistling Ridge Energy Project and site vicinity in order to assess the potential for such impacts. This survey was designed to identify, evaluate, and record prehistoric and historic cultural resources in accordance with Chapter 36 CFR §800. The survey objectives include identification of archaeological resources and historic properties that might be considered eligible for nomination to the National Register of Historic Places located within the area of potential effect for the development. The area of potential effect is shown on Figure 4.2-28, and includes a cumulative total of approximately 1,152 acres.

33758687_102.cdr



Source: GeoDataScape.

Job No. 33758687

Revised Figure 4.2-28

Area of Potential Effects

URS

Whistling Ridge Energy Project
Skamania County, Washington

~~The results of the survey and its findings have been reviewed by URS and no deficiencies were found.~~ URS expanded the study area to include the new road access, West Pit Road, and completed a file search of this area at the Washington State Department of Archeology and Historic Preservation (DAHP) in July 2009. The file search revealed no archeological or historical sites. An inventory of the new access road ~~survey of portions of the project site would~~and previously recorded resources will be revisited and forms updated, as appropriate, will be conducted in the ~~spring~~ fall 2009 by a URS archeologist ~~to confirm the findings~~ as part of preparation of the Environmental Impact Statement.

Study Methodology

This cultural resource assessment included a file search at the Washington State Department of Archaeology and Historic Preservation. Cultural and environmental background and history of the project vicinity was researched in order to provide an interpretive context for cultural resources potentially present in the project area. An intensive pedestrian inventory (survey) of all wind energy facility areas was conducted, and a windshield survey was conducted of proposed roads and road improvements. Literature was reviewed to examine the location and nature of potential traditional cultural properties (TCPs) in the project area. Potential TCP resources were sought during the field survey. The study methodology employed follows applicable NEPA regulations and is also consistent with US Secretary of Interior Standards for cultural resource survey and documentation under Section 106 of the National Historic Preservation Act (NHPA).

4.2.5.2 Regional Context

The cultural/historical sequence for the project vicinity is fairly well known, and was most recently provided by Griffin and Churchill (2001), but is also discussed by Beckham et al., (1988). Table 4.2-7 summarizes the prehistoric cultural/historical sequence in the project vicinity. The table is based on a synthesis of reports on archaeological sites and material cultural remains in the project vicinity. More information about the prehistoric cultural sequence can be found in Beckham et al. (1988).

Table 4.2-7
Prehistoric Cultural Sequence in the Project Vicinity

Cultural Period	Years Before Present	Site Types	Architecture	Subsistence
Early Period	11,000-	Rock shelters, open air use sites, lithic scatters, early in period	Few, if any, house structures early in period	Reliance primarily on large game hunting early in period
	4,500	Habitation sites, open use and lithic scatter sites, rock shelters, rock art, burials, etc. later in period	Increase in semi-subterranean house structures later in period	Increased reliance on fishing and botanical food resources, reliance on game hunting
Middle Period	4,500-250	Villages, resource processing camps, rock art, burials, open lithic scatters, etc.	Food storage facilities appear, increase in number and permanence of house structures	Further increase in reliance on fish and botanicals, reliance on game hunting secondary
Late Period	250-ethographic present	Permanent and temporary villages, burials, food storage sites, food processing sites, open air lithic scatters	Increased abundance of village sites, food storage facilities	Reliance on riverine, botanical and game resources

Sources: Griffin and Churchill (2001), Beckham et al. (1988)
Sequence defined by archeological sites and material cultural remains

The prehistoric cultural/historical sequence of the project area can be divided into three broad periods (Griffin and Churchill 2001). The **Early Period** began about 11,000 years BP and lasted until about 4,500 years BP. Cultural groups during the start of this period relied primarily on big game for subsistence. Botanical resources also were heavily used, although archaeological evidence for such is not plentiful. Few, if any, permanent dwelling or architectural structures are known from the early part of this period. However, the later part of this period is marked by an increased reliance on fish and botanical resources, and the introduction or increase in the use of semi-subterranean house structures. The appearance of such structures marks a decrease in mobility and a general increase in sedentism, particularly in winter months.

Architectural features, such as semi-subterranean house pits and food storage (cache) facilities marks the **Middle Period** (4,500-250 years BP). Such structures dating to this period are often found grouped in village configurations along streams and river confluence areas. Based on these architectural features, it is evident that cultural groups were sedentary during winter months. During this time, cultural groups continued to rely heavily on riverine and botanical resources, although large game animals were also used.

The **Late Period** (250 years BP [ethnographic present]) coincides with the introduction of the horse, resulting in increased mobility and a greater dispersal in settlement and access to a wider array of economically useful resources. Changes in material culture during this time period reflect the exploitation of a wider array of resources, as well as the increased access to European firearms and metal tools. During this period, cultural groups experienced drastic demographic changes as a result of European disease epidemics, the influx of European settlers and explorers, and related events (Griffin and Churchill 2001, Masten and Galm 1989, Beckham et al. 1988).

It is important to recognize that most evidence for prehistoric cultures is derived from lowland sites located near streams. Archaeological evidence in upland areas, such as the project vicinity, has not been extensively documented or explored. Upland forested areas are considered to be of

lower archaeological sensitivity because these areas are often removed from permanent, resource bearing water sources, and are generally thought to lack the wider array of natural resources normally found in lowland and/or riverine settings. Upland forested areas have not yet yielded evidence of prehistoric seasonal, semi-permanent, or permanent settlements.

4.2.5.3 Cultural Background

The project vicinity is ethnographically important to the Yakama Indian Nation. Information about the ethnographic period has been developed by the Yakama through elder testimony (oral history) and is also found in early accounts of European exploration of the Columbia River and the Northwest. Beckham et al. (1988) and Griffin and Churchill (2001) provide detailed descriptions of the ethnographic background of the project site and its surrounding area.

Briefly, the Columbia River Gorge was traditionally used by several cultural groups: the Wishram, White Salmon, and Cascades groups (Eastern Chinookan linguistic group) and the Yakama and Klickitat groups (Echeesh-Keen linguistic group) (Griffin and Churchill 2001). These groups used the Columbia River and its tributaries. Although the groups established territorial boundaries (usually based on geography), these boundaries were loose. The groups subsisted on a seasonal round of resource procurement based on resource seasonality and availability (Griffin and Churchill 2001). While upland and inland resources were seasonally utilized, permanent or semi-permanent villages were located along streams and other permanent water sources.

Euro-American exploration by Lewis and Clark, the Northwest Fur Company, and Hudson's Bay Company describe the indigenous cultural groups that settled along the Columbia River. Accounts of the settlements of the Wishram, White Salmon, Cascades, Yakama and Klickitat by these early explorers confirm the land-use pattern described by ethnographic informants. The implication of this use pattern for cultural resources is that evidence of cultural activity in upland and inland areas may not be evident through material remains, if it exists at all. Rather, most archaeological evidence for ethnographic and ethnohistoric activity is expected to be found in lowland areas along major rivers and streams.

European-American settlement in the northwest directly resulted in the depopulation and displacement of native cultural groups. A temporary Indian Reservation, the White Salmon Reservation, was established at the mouth of the White Salmon River in 1856. After two years, the residents of the reservation were moved to the present-day Yakama Reservation, and Euro-American homesteaders quickly established homesteads in place of the old reservation. In 1855, a treaty was signed in which the Confederated Yakama Tribes ceded their traditionally used lands to the Government but reserved their rights, through the Treaty of 1855, to fish at traditional locations along the Columbia and its tributaries, and to hunt in their traditional lands as long as the lands remained open and unclaimed. Today, the Confederated Tribes and Bands of the Yakama Nation include 14 tribes and bands from at least three different linguistic groups (Griffin and Churchill 2001).

Historic Setting

Relevant themes of historical significance include homesteading, logging, development of dams, railroading, development of fisheries, and recreation. Homesteading in the area did not fully

develop until 1857, when the Yakama Tribes were forcibly relocated from the Columbia River area. The Donation Land Act of 1850 enabled settlers to stake claims along the Columbia and its tributaries. The settlers pursued agriculture, established orchards, vineyards, and other crop fields groups (Griffin and Churchill 2001).

The development of the logging industry and dams coincided. Early lumber companies established dams to aid in the transport of timber. Timber harvest began in the White Salmon River area in the late 1800s. Dams were constructed at the mouths of most major tributaries to the Columbia River. Later, hydroelectric dam projects replaced the early logging dams in function. However, some remnants of these early structures remain in the area. The effects of these early logging dam construction activities on local fisheries are not well understood, but were likely harmful. The subsequent hydroelectric dams are known to have affected fisheries negatively. Although evidence of early dams may have been obliterated or inundated due to subsequent dam construction, evidence of early old-growth logging activities can be seen in upland areas, in the form of large stumps, springboard notches, logging roads, etc. (Griffin and Churchill 2001).

Development of the railroad in the Columbia River Gorge reached fruition by 1908. The complex history of local and regional railroad development cannot be reviewed here. However, it is important to note that the rail line paralleled the Columbia River and destroyed native fisheries and sites important to indigenous cultural groups. Evidence of the railroad appears in lowland areas, although the logging activities that took place in upland areas may be related to railroad construction (i.e., timber harvest for railroad ties may have taken place locally). The railroad was an important means of transportation for the area, and aided in the distribution of locally produced crops and goods to areas throughout Washington and Oregon. Other than small local roads, the railroad was the only means of transportation through the Columbia River Gorge until the 1920s (Griffin and Churchill 2001).

4.2.5.4 Cultural Resource Assessment

Pre-Field Research

Preliminary research consisted of a Department of Archaeology and Historic Preservation file search and literature review, a review of previously documented cultural resource in the project vicinity, and a review of previous cultural resource assessments conducted in the project vicinity.

On July 3, 2003, Ms. Raena Ballantyne, a CH2M HILL Cultural Resource Specialist, visited the Department of Archaeology and Historic Preservation in Olympia, Washington to determine whether cultural resources have been previously documented in the project area. In July 2009, Ms. Michelle Stegner, a URS Cultural Resource Specialist, expanded the study area to include the access road located outside of the Columbia River Gorge National Scenic Area. ~~This~~ Both searches provided basic information on the types and frequency distributions of cultural resources present or expected to be present in the project area, and also provided cultural context information.

No previously recorded cultural resources were documented in the area of potential effect for the project or the access road.

A number of cultural resources have been recorded outside of the project area in the project vicinity. Table 4.2-8 lists the known/recorded cultural resources and other pertinent information.

Table 4.2-8
Previously Documented Cultural Resources in the Project Vicinity in Relation to the Project Area of Potential Effect

Site Number	Site Type	National Register of Historic Places Eligibility Status	Location in Relation to Area of Potential Effect
45 SA 108	Prehistoric	Unevaluated	Completely outside
45 SA 408	Multicomponent	Unevaluated	Completely outside
45 SA 457	Historic	Unevaluated	Completely outside
45 SA 458	Historic	Unevaluated	Completely outside
45 KL 443	Prehistoric	Unevaluated	Completely outside
45 KL 444	Prehistoric	Unevaluated	Completely outside
45 KL 781	Prehistoric	Unevaluated	Completely outside
45 KL 782	Prehistoric	Unevaluated	Completely outside
45 KL 783	Prehistoric	Nominated, Eligible	Completely outside
45 KL 784	Prehistoric	Unevaluated	Completely outside
45 KL 789	Historic	Unevaluated	Completely outside
45 KL 790	Historic	Unevaluated	Completely outside
45 KL 841	Historic	SHPO[a] Determined Not Eligible	Completely outside
45 GP 596	Historic	Unevaluated	Completely outside

Site locations and other information obtained from the Department of Archaeology and Historic Preservation in Olympia, WA.
a. State Historic Preservation Officer

Native American Consultation

To initiate Tribal consultation, SDS Lumber Company invited Yakama tribal members to visit the project area in October 2007. Correspondence has been sent to cultural resource representatives of the Confederated Tribes and Bands of the Yakama Indian Reservation by SDS Lumber Company on November 4, 2008, requesting information on archaeological sites, traditional cultural properties, or any other concerns that the Tribe might have with this development. Two letters have been received from Chiefs of Tribes of the Yakama Nation, from Chief Wilbur Slockish of the Klickitat Tribe and from Chief Johnny Jackson of the Cascades Tribe. Neither letter identifies any traditional cultural properties or archeological sites within the project site. Copies of these letters are attached in Appendix F.

Field Survey Results

On August 12–14, 2003, Dr. James C. Bard, Mr. James J. Sharpe, and Ms. Raena Ballantyne, CH2M HILL Cultural Resource Specialists, conducted an intensive cultural resource inventory survey of the proposed area of potential effect. Proposed new roads and proposed upgrades to existing roads were inventoried using windshield survey methodology. Special attention was given to exposed road cut profiles and areas where streams or drainages crossed roadways. Each proposed turbine string and the proposed substation area were inventoried in a pedestrian survey using transects spaced 15 to 25 meters apart. The survey corridor width was 150 feet on each side of the hypothetical turbine centerline, for a total corridor width of 300 feet on each turbine string. The cultural resource specialists examined areas of exposed soils, rodent burrows, backdirt piles, upturned rootwads of trees, etc. Exploratory presence/absence shovel testing in the project area was not conducted. In some areas, surface duff and leaf litter was scraped away from boulder outcroppings and the forest floor to improve ground visibility. The project area lies on upland ridge top areas that are considered low in prehistoric archaeological sensitivity

and moderately low in terms of historic archaeological sensitivity. In areas of greater archaeological potential (i.e., on broad terraces or areas near streams and drainages), surface duff and leaf litter accumulation were scraped away to expose soils; such areas were inspected closely for evidence of cultural activity. Two ~~Cultural~~ cultural resources, consisting of a rock alignment and an historic debris scatter ~~(archaeological sites and isolates)~~ were documented using Washington State ~~Site~~ Isolate Forms by CH2M Hill and complied with U.S. Secretary of the Interior Standards.

On October 15, 2003, the proposed staging areas (Figure 2.1-1, Location of Proposed Whistling Ridge energy Project) were surveyed by Dr. James C. Bard and Ms. Carrie Haag of CH2M Hill. A pedestrian survey of these staging areas followed the transect spacing and methodology described above. No cultural resources were observed in the staging areas.

Traditional Cultural Properties

No TCPs were identified during the fieldwork for this project, nor have any been identified to date within the study area.

Griffin and Churchill (2001) conducted a thorough TCP investigation for a project directly east of the proposed project area, and east of the White Salmon River. Several categories of TCPs were identified during their study, and examples of these types of TCPs occurred in their study area. TCPs include power sites, wishing sites, vision quest locales, sweathouse locations, previous longhouse locations, sacred plant habitats, "refrigerator" storage areas, human burial sites, petroglyph and pictograph sites, and oral tradition and legendary sites. Because the proposed project is located nearby in similar terrain, these same TCP types might be expected to exist in the proposed project area. As noted above, two letters have been received from Chiefs of Tribes of the Yakama Nation, from Chief Wilbur Slockish of the Klickitat Tribe and from Chief Johnny Jackson of the Cascades Tribe. Neither letter identifies any traditional cultural properties or archeological sites within the Project site. Copies of these letters are attached in Appendix F.

4.2.5.5 Impacts

Regulatory Framework

Federal and state regulations require consideration of project effects on historic and/or cultural resources. Cultural resources must undergo a Section 106 Review Process for projects with a federal nexus under the NHPA. Section 106 review can be included in an EIS as a part of the NEPA compliance documentation.

Under applicable regulations, cultural resources may include:

Historic Properties. Historic properties are places eligible for inclusion in the National Register of Historic Places. Historic properties can include districts, sites, buildings, structures, objects, and landscapes significant in American history, prehistory, architecture, archaeology, engineering, and culture. Historic properties include TCPs. Historic properties must be given consideration under NEPA and the NHPA.

Native American Cultural Resources. Native American cultural resources may include human skeletal remains, funerary items, sacred items, and objects of cultural patrimony. Native American cultural items must be given consideration under NEPA, the NHPA, the Native American Graves Protection and Repatriation Act, and the American Indian Religious Freedom Act. Native American sacred sites must be considered under the American Indian Religious Freedom Act and Executive Order 13007. Native American traditional resource procurement areas and culturally important regional landscapes are Native American cultural resources often considered to be traditional cultural properties (and thus potential "historic properties").

Archaeological Sites. Archaeological sites and other scientific data must be given consideration under NEPA, the Archaeological Resources Protection Act, the Archaeological Data Protection Act, and to some extent under the NHPA and the Native American Graves Protection and Repatriation Act.

Other Cultural Resources. Cultural institutions, lifeways, culturally valued viewsheds, places of cultural association, and other valued places and social institutions must be considered under NEPA, Executive Order 12898, and sometimes other authorities.

"Historic properties" are protected through NHPA (16 USC 470f) and its implementing regulation, Protection of Historic Properties (36 CFR Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act. Prior to implementing an "undertaking" (issuing a federal permit), Section 106 of the NHPA requires federal agencies (FHWA, Federal Transit Administration, etc.) to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation and the State Historic Preservation Officer a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the National Register of Historic Places. Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a tribe (TCPs) to be determined eligible for inclusion in the National Register of Historic Places.

Under the NHPA, cultural resources are considered significant if they meet the National Register of Historic Places listing criteria in 36 CFR 60.4. Cultural resources must be evaluated in terms of their overall quality and integrity of location, design, setting, materials, workmanship, feeling, and association. Cultural institutions, lifeways, culturally valued viewsheds, places of cultural association, and other valued places and social institutions also must be considered under NEPA, Executive Order 12898, and sometimes other authorities. The American Indian Religious Freedom Act allows access to sites of religious importance to Native Americans. The Archaeological Resources Protection Act assigns penalties for vandalism and the unauthorized collection of archaeological resources on federal land and provides for federal agencies to issue permits for scientific excavation by qualified archaeologists. The Native American Graves Protection and Repatriation Act assigns ownership of Native American graves found on federal land to their direct descendants or to a culturally affiliated tribe or organization and provides for repatriation of human remains and funerary items to identified Native American descendants.

Cultural Resource Sites – Washington

On August 12-14, 2003, CH2M HILL Cultural Resource Specialists conducted an intensive cultural resource inventory survey of the proposed area of potential effect. Surveyed areas are

shown in Figure 4.2-28 Area of Potential Effects. Ground visibility in the project area varied from 15 percent to nearly 100 percent along turbine string areas, and was consistently 100 percent along proposed roadways and roads proposed for improvement. Soils in the project area are generally thin and characterized by sandy loam with angular and subangular cobble and gravel inclusions. Occasional boulder outcroppings are present in the project area. Such boulders were inspected for rock art, bedrock mortars, and other evidence of cultural use and modification.

The project area is covered by second and third growth commercial timber stands. Evidence of old growth logging is present in the project area in some locations: springboard notched and tall, large-diameter stumps can be observed in several locations throughout the project area.

No evidence of prehistoric activity was observed during the cultural resource survey. No archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented.

Isolate G2A is a linear stone alignment composed of piled basalt cobbles, all of which could be easily carried without the aid of machinery. No artifacts were found in association with the feature. The function and origin of the alignment are unknown, but the feature is thought to be associated with past logging activities.

Isolate B consists of a scatter of historic debris that has been badly disturbed by power transmission line construction, logging, and other development activities in the area. Artifacts from the area include very tiny fragments of purple, brown, olive green, clear, and white glass, two enamel metal cooking tins, a 1-gallon "Union Oil" can with "Triton SAE 30" stamped on the lid; tiny shards of blue on white ceramic, leather fragments, crushed tin cans and can fragments, and a tobacco tin lid. Most of the artifacts were very small and have been fragmented through past construction activity in the area.

Construction

No archaeological sites or historic properties were identified in the project area during the field inventory. All previously documented archaeological sites in the project vicinity are located well outside of the project area, as indicated in Table 4.2-8. Both of the archaeological isolates identified during the inventory for this project would likely be affected by the project. However, by definition, these isolates lack integrity and the ability to contribute information important to prehistory or history; they cannot be considered significant cultural resources. Construction of the proposed facilities is not anticipated to result in impacts to known/recorded cultural resources.

It is possible, although unlikely, that there are archaeological sites in the project area that were not detected during the archaeological inventory and fieldwork for this project. Such sites may be encountered during construction, installation, maintenance, and/or repair of the proposed wind energy facility. In the event of such an inadvertent discovery, work would be stopped in the area of the discovery and a qualified archaeologist be summoned to the area to identify and document the find and determine it significance.

TCPs are not known to exist in the project area and no impacts are anticipated.

In the unlikely event of a human remains discovery, federal law requires that all work in the area of the discovery be stopped immediately and the area secured. The Skamania County Medical Examiner would be contacted, and the State Historic Preservation Officer would be notified. If the Medical Examiner determines that the area is not a crime scene, and if the remains are determined to be Native American, the State Historic Preservation Officer and the tribes would consult to arrive at an appropriate treatment plan for the respectful re-internment of the remains.

Operations

Operation of the proposed facility would not result in impacts to known cultural resources. However, indirect impacts to cultural resources may result from maintenance activities. For example, maintenance activities for the proposed project facilities may require ground disturbances that could result in inadvertent discovery of cultural resources. If cultural resources are discovered during ground disturbing maintenance activities, assessment of the find would be necessary and appropriate mitigation measures implemented.

Decommissioning

Decommissioning of proposed project facilities is expected to result in impacts similar to construction impacts. There is a remote possibility that as-yet unidentified subsurface cultural resources could be discovered inadvertently during decommissioning activities. In this case, the protocol for such a discovery outlined in the Construction Impacts section above should be followed.

4.2.5.6 Mitigation Measures

Because no cultural resources (archaeological sites or historic properties) were identified in the project area, no mitigation actions are required. If cultural resources are inadvertently discovered during project construction and operations, assessment of the find would be necessary. If such cultural resources are found to be significant, mitigation measures would need to be devised and implemented.

4.2.6 AGRICULTURAL CROPS/ANIMALS

Agricultural activities are those activities conducted on lands defined in RCW 84.34.020(2) Open Space, Agricultural and Timber Lands - Current Use Assessment, and those activities involved in the production of crops and livestock, including but not limited to Operations and Maintenance of existing farm and stock ponds or drainage systems, irrigation systems, changes between agricultural activities, or maintenance or repair of existing serviceable structures and facilities. Activities that significantly impact a previously undisturbed critical area are not part of an on-going activity. An activity ceases to be on-going when the area on which it was conducted has been converted to a non-agricultural use, or has lain fallow for five years.

4.2.6.1 Existing Conditions

The Whistling Ridge Energy Project site would be on lands that have been used historically for commercial forestry. The project site has not been used for agricultural crops or animals.

4.2.6.2 Impacts

There would be no impacts to agricultural crops and animals.

4.2.6.3 Mitigation Measures

There would be no impacts to agricultural crops and animals, therefore mitigation measures are not proposed.

SECTION 4.3 TRANSPORTATION (WAC 463-60-372)

Construction and operation of the proposed Whistling Ridge Energy Project would affect transportation and traffic in the site area. Transportation issues would include construction traffic on roads (workers, equipment, and material deliveries by truck); transporting large wind energy facility components including tower sections, the nacelle and turbines, and blades either on rail lines or on the Columbia River; and Whistling Ridge Energy operation traffic (employees, visitors, deliveries of materials, and supplies). Types of transportation addressed in this section include roadway, rail, river, and air transport.

4.3.1 EXISTING CONDITIONS

4.3.1.1 Regional and Site Area

The Whistling Ridge Energy Project would be located on private land approximately 7 miles northwest of the city of White Salmon, and approximately 2 miles east of the Little White Salmon River in Skamania County, Washington. The general location is provided on Figure 2.1-1. The project would be located on commercial forest land owned by S.D.S. Co., LLC and Broughton Lumber Company in an unincorporated area of Skamania County, outside of the Columbia River Gorge National Scenic Area. ~~Approximately 2.1 miles of an existing private logging road would traverse the Scenic Area boundary (Figure 4.3-1, Project Site Roadway Network).~~

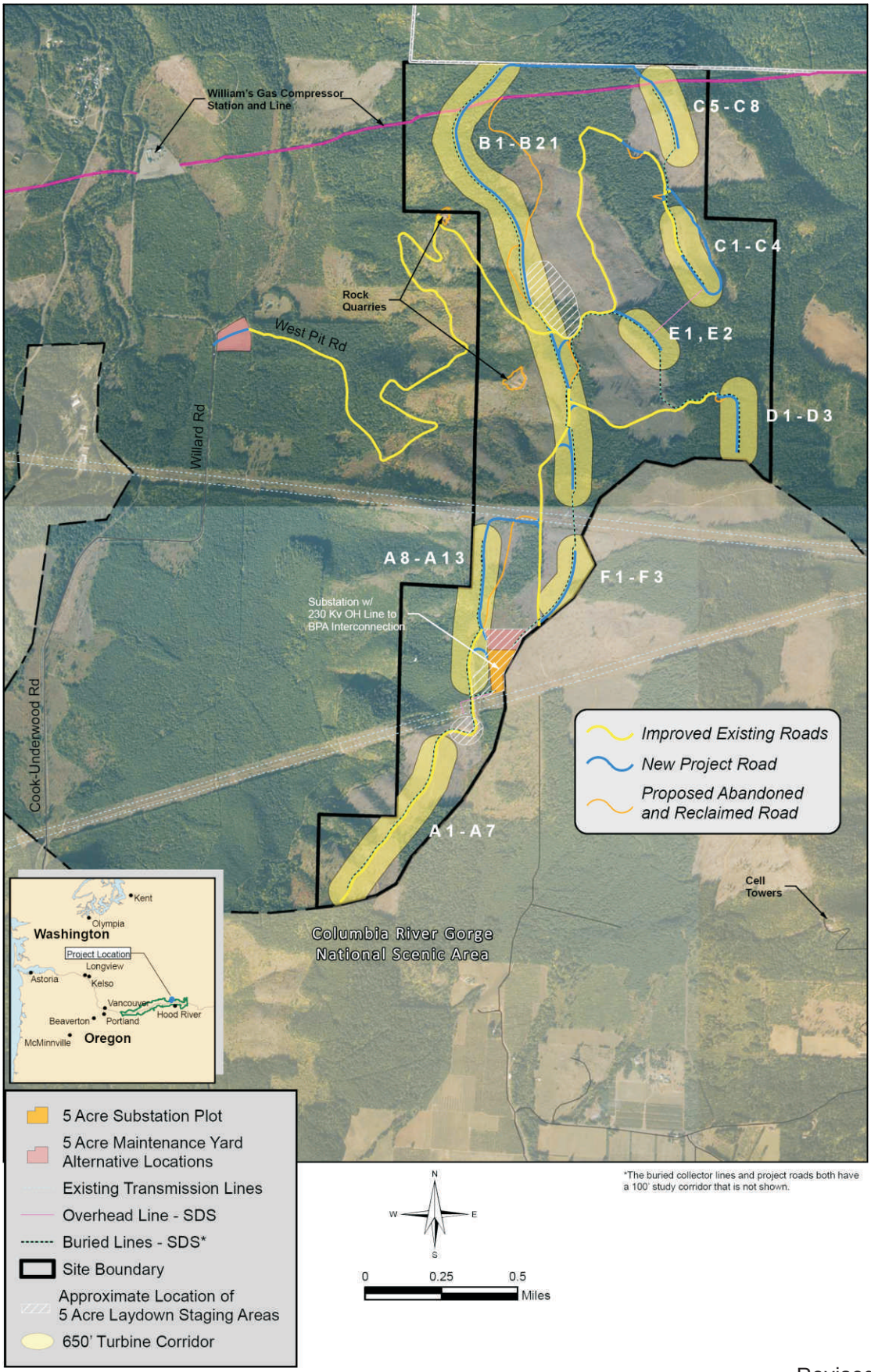
Roadway, rail, river, and air transportation are available in the regional and site areas surrounding the Whistling Ridge Energy Project.

Roadway Transportation

Existing Roadways

Access to the proposed Whistling Ridge Energy Project site would be provided by county roads that extend northward from SR 14, as well as an existing private logging road. From SR 14, access would be provided along Cook-Underwood Road to Willard Road, ~~Kollack-Knapp Road, Scoggins Road,~~ and then via a new direct connection to West Pit Road. West Pit Road is an existing private logging road ~~listed as CG2930.~~ that connects to a network of ~~The~~ existing private logging roads ~~is~~ located on S.D.S. Co., LLC and Broughton Lumber Company property~~, and~~. These logging roads would provide access to most areas where project facilities would be located (Figures 4.3-1 Project Site Roadway Network and ~~4.3-2~~ 4.3-2a and 4.3-2b, Other Roads with Potential Impact).

33758687_97.cdr



Source: GeoDataScape.

Job No. 33758687

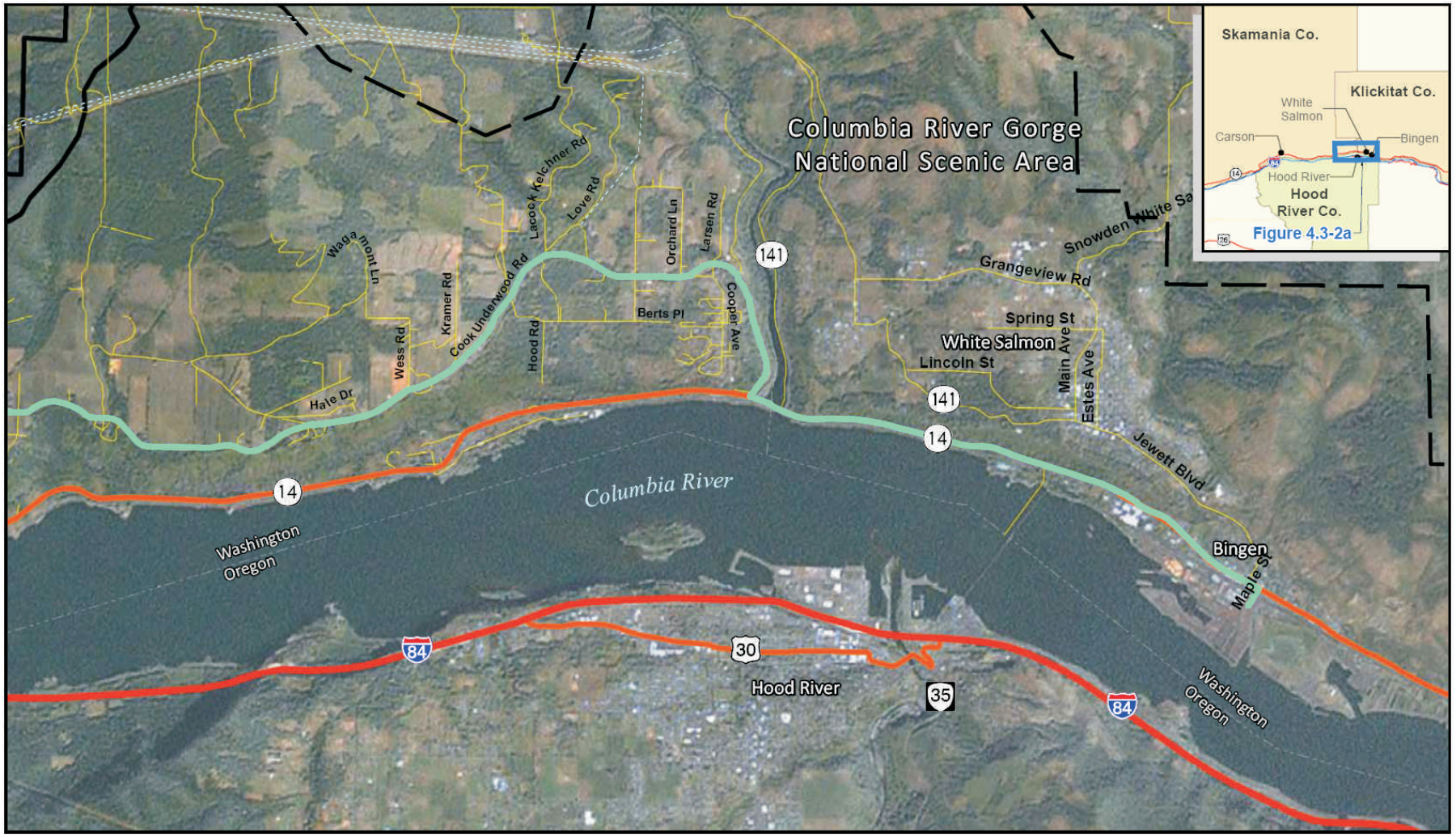
Revised Figure 4.3-1

Project Site Roadway Network

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_78.cdr



Site Boundary

Columbia River Gorge National Scenic Area

Other Roads with Potential Project Use

Local Roads

Source: GeoDataScape.

N W E S

0 0.5 1 Miles

Job No. 33758687

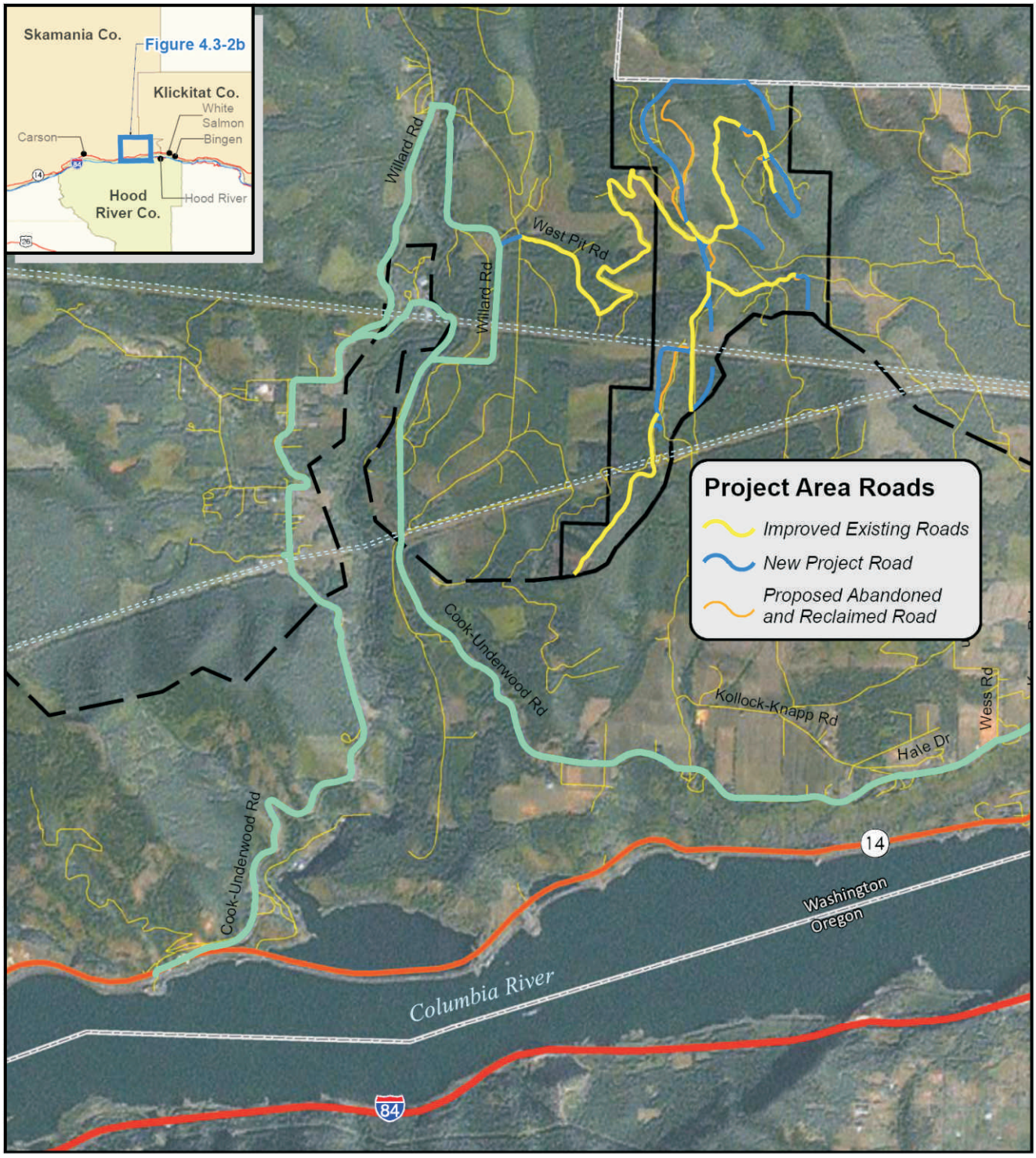
Revised Figure 4.3-2a

Other Roads with Potential Impact

URS

Whistling Ridge Energy Project
Skamania County, Washington

33758687_105.cdr



Site Boundary

Columbia River Gorge National Scenic Area

Other Roads with Potential Project Use

Local Roads

N
W
E
S

0 0.5 1 Miles

Source: GeoDataScape.

Job No. 33758687

Revised Figure 4.3-2b

Other Roads with Potential Impact

URS

Whistling Ridge Energy Project
Skamania County, Washington

Very little as-built information is available regarding existing pavement and base thickness along the proposed haul route. Field observations were conducted in 2007 and in January and July of 2009, and it was determined that the County roads are generally in good condition with certain sections showing signs of distress. West Pit Road was observed ~~The private logging road was determined~~ to be generally in poor condition, however roadway improvements for logging purposes were made during the summer of 2009. Additional improvements (beyond those needed for logging operations) will be needed for project construction and operation.

~~Pavement thickness was determined through measurement of pavement core samples. Roadway sub-grade testing was conducted along the proposed haul route using a dynamic cone penetrometer. Laboratory testing was conducted and in-situ sub-grade strength parameters were determined.~~

State Route 14. SR 14 between I-5 and the proposed project site is generally very narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has many hills, and curves with tight corners in several places. East of the project site on SR 14, there is one low and very narrow tunnel east of the town of Lyle, and also a very narrow bridge east of the city of The Dalles at approximately MP 86. Between Cook-Underwood Road and SR 97 (Goldendale), SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders. It also has some tight low-recommended-speed corners and a number of hills. Between SR 97 and the junction with SR 395/I-82, SR 14 is generally narrow with 12-foot lanes and 2- to 4-foot paved shoulders.

Maple Street. To get from the SDS Lumber Company facility to SR 14, trucks would need to drive on Maple Street for approximately 0.25 mile. This road was recently constructed and is in good condition. Maple Street has two 12-foot lanes, a wide concrete sidewalk on the east side, and a paved shoulder on the west side. This street is under the jurisdiction of the City of Bingen. There are currently no over-size or over-weight load restrictions in force.

Cook-Underwood Road. Cook-Underwood Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. In general, the side slope begins at the fog line. This road is under the jurisdiction of Skamania County. There are currently no over-size or over-weight load restrictions in force.

Willard Road. Willard Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. This road is under the jurisdiction of Skamania County. There are currently no over-size or over-weight load restrictions in force.

West Pit Road. West Pit Road varies in width from 20 to 26 feet. It is a dirt road covered in light pit run.

~~**Kollock-Knapp Road.** Kollock-Knapp Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. This road is under the jurisdiction of Skamania County. There are currently no over-size or over-weight load restrictions in force.~~

~~**Scoggins Road.** Scoggins Road is a narrow road without centerline delineation or useable shoulders. This road is under the jurisdiction of Skamania County. There are currently no over-size or over-weight load restrictions in force.~~

~~**CG2930:** CG2930 is currently very narrow, approximately 10 to 12 feet wide.~~

Existing Traffic Volumes

Average annual daily traffic (AADT) data for SR 14 was obtained from the ~~WSDOT's 2006~~ WSDOT 2008 Annual Traffic Report (WSDOT ~~2006~~ 2008). AADT on SR 14 at the west junction with Cook-Underwood Road during ~~2006~~ 2008 was approximately ~~2,800~~ 3,000 vehicles per day (vpd), and at the east junction with Cook-Underwood Road was approximately 3,300 vpd. A growth rate was developed for the project vicinity using historic data from annual traffic reports between 1996 and ~~2006~~ 2008. During several years between 1996 and ~~2006~~ 2008, there was no recorded historical growth in this area. Using this data, an average weighted growth rate of approximately 1 percent per year was determined. Estimated AADT on SR 14 at the west junction with Cook-Underwood Road during ~~2008~~ 2009 would be approximately ~~3,000~~ 3,100 vpd, and at the east junction with Cook-Underwood Road would be approximately 3,400 vpd.

Peak hour directional volumes were developed based on typical rural highway traffic patterns and proximity of business centers. Typical rural highway traffic patterns conservatively assume AM peak hour volumes to be approximately 7 percent of the total daily volumes, and PM peak hour volumes to be approximately 10 percent of the total daily volumes, with a directional split of 70/30. PM peak hour volumes are traditionally considered to by the highest during a given day. No current traffic data is available for Cook-Underwood Road at either the west or east junctions with SR 14, and traffic volumes were assumed using good engineering judgment and are based on typical patterns for small rural towns. Estimated ~~2008~~ 2009 PM peak hour traffic volumes at ~~the junction of SR 14 and Cook-Underwood Road~~ both the west and the east junctions of Cook-Underwood Road with SR 14 are presented in Table 4.3-1.

Table 4.3-1
Estimated ~~2008~~ 2009 PM Peak Hour Traffic Volumes
at West and East Junctions of SR 14 and Cook-Underwood Road

Location	West Junction PM Peak Hour (4:00 to 5:00)	East Junction PM Peak Hour (4:00 to 5:00)
Eastbound SR 14	90	~~90~~100
Westbound SR 14	220	~~210~~ 240
Southbound Cook-Underwood Road	10	10

Existing Level of Service

Level of service (LOS) is an estimate of operational performance based on travel delay to motor vehicles. The *Highway Capacity Manual* (TRB 2000) published by the Transportation Research Board is generally used when determining LOS. The *Highway Capacity Manual* defines LOS using a letter scale from A to F. LOS A is defined as minimal or no delay to vehicles and LOS F is defined as extreme delays to vehicles. LOS criteria for two-way-stop-control intersections are presented in Table 4.3-2.

Table 4.3-2
Level of Service Criteria for
Two-Way-Stop-Control Intersections

Level of Service	Expected Traffic Delay
A	< 10 seconds
B	> 10 - 15 seconds
C	> 15 - 25 seconds
D	> 25 - 35 seconds
E	> 35 - 50 seconds
F	> 50 seconds

Source: TRB (2000)

LOS analyses were conducted for ~~the junction at SR 14 and Cook-Underwood Road~~ both the west and the east junctions of Cook-Underwood Road with SR 14 using Highway Capacity Software Plus (HCS+). HCS+ algorithms are based on *Highway Capacity Manual* (TRB 2000) methodologies.

Analyses indicate that under ~~2008~~ 2009 estimated traffic volumes, ~~less than~~ up to approximately 10 seconds of delay would be experienced by ~~all~~ some vehicles at ~~the junction of SR 14 and Cook-Underwood Road~~ the west junction of Cook-Underwood Road with SR 14. Slightly greater than 10 seconds of delay would be experienced by some vehicles at the east junction of Cook-Underwood Road with SR 14.~~during the PM peak hour~~ These delays of approximately 10 seconds would only be expected to occur during the PM peak hour.~~ with~~ LOS A operations would be maintained at the west junction and LOS B or better operations at the east junction (Table 4.3-3). LOS C or better is typically considered acceptable for rural intersections and is the LOS threshold for Skamania County.

Table 4.3-3
Level of Service Summary
Estimated ~~2008~~ 2009 Traffic Volumes
at West and East Junctions of SR 14 and Cook-Underwood Road

Roadway and Turning Movement	Peak Hour	West Junction Estimated 2009 Traffic Volumes		East Junction Estimated ~~2008~~ 2009 Traffic Volumes	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14 Eastbound Left Turn	PM	7.9	A	~~7.9~~8.0	A
Cook-Underwood Road Southbound Left/Right Turn	PM	10.0-	A	~~9.9~~10.2	~~A~~B

Delay = Average per vehicle

Estimated Future Traffic Volumes

The Whistling Ridge Energy Project is scheduled to begin construction during the spring of ~~2010~~ 2011, and be fully operational by ~~the spring of 2011~~ mid-year 2012. Traffic volumes were estimated for these years based on the previously mentioned average weighted growth rate of approximately 1 percent per year. Estimated future traffic volumes without the Whistling Ridge Energy Project are presented in Table 4.3-4.

Table 4.3-4
Estimated ~~2010~~ 2011 and ~~2011~~ 2012 Traffic Volumes without the Project

Location	West Junction of Cook-Underwood Road with SR 14		East Junction of Cook-Underwood Road with SR 14	
	2011 PM Peak Hour (4:00 to 5:00)	2012 PM Peak Hour (4:00 to 5:00)	~~2010~~ 2011 PM Peak Hour (4:00 to 5:00)	~~2011~~ 2012 PM Peak Hour (4:00 to 5:00)
Eastbound SR 14	110	110	100	100
Westbound SR 14	260	260	~~220~~ 230	~~230~~ 240
Southbound Cook-Underwood Road	10	10	10	10

Estimated Future Level of Service

LOS analyses indicate that ~~the junction of SR 14 and Cook-Underwood Road~~ both the west and the east junctions of Cook-Underwood Road with SR 14 would continue to operate at LOS A along SR 14 during 2011 and 2012. The southbound approach at the west junction of Cook-Underwood Road with SR 14 would degrade to LOS B during 2011 and would remain at LOS B operations during 2012. On the southbound approach at the east junction of Cook-Underwood Road with SR 14, LOS B operations would be maintained during both future years with no change in LOS over year 2009.~~, but would degrade to LOS B at the Cook-Underwood Road approach under both estimated future year scenarios.~~ LOS summaries for estimated future year traffic volumes without the Whistling Ridge Energy Project are presented in Tables 4.3-5.

Table 4.3-5
Level of Service Summary
Estimated ~~2010~~ 2011 and ~~2011~~ 2012 Traffic Volumes without Project at Junctions of Cook-Underwood Road with SR 14

Roadway and Turning Movement	Peak Hour	West Junction				East Junction			
		Estimated 2011 Traffic Volumes		Estimated 2012 Traffic Volumes		Estimated ~~2010~~ 2011 Traffic Volumes		Estimated ~~2011~~ 2012 Traffic Volumes	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14 Eastbound Left Turn	PM	8.0	A	8.0	A	~~7.9~~ 8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	PM	10.1	B	10.2	B	~~10.0~~10.3	B	~~10.1~~10.3	B

Delay = Average per vehicle

Rail Transportation

The BNSF Railway operates a rail mainline that runs parallel to SR 14 to the south of the proposed project site. This line is a major link that ties the important industrial areas of Vancouver, BC; Portland, Oregon; and Seattle/Tacoma, Washington to the north-central states of the US, and eastern railroads via Chicago. SDS Lumber Company currently has two rail spurs from the BNSF mainline to their Bingen site. One spur terminates at the Maple Street crossing

and is approximately 800 feet in length. The second spur terminates at the plywood facility and is approximately 2,000 feet in length.

River Transportation

The proposed project site is located north of the Columbia River, which runs predominantly from east to west (and towards the Pacific Ocean) in this part of the state. River transportation in the site area includes barge and boat/shipping transport on the Columbia River. Barges moving upriver from the Ports of Longview or Vancouver are transported to the Bonneville Dam using tug boats. The barges and tugs bypass the Bonneville Dam via the lockage facility, and continue upriver past the SDS Lumber Company facility in Bingen. SDS has a dock and crane suitable for the use of unloading equipment. The Bonneville lockage facility accommodates commercial, government, and recreational vessels. The heaviest lockage traffic on average occurs during the month of August. Vessel traffic is typically heaviest on Thursdays, Fridays, Saturdays, and Sundays.

Air Transportation

Air transportation in the regional area includes the Portland International Airport, approximately 60 miles southwest of the proposed project site, and several other public and private local airports within a 10-mile radius.

4.3.2 IMPACTS

To determine potential transportation impacts, the Skamania County Public Works Department Manager, the County Engineer, and the Maintenance Superintendent were consulted to better understand existing roadway conditions, the proposed haul route, and traffic patterns. A pre and post over-weight haul design strategy for pavement assessment would be developed for the existing roadway network that would be used for the proposed haul route during construction.

4.3.2.1 Construction Access Routes

Construction access to the proposed tower locations would be achieved through travel along SR 14, Cook-Underwood Road, ~~Kollock-Knapp Road, Scoggins Road, and CG2930.~~ Willard Road, and West Pit Road. Historically, ~~CG2930~~ West Pit Road has been used primarily in support of logging activity. ~~and for access to existing BPA transmission lines.~~ Cook-Underwood Road, ~~Kollack-Knapp Road, and Scoggins Road~~ and Willard Road are paved Skamania County roadways that extend northward from SR 14, a Washington State roadway, towards the proposed project site. ~~The private logging road listed as CG2930 connects to Scoggins Road and consists of dirt and rock.~~ West Pit Road consists of dirt and rock and extends eastward towards the proposed project site. A new direct connection will be constructed between Willard Road and West Pit Road.

The Skamania County 2007 Comprehensive Plan, Chapter 4, Transportation Element, lists Cook-Underwood Road as Federal Functional Classification "Major Rural Collector" in County District 3. ~~Kollock-Knapp Road and Scoggins Road~~ Willard Road is~~are~~ listed as "Rural Local Access" also in County District 3. The Comprehensive Plan Transportation Element was

developed to address transportation needs in Skamania County. It represents the County's policy plan for the next 20 years and specifically considers the location and condition of the existing traffic circulation system, the projected transportation needs, and plans for addressing future transportation needs while maintaining established level of service standards.

The Southwest Washington Regional Transportation Council is the Regional Transportation Planning Organization for Skamania County, including the cities of Bingen and White Salmon.

All wind energy components including tower sections, the nacelle and turbines, and blades would be shipped to either the Port of Longview or the Port of Vancouver, and then be transported by any or all of the following three modes of travel:

- Specialized trucks along State, County, City, and private roadways
- BNSF rail lines running parallel to SR 14
- Barge and tug boat up the Columbia River and through the lockage facility at the Bonneville Dam

Wind energy components transported on specialized trucks from either of the Ports would be delivered directly to the proposed project site. Components transported either by rail or barge from either of the Ports would be delivered directly to the SDS Lumber Company industrial facility, loaded onto specialized trucks, and then transported to the proposed project site. Fuel would be delivered to the proposed site by truck as needed.

A discussion presenting details for each mode of transport follows.

Specialized Trucks

Specialized trucks may be used to transport wind energy components from either the Port of Longview or the Port of Vancouver to the ~~junction of SR 14 and Cook-Underwood Road.~~ west junction of Cook-Underwood Road with SR 14 at MP 56.28. Trucks transporting wind energy components could have loads as high as 17.5 feet measured from the ground to the highest point of the load, as wide as 14.5 feet or as long as 150 feet. ~~Trucks traveling along SR 14 between Vancouver, Washington and Cook-Underwood Road would be physically constrained by a series of three very narrow tunnels with height restrictions as low as 13 feet 9 inches measured vertically from the edge of the roadway (Figure 4.3-3, Tunnel Locations along SR 14).~~ Over-size loads that would include transport of the tower sections, the nacelles and turbines, and blades would encounter restrictions and/or prohibitions along SR 14 between Vancouver, Washington and the west junction of SR 14 and Cook-Underwood Road at MP ~~63.32~~56.28 due to the length and/or width of the loads. The WSDOT roadway restrictions that apply to this section of SR 14 are summarized in Table 4.3-6, Road and Bridge Restrictions for Oversize Motor Vehicles on SR 14. Cook-Underwood Road near its northern most point at approximate MP 5.5 contains a bridge that crosses the Little White Salmon River. Crossing this bridge with specialized trucks transporting wind energy components would require special provisions agreed upon between S.D.S Co., LLC and Skamania County.

~~Figure 4.3-3, Tunnel Locations along SR 14.~~

Table 4.3-6
Road and Bridge Restrictions for Oversize Motor Vehicles on SR 14
(all restrictions apply in both directions)

Milepost	Height	Width	Length
18.89 to 34.68 (west of project)	Loads over 10' wide require 1 front and 1 rear pilot cars		
19 to 56 (west of project)		Loads over 14' wide require 2 front and 1 rear pilot cars	
19 to 83.53 (west and east of project)			Loads over 125' – trailer/load length prohibited
56.28 to 63.25 (west of project)	All overheight (14')[1] loads must contact WSDOT Goldendale Office Detour via Cook-Underwood Road must be approved by Skamania County	No loads over 12' wide allowed Loads between 8.5 and 10' wide require 2 front and 1 rear pilot cars	
65 to 65 Hood River Bridge Crossing (east of project)		No overwidth loads allowed	
76.77 to 76.91 (east of project)	All overheight (14') loads must contact WSDOT Goldendale Office	Loads over 10' wide require 2 front and 1 rear pilot cars	

An alternate route for transport of wind energy components from either of the Ports to the east junction of SR 14 and Cook-Underwood Road at MP 63.32 would include trucks traveling on I-84 through Oregon to the Boardman junction, then along SR 730 to the junction of I-82 with SR 395, across the Columbia River back into Washington State and then to SR 14. Trucks traveling on SR 14 between the junction of I-82/SR 395 and Cook-Underwood Road would be physically constrained by one very narrow tunnel with a height restriction of 13 feet 3 inches measured vertically from the edge of the roadway.

There are several additional Columbia River crossings west of the I-82/SR 395 crossing, but each has weight restrictions that would prohibit the transport of wind energy components. These crossings include the Bridge of the Gods, the Hood River Bridge, SR 197, and SR 97.

All loads over 10 feet wide traveling from east of the proposed project site between MP 76.77 and 76.91 would require three pilot cars, two in front and one in the rear. The two front pilot cars would be required to maintain a minimum 500-foot separation. The lead pilot car in front of the load would warn oncoming traffic of the over-size load, and the pilot car immediately in front of the over-size load would be responsible to stop all oncoming traffic. All loads over 125 feet in length (including the trailer and load) traveling from east of the proposed project site between MP 83.50 (at the junction of SR 197) and MP 63.32 (at the east junction of SR 14 ~~and~~ with Cook-Underwood Road) are prohibited as of October 11, 2007. Special provisions and/or permitting may be required to transport the wind energy blades to the junction of SR 14 and Cook-Underwood Road at MP 63.32 from the junction of SR 197 (MP 83.50) if this route is selected.

[1] Heights are measured from the ground to the highest point on the load.

This transport option for wind energy components between either of the Ports and the east junction of SR 14 and Cook-Underwood Road at MP 63.32 from ~~both~~ east ~~and west~~ of the proposed project site may not be physically possible. However, specialized trucks would still be required to transport the wind energy components from the SDS Lumber Company industrial facility in Bingen, Washington to the proposed project site should they be transported on rail or barge from ~~the Port of Longview~~ either of the Ports. Transport of wind energy components using specialized trucks from the SDS Lumber Company facility to SR 14 would require the use of Maple Street in the City of Bingen, Washington for approximately 0.25 mile. There are currently no over-size or over-weight restrictions for this roadway. Transport of the wind energy blades from the SDS Lumber Company industrial facility to the east junction of SR 14 and Cook-Underwood Road at MP 63.32 would require the use of SR 14, which has a restriction on loads over 125 feet in length.

Rail

The option of using rail to transport the wind energy components from the Port of Longview to the SDS Lumber Company industrial facility also was analyzed. Wind energy components on rail cars can be up to 14.5 feet in width, up to approximately 15 feet in height, and as long as 150 feet. The BNSF rail line between Vancouver, Washington and the SDS Lumber Company facility in Bingen, Washington may not be able to accommodate loads with widths in excess of 14 feet. This may preclude transport of the bottom tower sections using rail. The wind energy nacelles, turbines, and blades could be transported along the BNSF line to the SDS Lumber Company facility. BNSF could transport the wind energy components on standard or heavy-duty 89-foot long flat rail cars. The wind energy components would be off-loaded at the SDS Lumber Company facility to a staging location to be determined and loaded onto specialized trucks for transport to the proposed project site. Transport of wind energy components using specialized trucks from the SDS Lumber Company industrial facility to SR 14 would require the use of Maple Street in the City of Bingen, Washington for approximately 0.25 mile. There are currently no over-size or over-weight restrictions for this roadway. Transport of the wind energy blades from the SDS Lumber Company facility to the east junction of SR 14 and Cook-Underwood Road at MP 63.32 using specialized trucks would require the use of SR 14, which has a restriction on loads over 125 feet in length.

Barge

The third option analyzed for transporting the wind energy components from either the Port of Longview or Port of Vancouver to the SDS Lumber Company industrial facility was by using barges. The wind energy components would be off-loaded from a ship at either of the Ports, loaded onto barges, and then transported upriver to the Bonneville Dam using tug boats. The barges and tugs would by-pass the Bonneville Dam via the lockage facility, and continue upriver to the SDS Lumber Company industrial facility. There would be no over-size or over-weight restrictions using barges as a transport mode for wind energy components at either of the Ports, on the Columbia River, or at the lockage facility at the Bonneville Dam. Coordination with the Bonneville Dam Project Office would be required to determine optimal times for lockage use. The Bonneville lockage facility accommodates commercial, government, and recreational vessels. The heaviest lockage traffic on average occurs during the month of August. Vessel

traffic is typically heaviest on Thursdays, Fridays, Saturdays, and Sundays. The wind energy components would be off-loaded at the SDS Lumber Company industrial facility to a staging location to be determined and loaded onto specialized trucks for transport to the proposed project site. Transport of wind energy components using specialized trucks from the SDS Lumber Company facility to SR 14 would require the use of Maple Street in the City of Bingen, Washington for approximately 0.25 mile. There are currently no over-size or over-weight restrictions for this roadway. Like the use of rail, this option would still require using specialized trucks to transport the wind energy blades from the SDS Lumber Company facility to the east junction of SR 14 and Cook-Underwood Road at MP 63.32, and this section of SR 14 has a length restriction of 125 feet.

4.3.2.2 Roadway Improvements

Improvements to the County roadways and the private logging road would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components from SR 14 to the proposed project site. Improvements required for support of construction activities would depend primarily upon truck size, load size, and axle loading. Roadway improvements could include:

- Rebuilding large sections of the existing roadway network
- Widening certain sections of the existing roadway network
- Flattening and/or rebuilding existing roadway topography both horizontally and vertically
- Placing asphalt in select areas for hauling equipment access

A detailed discussion of specific roadway improvements for each roadway along the haul route follows. All private roadway improvements required prior to hauling and new private roadway construction at the proposed project site would be designed and constructed in accordance with the standards for the applicable road classifications as set forth in the Skamania County Private Road Guidelines and Development Assistance Manual, as adopted by the County Resolution in 2008. All existing county roadways requiring improvements prior to hauling would be designed and constructed in accordance with the WSDOT *Design Manual* (WSDOT 2007) and *A Policy on Geometric Design of Highways and Street*s (AASHTO 2004).

State Route 14. All over-size and over-weight loads would require permits. These loads also would require pilot cars both in the front and the rear, and could require additional traffic control measures. SR 14 would require no improvements to accommodate the transport of wind energy components~~, except possibly for the need for minor improvements at the intersection of SR 14 and Cook-Underwood Road.~~.

Maple Street. To get from the SDS Lumber Company facility to SR 14, trucks would need to drive on Maple Street for approximately 0.25 mile. This road was recently constructed and is in good condition. Maple Street has two 12-foot lanes, a wide concrete sidewalk on the east side, and a paved shoulder on the west side. There are currently no over-size or over-weight load

restrictions in force and permitting by the City of Bingen would not be required. These loads would require pilot cars both in the front and the rear and could require additional traffic control measures. Maple Street would require no improvements to accommodate the transport of wind energy components.

Cook-Underwood Road. Cook-Underwood Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. There are currently no over-size or over-weight load restrictions in force but permitting would be required by Skamania County. These loads would require pilot cars both in the front and the rear and could require additional traffic control measures. Cook-Underwood Road would require no improvements to accommodate the transport of wind energy components ~~outside the limits of the junction with SR 14 and the intersection with Kollock-Knapp Road~~.

~~At the junction with SR 14, improvements would be required.~~ Specialized trucks (including a drivable rear axle) transporting wind energy blades (which are the longest single wind energy component) ~~westbound~~ eastbound on SR 14 onto Cook-Underwood Road at MP 56.28 or westbound onto Cook-Underwood Road at MP 63.32 would require a 135-foot inside turning radius, and a 20-foot allowance for "tip swing." Approximately 15 to 20 feet of the wind energy blade would extend beyond the centerline of the drivable rear axle.

~~At the intersection of Cook-Underwood Road and Kollock-Knapp Road (Figure 4.3-8), improvements would be required for transport of wind energy blades to the proposed project site. To accommodate the required truck turning radii, temporary widening at this intersection would be required. Widening would include removal of trees and vegetation and embankment cut sections both on the inside and outside of the turn. The embankment cut sections would not require paving, but would require an all-weather driving surface. Right of way ownership and easement determination would be required.~~

At the intersection of Cook-Underwood Road and Willard Road improvements could be required for transport of wind energy blades to the proposed project site for trucks coming from the west. To accommodate the required truck turning radii, temporary widening at this intersection could be required. Widening could include removal of trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. Right of way ownership and easement determination would be required.

Willard Road. Willard Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width. In general, the side slope begins at the fog line. There are currently no over-size or over-weight load restrictions in force but permitting would be required by Skamania County. These loads also would require pilot cars both in the front and the rear and could require additional traffic control measures. Willard Road would require no improvements to accommodate the transport of wind energy components outside the limits of the intersection with Cook-Underwood Road.

A new direct connection would be required between Willard Road and West Pit Road for transport of wind energy blades to the proposed project site. The intersection of Willard Road and West Pit Road would be designed to accommodate the required truck turning radii.

West Pit Road. West Pit Road varies in width from 20 to 26 feet. It is a dirt road covered in light pit run. This road would require additional permanent widening to to accommodate transport of wind energy components from Willard Road to the proposed project site. West Pit Road would be improved to provide a minimum drivable section width of 25 feet (width of finished road), with an additional 5 feet of shoulder on either side to provide access to the site by construction vehicles, with allowance for side slope and drainage. Widening could include removal of trees and vegetation, and engineered fill sections and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface.

~~**Kollock-Knapp Road.** Kollock-Knapp Road has two 12-foot lanes and paved shoulders that are 1 foot or less in width (Figures 4.3-9 through 4.3-12). In general, the side slope begins at the fog line. There are currently no over-size or over-weight load restrictions in force but permitting would be required by Skamania County. These loads also would require pilot cars both in the front and the rear and could require additional traffic control measures. Kollock-Knapp Road would require no improvements to accommodate the transport of wind energy components outside the limits of the intersections with Cook-Underwood Road and Scoggins Road.~~

~~At the intersection of Kollock-Knapp Road and Scoggins Road (Figures 4.3-13 and 4.3-14), improvements would be required for transport of wind energy blades to the proposed project site. To accommodate the required truck turning radii, temporary widening at this intersection would be required. Widening would include removal of trees, vegetation, and fencing as well as an engineered fill and embankment cut section on the outside of the turn; and removal of vegetation and shrubs and an embankment cut section on the inside of the turn. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. Right of way ownership and easement determination would be required.~~

~~**Scoggins Road.** Scoggins Road is a narrow road without centerline delineation or useable shoulders. In general, the side slope begins at the fog line (Figure 4.3-15). Approximately 150 to 200 feet of Scoggins Road would be required for use for construction and operational purposes. There are currently no over-size or over-weight load restrictions in force but permitting would be required by Skamania County. These loads also would require pilot cars both in the front and the rear and could require additional traffic control measures. Scoggins Road would require no improvements to accommodate the transport of wind energy components outside the limits of the intersections with Kollock-Knapp Road and CG2930.~~

~~At the intersection of Scoggins Road and CG2930, improvements would be required for transport of wind energy blades to the proposed project site. To accommodate the required truck turning radii, temporary widening at this intersection would be required. Widening would include removal of trees and vegetation and an embankment cut section on the inside of the turn, and removal of trees and vegetation and an engineered fill section on the outside of the turn (Figure 4.3-16). Improvements to the intersections of Scoggins Road with both Kollock-Knapp Road and CG2930 would most likely encroach upon the entire length of Scoggins Road proposed for the haul route to the proposed project site. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. Right of way ownership and easement determination would be required.~~

~~**CG2930.** CG2930 is currently very narrow, approximately 10 to 12 feet wide, and would require permanent widening to a minimum drivable section width of 20 feet with allowance for side slope and drainage from Scoggins Road to the proposed project site (Figures 4.3-17 through 4.3-25). Widening would require possible removal of trees, and possible engineered fill and embankment cut sections. The engineered fill and embankment cut sections would not require paving, but would require an all-weather driving surface. There are two sharp left hand turns in the roadway enroute to the proposed project site (Figures 4.3-17, 4.3-23, and 4.3-24) that would require additional special considerations to accommodate the required truck turning radii for transport of the wind energy blades to the site.~~

~~Figure 4.3-4, Junction SR 14 and Cook-Underwood Road - Photo 1.~~
~~Figure 4.3-5, Junction SR 14 and Cook-Underwood Road - Photo 2.~~
~~Figure 4.3-6, Junction SR 14 and Cook-Underwood Road - Photo 3.~~
~~Figure 4.3-7, Junction SR 14 and Cook-Underwood Road - Photo 4.~~
~~Figure 4.3-8, Junction Cook-Underwood Road and Kollock-Knapp Road.~~
~~Figure 4.3-9, Kollock-Knapp Road - Photo 1.~~
~~Figure 4.3-10, Kollock-Knapp Road - Photo 2.~~
~~Figure 4.3-11, Kollock-Knapp Road - Photo 3.~~
~~Figure 4.3-12, Kollock-Knapp Road - Photo 4.~~
~~Figure 4.3-13, Junction Kollock-Knapp Road and Scoggins Road - Photo 1.~~
~~Figure 4.3-14, Junction Kollock-Knapp Road and Scoggins Road - Photo 2.~~
~~Figure 4.3-15, Scoggins Road.~~
~~Figure 4.3-16, Junction Scoggins Road and CG2930.~~
~~Figure 4.3-17, CG2930 - Photo 1.~~
~~Figure 4.3-18, CG2930 - Photo 2.~~
~~Figure 4.3-19, CG2930 - Photo 3.~~
~~Figure 4.3-20, CG2930 - Photo 4.~~
~~Figure 4.3-21, CG2930 - Photo 5.~~
~~Figure 4.3-22, CG2930 - Photo 6.~~
~~Figure 4.3-23, CG2930 - Photo 7.~~
~~Figure 4.3-24, CG2930 - Photo 8.~~
~~Figure 4.3-25, CG2930 - Photo 9.~~

New Roadway Construction at the Proposed Project Site

Access to the proposed project site would be provided through the existing County and private roadway network. Access to all proposed wind tower locations would require some new road construction. In addition to approximately ~~7.2~~7.9 miles of existing private logging roads that would require improvement, approximately 2.4 miles of new private gravel access roads would need to be constructed. The new gravel roadways would extend toward and run along the turbine strings, and would be designed and constructed according to the County private roadway standards. The new private roadways that extend toward the turbine strings would be designed for a minimum drivable section width of 25 feet with allowance for side slope and drainage. The new private roadways that would run along or between the turbine strings would be designed for a minimum drivable section width of 25 feet with an additional 5-foot section on both sides to accommodate drainage and clearance for the project crane that would be on site to assemble the

tower sections, the nacelles, and blades. Not all newly constructed roads would need to be paved, but they would require an all-weather driving surface.

Roadway Limitations

Some of the trucks that would transport construction equipment and materials to the proposed project site along State and County roadways could have a gross vehicle weight in excess of 105,500 pounds. These loads would exceed the WSDOT legal load limit. Trucks with loads in excess of the legal load limit could degrade the condition of the existing roadways along the proposed haul route, and may require additional axles in order to distribute the weight of the load. Permits would be required for all over-weight hauls.

Parking

During construction, parking would be located at the construction staging area and along the proposed project site access roads. Parking along turbine string roads would be primarily for those employees working on foundations, electrical infrastructure, and turbines. Vehicles would park in areas that would be already temporarily or permanently disturbed from other construction activities. No additional ground disturbance would occur solely for construction parking requirements.

Hazardous Materials Transport

Diesel fuel and gasoline would be the only potentially dangerous materials that would be used in significant quantities during construction. The estimated total quantity delivered and consumed during construction would be approximately 19,250 gallons. The contractor would use fuel trucks to refill construction vehicles and equipment on site. The fuel trucks would be properly licensed and would incorporate features in equipment and operation such as automatic shut-off devices to prevent accidental spills.

Aviation Hazards

Temporary construction equipment such as cranes and derricks that would be used for the construction of the proposed towers could propose a hazard to aviation safety during the construction period. A "Determination of No Hazard to Air Navigation" would have to be obtained for the proposed project site.

Traffic Hazards

Traffic hazards associated with construction projects are generally related to accident occurrence. Construction of the project would require that many construction vehicles, including trucks with over-size and over-weight loads, share the existing roadway network with the general public. As a result, some accidents could occur that would be directly attributable to construction traffic. An increase in accident occurrence during the construction of the project could take place, but any increase is expected to be minimal.

4.3.2.3 Construction Traffic

The project construction activities would last approximately one year, and would continue from site preparation through full operation. During that time frame, there would be an increase in traffic activity in and around the proposed project vicinity due to the construction workforce, equipment deliveries, and empty trucks returning to SR 14. Traffic delays could occur on the existing roadway network due to the maneuvering of large vehicles carrying heavy and/or long loads.

During the summer months, the cities of Bingen and White Salmon experience a significant increase in traffic volume due to recreational activities in the surrounding area. Prior to construction of the Whistling Ridge Energy Project, coordination would be required between the owner, contractor, the cities of Bingen and White Salmon, Skamania County, and WSDOT to ensure the highest level of safety possible for both the traveling public and the construction vehicles.

During construction, approximately 330 workers total would be employed. During the peak construction period, it is expected that approximately 265 personnel would be on site at the same time, while multiple construction disciplines conduct work concurrently. Estimated traffic volumes include existing local traffic, construction workers and vehicles, and over-size and over-weight trucks. Approximately 65 to 75 percent of the construction labor force would most likely be hired from the cities of Portland and Vancouver. Approximately 25 to 35 percent of the workers would most likely be residents of Skamania, Klickitat, and Hood River counties. The respective percentages are based on the relative populations in the cities of Portland and Vancouver when compared to Skamania, Klickitat, and Hood River counties. All construction workers are expected to commute up to approximately 60 miles each way daily to and from the proposed project site.

Estimated traffic volumes during construction of the Whistling Ridge Energy Project at the west and east junctions of Cook-Underwood Road with SR 14 are presented in Table 4.3-7.

Table 4.3-7
Estimated Traffic Volumes during Construction

	West Junction		East Junction	
	AM Peak (7:00 - 8:00 am)	PM Peak (4:00 - 5:00 pm)	AM Peak (7:00 - 8:00 am)	PM Peak (4:00 - 5:00 pm)
Eastbound SR 14	370	105	~~370~~390	~~105~~115
Westbound SR 14	160	240	~~160~~170	~~230~~ 270
Southbound Cook-Underwood Road	20	285	20	285

During the one-year construction period, there would be over-size and over-weight trucks transporting large wind energy components to the proposed project site throughout the day. Over-size and over-weight trucks are only expected during an approximate two to three month period when the wind energy components are transported to the proposed project site. For traffic analyses purposes, two worst case scenarios were considered. The first assumes that all construction vehicles related to the project during construction would travel through the west junction of Cook-Underwood Road with SR 14. The second assumes that all construction vehicles related to the project during construction would travel through the east junction of

Cook-Underwood Road with SR 14. The respective numbers of construction vehicles related to the project during construction that would travel through either the west or the east junctions of Cook-Underwood Road with SR 14 is not known at this time. It is expected though that during the AM peak hour, approximately 30 construction vehicles would travel through ~~the~~ either junction of SR 14 and Cook-Underwood Road. During the PM peak hour, as many as 10 construction vehicles could travel through this junction. Typical rural highway traffic patterns conservatively assume AM peak hour volumes to be approximately 7 percent of the total daily volumes, and PM peak hour volumes to be approximately 10 percent of the total daily volumes, with a directional split of 70/30. PM peak hour volumes are traditionally considered to be the highest during a given day. A "worst case" traffic analysis scenario is presented for the AM and PM peak hours and includes 7 and 10 percent of the total daily construction vehicles, respectively.

4.3.2.4 Roadway Operations during Construction

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road using estimated ~~2010~~ 2011 traffic volumes. The results indicate that estimated ~~2010~~ 2011 traffic volumes including construction vehicles would have a minimal impact on the operations of either the west or east junction of SR 14 and Cook-Underwood Road Delays would increase ~~slightly~~ (up to approximately ~~4 to 5~~ 6 seconds per vehicle) for vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14 over estimated ~~2008~~ 2011 operations. The southbound approach on Cook-Underwood Road at the west junction with SR 14 ~~also~~ would experience degradation in LOS from A to B during the AM hour over estimated ~~2008~~ 2011 operations. The southbound approach on Cook-Underwood Road at the east junction with SR 14 would experience degradation in LOS from B to C during the AM peak hour over estimated 2011 operations. LOS B operations would be maintained at both the west and east junctions of Cook-Underwood Road with SR 14 during the PM peak hour with no change in LOS over year 2011. Analyses results are presented in Tables 4.3-8 and 4.3-8a.

Table 4.3-8
Level of Service Summary during Construction
West Junction of Cook-Underwood Road with SR 14

Location	Peak Hour	Estimated 2009 Traffic Volumes		Estimated 2011 Traffic Volumes			
				w/o Construction		w/ Construction	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14	AM	7.6	A	7.6	A	8.4	A
Eastbound Left Turn	PM	7.9	A	8.0	A	8.0	A
Cook-Underwood Road	AM	9.4	A	9.4	A	14.7	B
Southbound Left/Right Turn	PM	10.0-	A	10.1	B	14.1	B

Table 4.3-8a
Level of Service Summary during Construction
East Junction of Cook-Underwood Road with SR 14

Location	Peak Hour	Estimated ~~2008~~ 2009 Traffic Volumes		Estimated ~~2010~~ 2011 Traffic Volumes			
				w/o Construction		w/ Construction	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14 Eastbound Left Turn	AM	~~7.5~~ 7.6	A	7.6	A	8.4	A
	PM	~~7.9~~8.0	A	~~7.9~~ 8.0	A	~~8.0~~8.1	A
Cook-Underwood Road Southbound Left/Right Turn	AM	~~9.3~~ 9.4	A	~~9.4~~9.5	A	~~14.7~~15.1	~~B~~C
	PM	~~9.9~~ 10.2	~~A~~B	~~10.0~~ 10.3	B	~~13.8~~ 14.7	B

Delay = Average per vehicle

It is assumed that construction traffic trips would be distributed as follows:

- 65 to 75 percent traveling to and from west of the proposed project site on SR 14
- 25 to 35 percent traveling to and from east of the proposed project site on SR 14

Many of these trips would occur outside of the peak periods, depending on their origin location and start time.

SR 14 in the vicinity of the proposed project site is a two-lane undivided rural highway with limited access. Access points in the proposed project vicinity do not include roadway channelization for turning movements. Potential moderate impacts to travel safety could occur due to the turning movements of over-size and over-weight trucks onto and off of Cook-Underwood Road during the peak construction period. No significant construction impacts are anticipated.

River and Air Transportation

Anticipated impacts to river transportation would be low. It is not expected that local or regional airports would be used for transporting construction equipment or material and no air transportation impacts would be anticipated.

4.3.2.5 Operational Traffic

The project is being designed to operate continuously (24 hours a day, seven days a week) using an automated system. The project would employ an estimated eight to nine full-time employees. The operations crew would typically work eight-hour days Monday through Friday.

The maximum number of vehicle trips associated with workers commuting to and from the proposed Operations and Maintenance facility on State, County, and private roads would be approximately 30 daily. In addition to the operations crew, there would be occasional service delivery vehicle trips as well. The distribution of operational traffic trips is expected to be the same as for construction trips.

Peak-hour traffic volumes at both the west and east junctions of SR 14 and Cook-Underwood Road include ~~2011~~ 2012 baseline traffic volumes and the project-generated traffic volumes. For traffic analyses purposes, two worst case scenarios were considered. The first assumes that all operational vehicles related to the project during operation would travel through the west junction of Cook-Underwood Road with SR 14. The second assumes that all operational

vehicles related to the project during operations would travel through the east junction of Cook-Underwood Road with SR 14. The respective numbers of operational vehicles related to the project during operations that would travel through either the west or the east junctions of Cook-Underwood Road with SR 14 is not known at this time. Estimated traffic volumes during full operation of the project are presented in Table 4.3-9.

Table 4.3-9
Estimated Traffic Volumes during Operation
At Junctions of Cook-Underwood Road and SR 14

	West Junction		East Junction	
Location	AM Peak (7:00 - 8:00 am)	PM Peak (4:00 - 5:00 pm)	AM Peak (7:00 - 8:00 am)	PM Peak (4:00 - 5:00 pm)
Eastbound SR 14	180	100	~~170~~190	~~100~~110
Westbound SR 14	75	240	~~75~~85	~~230~~260
Southbound Cook-Underwood Road	10	25	10	25

Peak-hour LOS analyses were completed for both the west and east junctions of SR 14 and Cook-Underwood Road both the west and east junctions of Cook-Underwood Road with SR 14 using estimated ~~2011~~ 2012 traffic volumes. The results indicate that estimated ~~2011~~ 2012 traffic volumes, including operational vehicles, would have a minimal impact on the operations of ~~the junction of SR 14 and Cook-Underwood Road.~~ either the west or the east junctions of Cook-Underwood Road with SR 14. Delays would increase slightly, less than 1 second per vehicle, for vehicles turning left or right from Cook-Underwood Road at either the west or the east junctions of Cook-Underwood Road with SR 14 over estimated ~~2008~~ 2012 operations. ~~The southbound approach on Cook-Underwood Road at SR 14 also would experience degradation in LOS from A to B over estimated 2008 operations, but only during the PM peak hour.~~ LOS A and B operations would be maintained during the AM and PM peak hours respectively at both the west and east junctions of Cook-Underwood Road with SR 14 with no change in LOS over year 2012. Analyses results are presented in Tables 4.3-10 and 4.3-10a.

Table 4.3-10
Level of Service Summary during Operation
West Junction of Cook-Underwood Road with SR 14

		Estimated 2008 2009 Traffic Volumes		Estimated 2011 2012 Traffic Volumes			
				w/o Operation		w/ Operation	
Location	Peak Hour	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14 Eastbound Left Turn	AM	7.5 7.6	A	7.6	A	7.6	A
	PM	7.9	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	9.3 9.4	A	9.4 9.5	A	9.7	A
	PM	9.9 10.0-	A	10.1 10.2	B	10.3 10.4	B

Delay = Average per vehicle

Table 4.3-10a
Level of Service Summary during Operation
East Junction of Cook-Underwood Road with SR 14

Location	Peak	Estimated ~~2008~~	Estimated ~~2011~~ 2012 Traffic Volumes

	Hour	2009 Traffic Volumes		w/o Operation		w/ Operation	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
SR 14 Eastbound Left Turn	AM	~~7.5~~ 7.6	A	7.6	A	7.6	A
	PM	~~7.9~~8.0	A	8.0	A	8.0	A
Cook-Underwood Road Southbound Left/Right Turn	AM	~~9.3~~ 9.4	A	~~9.4~~ 9.5	A	~~9.7~~9.8	A
	PM	~~9.9~~ 10.2	~~A~~B	~~10.1~~ 10.3	B	~~10.3~~ 10.6	B

Delay = Average per vehicle

Roadway Limitations

Vehicles used during Operations and Maintenance of the proposed project would primarily consist of employees commuting to and from the site. This number is not expected to exceed State or County roadway legal load limits. These vehicles would not contribute to roadway degradation.

Parking

During operations, employees would park at the Operations and Maintenance facility parking lot. There would be a maximum of approximately 10 employee vehicles each day as well as potential visitor and delivery vehicles. No more than approximately 20 vehicles are expected to be parked in the Operations and Maintenance facility parking lot at any one time. A visitor kiosk is also planned at the Operations and Maintenance facility that would provide tourists with a safe place to view and learn about wind turbines. Parking requirements for the visitor kiosk would be accommodated by the Operations and Maintenance facility parking lot.

Hazardous Materials Transport

No significant quantities of hazardous materials would be transported to or from the proposed project site during operations. The only hazardous materials that would be transported to the site would include minimal quantities of lubricating oils, hydraulic fluids, and mineral oil. Hazardous waste materials would require infrequent disposal and would not result in safety risks associated with hazardous materials transport.

Aviation Hazards

It is expected that the proposed wind turbines would not be in conflict with arriving or departing aircraft under instrument flight rule or visual flight rule from either the public or private airports within the proposed project vicinity. The FAA would need to be notified of any alterations to the wind towers that could affect the national air space. All towers would meet FAA regulations regarding lighting. A "Determination of No Hazard to Air Navigation" would be obtained for the proposed project site.

Traffic Hazards

Operation of the project is not expected to increase traffic hazards related to accident occurrences.

4.3.3 MITIGATION MEASURES

Construction Traffic Control

The following mitigation measures are proposed to reduce impacts from project construction on roadway traffic in the region:

- A Transportation Management Plan (TMP) would be prepared in consultation with both WSDOT and Skamania County and submitted to EFSEC for approval that would direct and obligate the contractor to implement procedures to minimize traffic impacts
- The TMP would include requirements for coordination of project-related construction traffic and WSDOT planned construction projects
- The TMP would include requirements for coordination of project-related construction traffic and Skamania County, City of Bingen, and City of White Salmon summer recreational traffic
- Whistling Ridge Energy LLC and its contractors would be required to comply with State and County permitting requirements for over-size and over-weight vehicles
- Whistling Ridge Energy LLC would be required to notify land owners in the project vicinity prior to construction of transportation routes that would be used for construction equipment and labor
- Approved State and/or County advanced warning construction signs would be placed prior to and during construction
- Certified flaggers would be used when necessary to direct traffic when over-size and over-weight trucks either enter or exit public roads, to minimize risk of accidents
- Pilot cars would be used both in front of and behind all trucks transporting over-size or over-weight loads on all public roadways
- Traffic flow would not be restricted for more than 20 minutes during the construction phase

Access Roadway Construction

All sections of the access roadway system that would require improvements or new construction would be designed and built according to WSDOT and Washington State access management standards.

Hazardous Materials Transport

Transport of hazardous materials would be conducted in a manner that would protect both human health and the environment and would be in accordance with applicable Federal and WSDOT requirements.

Roadway Maintenance

- Pre- and post-haul construction visual assessments of roadway surface conditions would be conducted identifying weak or deteriorated areas along the haul route that may require mitigation

- Should mitigation be required, a mitigation design program would be developed to repair all pavement sections to pre-construction conditions or better

- Whistling Ridge Energy LLC would be responsible for maintaining turbine string access roads, access ways, and other roads built to construct and operate the proposed project

- All snow removal would be performed in a safe manner that would not degrade roadway conditions

SECTION 4.4 SOCIOECONOMIC IMPACT (WAC 463-60-535)

This section presents an analysis of the impact of the Whistling Ridge Energy Project on local socioeconomic resources. The section analyzes impacts to local population, work force, property values, housing, the local economy, government fiscal conditions, health and safety facilities and services, and education facilities and services. An analysis of the impacts the project would have on traffic is contained in Section 4.3, Transportation.

4.4.1. EXISTING CONDITIONS

The project site is located in unincorporated Skamania County in southwestern Washington, approximately 7 miles northwest of White Salmon, Washington and Hood River, Oregon. The area for which information is presented includes Skamania, Klickitat, and Hood River counties, and the cities of White Salmon and Hood River, depending on the resource and the available data for that resource. Data for the State of Washington are presented for comparison.

4.4.1.1 Population and Housing

Demographic Characteristics

The population of Skamania County in 2008 was 10,700 and represented less than one percent of the statewide population of 6.6 million. Table 4.4-1 presents the geographic distribution of the population within Skamania County, compared to the State of Washington. As shown, a greater percentage of Skamania County residents live in unincorporated areas (78 percent) than in incorporated cities. Within the incorporated area, 62 percent of the population lives in Stevenson and the remaining 38 percent lives in North Bonneville. The populations of the cities of Stevenson and North Bonneville represent 13 percent and 8 percent of the total County population, respectively. The counties of Klickitat, Washington, and Hood River, Oregon, have slightly fewer residents living in unincorporated areas relative to Skamania County.

Incorporated cities closest to the project site are the City of White Salmon (7 miles southwest of the site) in Washington and the City of Hood River (approximately 8 miles southwest of the site) in Oregon. The City of Hood River is home to 6,865 residents, while the City of White Salmon is home to 2,205 residents. The metropolitan area closest to the project site is the Portland-Vancouver-Beaverton metropolitan area, with a population of 2.2 million people (PSU Research Center 2008a), located approximately 61 miles west of the project site.

Table 4.4-2 shows the age distributions of the residents of the cities of White Salmon and Hood River; the counties of Skamania, Klickitat, and Hood River; and the states of Washington and Oregon for 2008. Age distribution illustrates the ratio of working-age persons to younger and older residents, which affects both the supply of labor and the level and distribution of income. In White Salmon, 36 percent of the population is of non-working age (i.e., either 14 or under, or 65 and over). In Skamania County and Klickitat County, 22 percent and 24 percent of the populations (respectively) are of non-working age. In comparison, the same measures for the Washington and Oregon are 22 percent and 21 percent.

Table 4.4-1
Population Distribution in the Project Vicinity

Jurisdiction	Population, April 1, 2000	Population, April 1, 2008 (July 1, 2008 for Oregon Statistics)
Skamania County	9,872	10,700
Unincorporated	8,079	8,383
Incorporated	1,793	2,317
North Bonneville	593	877
Stevenson	1,200	1,440
Klickitat County	19,161	20,100
Unincorporated	12,536	13,490
Incorporated	6,625	6,610
Bingen	672	680
Goldendale	3,760	3,725
White Salmon	2,193	2,205
Hood River County (Oregon)	20,411	21,625
Unincorporated	13,465	13,710
Incorporated	6,946	7,915
Cascade Locks	1,115	1,050
Hood River	5,831	6,865
Washington State	5,894,143	6,587,600
Unincorporated	2,374,593	2,527,130
Incorporated	3,519,550	4,060,470
Oregon State	3,421,399	3,791,075
Unincorporated	1,141,038	1,149,668
Incorporated	2,280,361	2,641,407

Source: WOFM (2008a), PSU Research Center (2008a).

Table 4.4-2
Population Age Distribution in the Project Vicinity, 2008

Jurisdiction	Age 14 and Under		Age 15 to 64		Age 65 and Over	
	Number	Percent	Number	Percent	Number	Percent
White Salmon	458	20%	1,476	64%	367	16%
Hood River	1,525	23%	4,365	66%	753	11%
Skamania County	2,103	20	7,362	69	1,235	12
Klickitat County	3,992	20	13,215	66	2,894	14
Hood River County	4,661	22	14,211	66	2,599	12
Washington State	1,295,245	20	4,521,044	69	771,311	12
Oregon State	724,681	19	2,554,333	68	466,441	12

Source: WOFM (2008b), PSU Research Center (2008b), Claritas (2009).

Table 4.4-3 shows that the cities of White Salmon and Hood River have slightly more women than men, and are predominantly white and non-Hispanic racially, although minority residents represent 23 percent of the White Salmon population and 31 percent of the Hood River population. The three-county area including Skamania, Klickitat, and Hood River counties is also predominantly white, non-Hispanic. Hood River County has the highest minority percentage (31 percent) of population, followed by Klickitat County (16 percent) and Skamania County (11 percent). The State of Washington population includes 24 percent minority residents. Oregon's population is 20 percent minority.

Table 4.4-3
Race and Sex Composition in the Project Vicinity, 2008

Jurisdiction	Population	Sex (%)		Race (%)										
					Hispanic/Latino					Not Hispanic/Latino				
		M	F	Minority[a]	White	Black	AIAN	API	SOR	White	Black	AIAN	API	SOR
Combined CBGs Within Approx. 3 Miles of Project Site	3,347	52	48	12	3	0	0	0	5	88	0	1	0	2
CT 9503 CBG 2	678	52	48	14	4	0	0	0	8	86	0	0	1	2
CT 9503 CBG 3	1,068	51	49	9	1	0	0	0	4	91	0	1	0	2
CT 9504 CBG 2	1,601	52	48	12	3	0	0	0	6	88	0	2	0	1
City of White Salmon	2,301	49	51	23	4	0	0	0	15	77	0	1	1	2
City of Hood River	6,643	48	52	31	11	0	0	0	15	69	1	1	1	2
Skamania County	10,962	50	50	11	2	0	0	0	3	89	0	2	1	3
Klickitat County	20,399	50	50	16	3	0	0	0	6	84	0	3	1	3
Hood River County	21,770	50	50	31	9	0	0	0	17	69	0	1	2	2
Washington State	6,523,733	50	50	24	4	0	0	0	5	76	3	1	7	3
Oregon State	3,772,854	50	50	20	4	0	0	0	6	80	2	1	4	3

Source: Claritas (2009).

a. For the purpose of this analysis, minority includes those residents identified as Black or African American, American Indian or Alaskan Native, Asian Pacific Islander, Some Other Race, Two or More Races, or Hispanic/Latino.

Notes:

Percentages may not total 100 percent due to decimal places not expressed in this table.

AIAN = American Indian or Alaskan Native

API = Asian Pacific Islander

SOR = Some Other Race or Two or More Races

CBG = Census Block Group

CT = Census Tract

The race and ethnicity composition of the project area is estimated by analyzing the three census block groups that most closely match an area defined by a three-mile radius around the project site. When combined, the population in these three census blocks is approximately 12 percent minority. The second most common race and ethnicity category for residents in this area is (1) Hispanic/Latino, and (2) Some Other Race or Two or More Races.

The population living within three miles of the project site has a lower minority percentage than the two nearest cities (White Salmon and Hood River), Klickitat County, Hood River County, Washington State, and Oregon State. The population within three miles of the project site has a higher minority percentage (12 percent) compared to the same measure for Skamania County as a whole (11 percent). Although minority residents do exist near the project site, the area near the project does not have a substantially higher minority population when compared to larger reference populations.

Poverty status in 2000 is available for all areas studied. More current poverty statistics (for the period 2005 to 2007 as an annual average) are only available for the areas with relatively larger populations (Klickitat County, Hood River County, Washington, and Oregon). Table 4.4-4 shows 2000 poverty statistics for all areas (for comparison purposes), and also shows more current poverty statistics where available. Poverty estimates for 2008 were not available.

Table 4.4-4
Population Living Below the Poverty Level

Jurisdiction[a]	Population For Whom Poverty Status is Determined[b]	Number of Persons Living Below Poverty Level	Percentage of Persons Living Below Poverty Level
Combined Census Block Groups Within Approx. 3 Miles of Project Site (2000)	3,191	299	9
Individual Census Tract 9503 Block Group 2 (2000)	1,467	193	13
Individual Census Tract 9503 Block Group 3 (2000)	685	69	10
Individual Census Tract 9504 Block Group 2 (2000)	1,039	37	4
City of White Salmon (2000)	2,144	357	17
City of Hood River (2000)	5,801	1,004	17
Skamania County (2000)	9,763	1,281	13
Klickitat County (2000/annual 2005-2007)	18,983/19,540	3,236/3,779	17/19
Hood River County (2000/annual 2005-2007)	19,986/21,061	2,845/3,044	14/14
Washington State (2000/annual 2005-2007)	5,765,201/ 6,237,571	612,370/ 737,254	11/12
Oregon State (2000/annual 2005-2007)	3,347,667/ 3,611,297	388,740/ 488,896	12/14

Source: US Census (2008a and 2008b).

a. Estimates of this type of data for the areas with smaller populations (census block groups, cities, and Skamania County) were not available for more recent years from the US Census or from Claritas.

b. Poverty status was determined by dividing the population living below poverty by the population for whom poverty status is determined, which excludes those living in institutional housing.

In 2000, 17 percent of the populations of the cities of White Salmon and Hood River were living below the poverty level. This same measure was 13 percent for Skamania County, 17 percent

for Klickitat County, and 14 percent for Hood River County the same year. The cities and counties near the project site had relatively more residents living below the poverty level compared to Washington as a whole, and Oregon as a whole in 2000.

Approximately nine percent of the population living within approximately three miles of the project site lived below the poverty level in 2000, indicating fewer people living in poverty compared to the cities and counties near the project site. The geographic areas for which more recent (2005–2007 annual average) poverty statistics are available have all increased in percentage of persons living below the poverty level, as shown in Table 4.4-4.

Population Growth Trends

Most of the population in Skamania County lies in the southern quarter of the county, along the Columbia River and in the Wind River Valley. Population growth in Skamania County was 0.4 percentage points less than the State of Washington during the period 2000 to 2008, but is expected to approach the state rate during the period 2008 to 2015. Skamania County's population is expected to grow from 10,700 in 2008 to 11,720 in 2015. Both Skamania County and Washington State growth rates are expected to slow by 0.3 percentages points during the period 2015 to 2025. Skamania County is expected to have 12,915 residents by 2025 (Table 4.4-5).

Table 4.4-5
Population Growth Trends and Projections for the Project Vicinity

Jurisdiction	2000 Census	2008	2000-2008		2015 Fore-cast	2008-2015		2025 Fore-cast	2015-2025	
			Number Change	Annual Average Rate of Growth		Number Change	Annual Average Rate of Growth		Number Change	Annual Average Rate of Growth
City of Hood River	5,831	6,865	1,034	2.1%	NA[a]	NA[a]	NA[a]	NA[a]	(b)	(b)
City of White Salmon	2,193	2,005	-188	-1.1%	NA[a]	NA[a]	NA[a]	NA[a]	(b)	(b)
Skamania Co.	9,872	10,700	828	1.0%	11,720	1,020	1.3%	12,915	1,195	1.0%
Klickitat Co.	19,161	20,100	939	0.6%	23,049	2,949	2.0%	25,831	2,782	1.1%
Hood River Co.	20,411	21,625	1,214	0.7%	23,485	1,860	1.2%	26,667	3,182	1.3%
Washington St.	5.9 million	6.6 million	0.7 million	1.4%	7.3 million	0.7 million	1.4%	8.1 million	0.9 million	1.1%
Oregon State	3.4 million	3.8 million	0.4 million	1.3%	4.1 million	0.3 million	1.1%	4.6 million	0.5 million	1.2%

Sources: WOFM (2008c), OOEA (2008).

a. Population forecasts by city are not available from the Washington State Office of Financial Management.

The City of White Salmon, near the project but in Klickitat County, has decreased in population 1.1 percent per year, on average, between 2000 and 2008, from 2,193 in 2000 to 2,005 in 2008. The City of Hood River has grown 2.1 percent per year between 2000 and 2008, from 5,831 in 2000 to 6,865 in 2008. During the same period, Hood River County grew 0.7 percent annually, from 20,411 in 2000 to 21,625 in 2008. Hood River County is expected to grow 1.2 percent and 1.3 percent, respectively, during the periods 2008–2015 and 2015–2025. Although Hood River County's growth

rate for the period 2000–2008 was over one-half of one percent less than the same measure for Oregon State, in future periods 2008–2015 and 2015–2025, the growth rate for Hood River County is expected to be 0.1 percentage point higher than the same measure for Oregon (Table 4.4-5).

Housing Characteristics

Table 4.4-6 presents housing characteristics in Skamania County, Klickitat County, Hood River County, the cities of White Salmon and Hood River, and the states of Washington and Oregon. The number of housing units that existed in Skamania County in 2000 (4,576) increased to 5,409 by 2008, representing an annual average rate of growth of 2.1 percent, a rate that is slightly higher than the same rates for Klickitat County (1.8 percent) and the state (1.7 percent).

Table 4.4-6
Housing Characteristics in the Project Vicinity, 2000 and 2008

	Total Housing Units	Occupancy Rate (%)	Percent of Occupied Housing Units That Were Owner-Occupied (%)	Average Household Size
City of White Salmon				
2000	948	93.6	57.2	2.5
2008	985	93.8[a]	57.3[a]	2.4[a]
City of Hood River				
2000	2,645	91.8	47.6	2.4
2008	3,050[a]	88.2[a]	46.8[a]	2.5[a]
Skamania County				
2000	4,576	82.1	73.8	2.6
2008	5,409	83.2[a]	74.2[a]	2.6[a]
Klickitat County				
2000	8,633	86.6	68.8	2.5
2008	9,985	89.2	66.7	2.4
Hood River County				
2000	7,818	92.7	64.9	2.7
2008	8,493[a]	89.5[a]	64.4[a]	2.8[a]
State of Washington				
2000	2,451,075	92.7	64.6	2.5
2008	2,805,340	91.6	65.6	2.5
State of Oregon				
2000	1,452,709	91.8	64.3	2.5
2008	1,613,136[a]	91.8[a]	64.5[a]	2.5[a]

Sources include 2005-2007 estimates for geographic areas with over 20,000 population (US Census 2008a), 2000 estimates (US Census 2008b), and 2008 information from Washington Office of Financial Management (WOFM 2008d), except where footnoted.
a. Claritas (2009).

The rate of increase in number of housing units for Hood River County and Oregon State are 1.0 percent and 1.3 percent, respectively, for the period 2000 to 2008. Occupancy rates increased in Skamania County and Klickitat County during the period 2000 to 2008, and decreased for Washington State and Hood River County. Occupancy rates in Oregon stayed constant during the period 2000 to 2008. During that same period, the share of occupied units that were owner-occupied increased in Skamania County, Washington State, and Oregon State, and decreased in Klickitat County and Hood River County.

Between 2000 and 2008, the population of Skamania County grew by approximately 1.0 percent per year, while the number of housing units in the county was expected to grow by 2.1 percent.

These measures suggest that vacancy rates have increased during this period, indicating decreasing demand for housing. Average household size in Skamania County was 2.6 people, slightly higher than the same measure for Washington State during the period 2000 to 2008 (Table 4.4-6).

The number of housing units in the cities of White Salmon and Hood River increased during the period 2000 to 2008 by 0.5 percent (White Salmon) and 1.8 percent (Hood River). Occupancy rates in 2008 were 93.8 percent (White Salmon) and 88.2 percent (Hood River). Household sizes for these cities were similar to the same measures for the counties in which they are located. Over half of occupied housing units were owner-occupied in White Salmon in 2008, while slightly less than half of occupied housing units were owner-occupied in Hood River in 2008 (Table 4.4-6).

In 2000, median gross rent was 13 percent lower in Skamania County when compared to the state. In Klickitat County the same year, median gross rent was 25 percent lower when compared to the same statistic for Washington State. Median gross rent in White Salmon in 2000 was slightly higher when compared to the same measure for Klickitat County. During the period 2000 to 2007, median gross rents grew approximately 2.5 percent in Klickitat County and 3.2 percent in Washington State.

The City of Hood River, the largest city in the project vicinity, is located across the Columbia River from the project site. The City of Hood River had median gross rent of $544 in 2000. That year, rents were higher when compared to Hood River County. Median gross rent in Hood River County was 13 percent lower than in Oregon as a whole in 2000. More currently, during the period 2005–2007, rents in Hood River County were lower compared to Oregon.

Housing values in Skamania and Klickitat counties were lower in 2008 when compared to some other areas in Washington State (Table 4.4-7). The median housing value in the City of White Salmon ($192,750) was higher than in Klickitat County as a whole. The median housing value for the City of Hood River in 2008 ($199,215) was less than the same measures for Hood River County ($213,173) and Oregon ($236,157) (Table 4.4-7).

The residences closest to the project site are located approximately 0.48 mile and 0.8 mile from proposed turbine locations. A new homesite location has been applied for, and would be located approximately 2,000 feet (0.38 mile) from the south property line. The unincorporated community of Willard is located approximately 2.25 miles northwest of the project site. The unincorporated community of Mill also A is located near the project site, approximately 1.5 miles west of the site. The homes near the project site are rural, primarily single family, between 30 and 50 years old, and low- to medium-density.

Table 4.4-7
Housing Values

Jurisdiction	2000		Current Year	
	Median Gross Rent	Median Value for Owner-Occupied Housing Units	Median Gross Rent	Median Value for Owner-Occupied Housing Units (2008)
City of Hood River	$544	$143,100	NA[a]	$199,215
City of White Salmon	$499	$132,300	NA[a]	$192,750
Skamania Co.	$579	$150,200	NA[a]	$255,257
Klickitat Co.	$498	$110,400	$578[b]	$173,451
Hood River Co.	$538	$152,400	$660[b]	$213,173
Washington St.	$663	$168,300	$799[b]	$262,036
Oregon State	$620	$152,100	$735[b]	$236,157

Sources: US Census (2008a and 2008b), Claritas (2009).
a. Not available.
b. This estimate is for the annual average for the period 2005-2007. The same measure for more recent years was not available.

Temporary Lodging

Over 1,000 hotel rooms and 39 recreational vehicle (RV) or tent campsites exist within 25 miles of the project site (Table 4.4-8). Assuming average occupancy rates of 70 percent, a minimum of 325 hotels rooms or RV/tent campsites are available at any one time.

Table 4.4-8
Temporary Lodging Units

Type of Lodging	Units within 25 Miles of Project Site
Hotel or Motel	1,043
RV Camping	21
Tent Camping	16
Cabin or RV	2
Total Units	1,082
Units Available Assuming 70% Occupancy	325

Source: Woodall (2008), TravelWashington (2008).

4.4.1.2 Employment and Income

The sources of income and types of employment in an area often provide the most comprehensive indicators of the health and direction of the local economy. To a large extent, these factors also play a part in determining the overall welfare and quality of life of the individuals inhabiting the area. Tables 4.4-9 through 4.4-11 present 2006 income and employment levels for Skamania County, Klickitat County, and Hood River County.

In 2006, employment in Skamania County averaged 3,116 jobs, of which 2,284 (73 percent) were held by wage and salary workers and 832 (27 percent) by proprietors. Place of work earnings (wages, salaries and proprietors' earnings) accounted for approximately one-quarter of total personal income in the county, with income from property (dividends, interest and rent) and transfer payments (mainly Social Security) making up the balance. The principal sources of employment were local government, accommodation and food services, federal government, and manufacturing (Table 4.4-9).

Table 4.4-9
Employment and Income Data for Skamania County, 2006

Category	Employment		Earnings	
	Jobs	%	$	%
Total	3,116	100%	$297,460	100%
Wage and salary employment	2,284	73%	$66,142	22%
Proprietor employment	832	27%	$6,976	2%
Farm employment	101	3%	$195	0%
Nonfarm employment	3,015	97%	$91,792	31%
Forestry, fishing, related activities, other	(D)	NA	(D)	NA
Mining	(D)	NA	(D)	NA
Utilities	-	0%	$-	0%
Construction	179	6%	$4,341	5%
Manufacturing	226	7%	$10,641	12%
Wholesale trade	38	1%	$1,182	1%
Retail trade	197	7%	$3,498	4%
Transportation and warehousing	61	2%	$2,169	2%
Information	20	1%	$355	0%
Finance and insurance	61	2%	$1,259	1%
Real estate and rental and leasing	(D)	NA	(D)	NA
Professional and technical services	141	5%	$4,902	5%
Management of companies/enterprises	(D)	NA	(D)	NA
Administrative and waste services	(D)	NA	(D)	NA
Educational services	(D)	NA	(D)	NA
Health care and social assistance	(D)	NA	(D)	NA
Arts, entertainment, and recreation	62	2%	$417	0%
Accommodation and food services	626	21%	$14,992	16%
Other services, except public admin.	205	7%	$3,538	4%
Federal government, civilian	159	5%	$12,231	13%
Military (government)	34	1%	$1,202	1%
State government	39	1%	$1,815	2%
Local government	589	20%	$23,404	25%

Source: BEA 2008.
This type of industry breakdown is not available for years beyond 2006.
(D) Not shown to avoid disclosure of confidential information; estimates for this item are included in the totals.
NA = Not available

The annual unemployment rate in Skamania County was 6.6 percent in 2007, and rose to 8.4 percent in 2008. In comparison, the same measure in 2000 was 6.0 percent. Relative to the state as a whole, Washington unemployment rates in 2007 and 2008 were 4.5 percent and 5.5 percent, respectively, having risen from 5.0 percent in 2000 (Table 4.4-12) (WESD 2008). Per capita personal income in 2006 in Skamania County was $28,265, which was 74 of per capita personal income for the State of Washington as a whole (BEA 2008). Median household income the same year (2006) was $39,476, or70 percent of the same measure for Washington State as a whole ($56,184) (WOFM 2008e). These statistics indicate relatively lower income near the project when compared to some other areas in Washington.

These current unemployment rates and trends and income levels not only reflect that the economy in Skamania County is more depressed when compared to some other areas in Washington, but also that the current national economic slowdown that began in 2008 is affecting areas near the project. The 2008 annual unemployment rate in Skamania County was almost three percentage points higher than the state average, indicating a slow economy.

Table 4.4-10
Employment and Income Data for Klickitat County, 2006

Category	Employment		Earnings	
	Jobs	%	$	%
Total	9,880	100%	$551,401	100%
Wage and salary employment	6,573	67%	$209,347	38%
Proprietor employment	3,307	33%	$46,405	8%
Farm employment	1,269	13%	$18,671	3%
Nonfarm employment	8,611	87%	$285,137	52%
Forestry, fishing, related activities, other	(D)	NA	(D)	NA
Mining	(D)	NA	(D)	NA
Utilities	51	1%	$4,636	2%
Construction	772	9%	$20,421	7%
Manufacturing	615	7%	$18,200	6%
Wholesale trade	185	2%	$6,110	2%
Retail trade	671	8%	$32,152	11%
Transportation and warehousing	249	3%	$11,061	4%
Information	63	1%	$1,715	1%
Finance and insurance	185	2%	$4,664	2%
Real estate and rental and leasing	500	6%	$2,590	1%
Professional and technical services	624	7%	$29,681	10%
Management of companies/enterprises	(D)	NA	(D)	NA
Administrative and waste services	(D)	NA	(D)	NA
Educational services	49	1%	$639	0%
Health care and social assistance	405	5%	$9,309	3%
Arts, entertainment, and recreation	194	2%	$1,924	1%
Accommodation and food services	382	4%	$4,639	2%
Other services, except public admin.	678	8%	$13,694	5%
Federal government, civilian	103	1%	$7,216	3%
Military (government)	64	1%	$2,256	1%
State government	176	2%	$8,823	3%
Local government	1,422	17%	$62,131	22%

Source: BEA 2008.
This type of industry breakdown is not available for years beyond 2006.
(D) Not shown to avoid disclosure of confidential information; estimates for this item are included in the totals.
NA = Not available

To the east of the project, 6,573 jobs (67 percent) of the total 9,880 jobs in Klickitat County in 2006 were held by wage and salary workers. Approximately 33 percent of jobs (3,307 jobs) were held by proprietors. Place of work earnings (wages, salaries and proprietors' earnings) accounted for about 46 percent of total personal income in the county, with income from property (dividends, interest and rent) and transfer payments (mainly Social Security) making up the balance. The principal sources of employment were local government, retail trade, and professional and technical services (Table 4.4-10).

The annual unemployment rate in Klickitat County was 6.7 percent in 2007, and rose two percentage points to 8.2 percent in 2008. In comparison, the annual unemployment rate in Klickitat County in 2000 was 7.5 percent. Washington unemployment rates in 2007 and 2008 were 4.5 percent and 5.5 percent, respectively, and 5.0 percent in 2000 (Table 4.4-12) (WESD 2008). Per capita personal income in 2006 in Klickitat County was $27,827, which was 73 percent of the same measure for the State of Washington as a whole and similar to the income levels for Skamania County (BEA 2008). Median household income the same year (2006) was $44,843, or 80 percent of the same measure for Washington State as a whole ($56,184) (WOFM

2008e). Similar to in Skamania County, these rates reflect (1) a relatively depressed local economy, and (2) the current nationwide economic slowdown.

Table 4.4-11
Employment and Income Data for Hood River County, 2006

Category	Employment		Earnings	
	Jobs	%	$	%
Total	15,578	100%	$621,528	100%
Wage and salary employment	12,179	78%	$328,095	53%
Proprietor employment	3,399	22%	$36,246	6%
Farm employment	1,743	11%	$36,809	6%
Nonfarm employment	13,835	89%	$400,990	65%
Forestry, fishing, related activities, other	638	5%	$18,093	5%
Mining	(L)	NA	(L)	NA
Utilities	45	0%	$3,585	1%
Construction	859	6%	$25,707	6%
Manufacturing	1,395	10%	$57,434	14%
Wholesale trade	579	4%	$18,005	4%
Retail trade	1,743	13%	$38,593	10%
Transportation and warehousing	152	1%	$4,758	1%
Information	181	1%	$8,208	2%
Finance and insurance	201	1%	$5,947	1%
Real estate and rental and leasing	422	3%	$4,666	1%
Professional and technical services	809	6%	$26,401	7%
Management of companies/enterprises	(D)	NA	(D)	NA
Administrative and waste services	(D)	NA	(D)	NA
Educational services	173	1%	$2,118	1%
Health care and social assistance	1,926	14%	$57,117	14%
Arts, entertainment, and recreation	742	5%	$15,547	4%
Accommodation and food services	1,438	10%	$23,906	6%
Other services, except public admin.	664	5%	$11,703	3%
Federal government, civilian	118	1%	$9,472	2%
Military (government)	63	0%	$2,221	1%
State government	108	1%	$6,277	2%
Local government	1,091	8%	$48,236	12%

Source: BEA 2008.
(D) Not shown to avoid disclosure of confidential information; estimates for this item are included in the totals.
(L) Less than 10 jobs, but the estimates for this item are included in the totals.Note: This type of industry breakdown is not available for years beyond 2006.
NA = Not available

Of the three counties that surround the project site, Hood River County has the highest number of employed workers. In 2006, employment in Hood River County averaged 15,578 jobs, of which 12,179 (78 percent) were held by wage and salary workers and 3,399 (22 percent) by proprietors. Place of work earnings (wages, salaries and proprietors' earnings) accounted for 59 percent of total personal income in the County, with income from property (dividends, interest and rent) and transfer payments (mainly Social Security) making up the balance. The principal sources of employment were manufacturing, health care and social assistance, local government, and retail trade (Table 4.4-11).

The annual unemployment rate in Hood River County was 4.6 percent in 2007, having fallen from 6.6 percent in 2000. The December 2008 unemployment rate in Hood River County was 5.7 percent. In comparison, the annual unemployment rate for Oregon as a whole was 5.1 percent in 2000 and 5.2 percent in 2007. The December, 2008 unemployment rate for Oregon

was 5.7 percent (Table 4.4-12) (OED 2009). Hood River County has the lowest unemployment of the three counties near the project site. The most recent available annual unemployment rate in Hood River County (2007) is roughly two percentage points lower than the same measures for Klickitat and Skamania counties and 0.6 percentage point lower than the same measure for Oregon as a whole.

Table 4.4-12
Unemployment Trends

Geographic Area	Unemployed					
	2000 Annual		2007 Annual		Most Recent Annual or Monthly Estimates[a]	
	No.	Percent	No.	Percent	No.	Percent
Skamania County	290	6.0	340	6.6	450	8.4
Klickitat County	700	7.5	650	6.7	820	8.2
Hood River County	757	6.6	592	4.6	712	5.7
Washington State	151,340	5.0	154,720	4.5	192,000	5.5
Oregon State	93,196	5.1	100,517	5.2	158,369	8.0

Sources: WESD (2008), OED (2009).

a. The most recent annual statistics for Washington are for 2008 and are shown in this column. The most recent annual statistics for Oregon are for 2007. This column shows (for the Oregon areas) the most recent unemployment rate available for both Oregon and Hood River County, which is the December 2008 monthly unemployment rate.

Of the three counties that surround the project site, Hood River County has the highest per capita and median household income, although these measures remain below the state average. Per capita personal income in 2006 in Hood River County was $29,333, which was 88 percent of the same measure for the State of Oregon (BEA 2008). Median household income in 2007 was $47,159, or 97 percent of the same measure for Oregon State as a whole ($48,735) (USDA 2007).

These unemployment rates and income levels indicate that all three counties near the project have been affected by the national economic slowdown. The economic slowdown together with (1) the relatively high unemployment and low income levels in Skamania and Klickitat Counties, and (2) the decreasing federal payments for the Counties, translate to economic challenges for these three Counties in the near future.

Major employers in the region surrounding the Whistling Ridge Energy Project site include those listed in Table 4.4-13.

Skamania County is about 40 miles in length from west to east, and extends northward from the Columbia River into the Cascade Mountains and the Gifford Pinchot National Forest. The county covers 1,672 square miles and is part of an area recognized for scenic beauty and as a major water, highway, and railroad transportation corridor. Skamania County has historically been highly dependent on logging and the forest products industry. Recently, due in part to government restrictions on timber harvesting, economic activity has shifted away from logging and forest products to tourism and recreation.

Table 4.4-13
Major Employers in Skamania County

County	Company
Skamania	Skamania Lodge
	Skamania County Government
	Stevenson-Carson School District
	Wilkins, Kaiser, Olsen
	Carson Hot Springs Resort
	Bonneville Hot Springs Resort
	A & J Select
	Big River Grill/El Rio
	Molded Fiberglass Company
	High Cascade Veneer
	Skamania County P.U.D. No. 1
Klickitat	TLC Modular Homes
	Custom Interface, Inc.
	Innovative Composite Engineering (ICE)
	Insitu/Boeing
	Klickitat County Government
	SDS Lumber Company
	Underwood Fruit
Hood River	Mt. Hood Meadows
	Hood River County School District
	Diamond Fruit Growers
	Providence Hood River Hospital
	Duckwall-Pooley Fruit Company
	Embarq
	Hood River County Government
	Cardinal Glass IG
	Columbia Gorge Hotel
	Hood River Care Center
	Maritime Services
	Columbia Gorge Center
	City of Hood River Government

Source: SCCC (2008), Real Estate.com (2008), Klickitat County PEDA (2008).

Approximately 85 percent of land in Skamania County is currently owned by the federal government (Mill A Community Action Committee 2008), resulting in relatively low property tax revenues for the County and for local school districts. Federal programs have been in place for over 100 years to relieve the economic burden placed on the County and local schools by the relatively low property tax revenue. Most of these programs operated with or related to funds generated by the sale of timber on federal lands. Historically, approximately one-quarter of US Forest Service revenues, such as those from timber sales, have been returned to States and Counties in which national forest lands are located.

The Secure Rural Schools Act was enacted in 2000 to provide assistance to rural counties, such as Skamania County, affected by the decline in revenue from timber harvests in federal lands. Public Law 110-343, enacted on October 3, 2008, reauthorized and amended the Secure Rural Schools and Community Self-Determination Act of 2000 (Public Law 106-393). The new Secure Rural Schools Act authorizes distribution of funds only through 2011, and the distributions will decrease each year beginning in 2008 (USFS 2008). Consequently, Skamania County will need to find alternate funding for governmental services.

Economic uses on the project site include timber harvesting. The project site is on land managed for commercial forestry by S.D.S. Co., LLC and Broughton Lumber Company. The Applicant, Whistling Ridge Energy LLC, is wholly-owned by S.D.S. Co., LLC. All of the parcels on which the project would be constructed are managed for a continual cycle of growth, harvest, and replanting. As a longstanding commercial forestry site, no old-growth forests exist in areas where the project is proposed. Many of the stands of trees on the sections of land that would have turbines on them are near maturity. S.D.S. Co., LLC and Broughton Lumber Company have recently implemented timber harvest plans on portions of the land. Additional harvests are planned, subject to requirements of a Forest Practice Application.

Mill A and Willard consist entirely of housing. The lumber mill closed in 1988, and the school in Mill A has a declining population.

4.4.1.3 Fiscal Conditions

Washington State and Skamania County collect several types of taxes:

- Payroll taxes are paid in Washington by employers for compensation to unemployed or injured workers. Skamania County does not benefit from collection of payroll taxes.

- Washington's Business and Occupation (B&O) tax is levied on the gross receipts of business operations. This revenue would not represent a benefit to Skamania County because all B&O tax revenues remain in the State budget. The amount paid in B&O tax could be less if the project qualifies for a credit under the Rural County B&O Tax Credit for New Employees program. Skamania County does not levy a business tax.

- Washington State collects retail sales and use tax. The sales and use tax rate for the unincorporated area of Skamania County is 7.0 percent, meaning that after the State government's share of 6.5 percent, a remaining 0.5 percent goes to the County. Sales and use tax collected in Skamania County during calendar year 2007 was $630,515. Total taxable (sales and use) retail sales in 2007 was $39.8 million. Since 1995, taxable sales have decreased annually by as much as 34 percent (2001–2002) and increased annually by as much as 52 percent (2002–2003). Cumulatively, taxable sales increased over 50 percent between 1995 and 2007 (WDOR 2008).

- Skamania County collects property taxes for taxing districts within the County. Skamania County's tax base, i.e., assessed value of real and personal property, was $1.134 billion in 2007 (WDOR 2009a). Skamania County collected (current and

delinquent) property tax of $9.6 million in calendar year 2007 (WDOR 2008). The average property tax rate for Skamania County in 2008 was $8.36/$1,000 assessed value (WDOR 2009b).

In 2008, the Skamania County Budget was $55,262,498, including $15.8 million for the Current Expense Fund and $39.5 million for all other County funds. The top four categories make up over half of the Current Expense Fund, and include General Services (21 percent), the Sheriff's Department (16 percent), facilities and recreation (13 percent), and the jail (6 percent). Skamania County's General Fund was categorized in 2007 as shown in Table 4.4-14.

Table 4.4-14
Skamania County General Fund, 2007

Category	Amount
General Property Taxes	1,474,406
Sales & Use Taxes	333,956
Other Local Taxes	172,114
Licenses & Permits	230,151
Charges & Fees for Services	459,560
Interest & Investment Earnings	1,739,209
Fines & Forfeits	526,162
Rents, Insurance Premium, Internal Contributions, Miscellaneous	656,295
Intergovernmental Revenues	7,461,639
Debt Proceeds	--
Operating Transfers-In	0
Total Revenues	**13,053,492**
Law & Justice Services	4,724,993
Fire & Emergency Services	353,558
Health & Human Services	406,551
Natural Resources	1,370,187
General Government	2,954,717
Capital	204,931
Debt Service-Interest	40,589
Operating Transfers-Out	792,030
Total Expenditures	**10,847,556**

Source: Washington State Auditor (2009).

The project site is within Taxing District 109, for which the total millage rate[1] is $8.026839/$1,000 assessed value. The millage rate is broken down as shown in Table 4.4-15.

[1]The millage rate is the amount per $1,000 of property assessed value that is used to calculate taxes on property.

Table 4.4-15
Breakdown of Taxing District No. 109 Millage Rate

Category	Amount
Current Expense	1.218965
Mental Health	0.012500
Developmental	0.012500
Veteran's Relief	0.011250
County Road	1.262288
Hospital and EMS District	0.643625
State Treasurer (State School Fund)	2.033112
Cemetery District	0.074757
Library District	0.338660
Excess Levy: School District 405 (Klickitat County), Maintenance and Operations	1.640058
Excess Levy: School District 405 (Klickitat County), Capital Projects	0.163270
Excess Levy: School District 405 (Klickitat County), Bond	0.281641
Public Utility District	0.334213
Total	8.026839

Source: L. Moore (personal communication).

4.4.1.4 Public Services and Utilities

Fire Protection

Two city fire departments (North Bonneville and Stevenson) and seven Skamania County fire districts provide fire protection to Skamania County residents. WDNR also provides fire suppression services to forested areas in Skamania County, and would be the first responder to a fire emergency at the project site (J. Weeks, personal communication). Skamania County Fire District No. 3 (SCFD3) provides fire protection and emergency response to a 20-square mile service area immediately south of the project site (Cox 2008). Although the project site is not formally within SCFD3's service area (T. Skinner, personal communication), SCFD3 would likely respond to a fire at the project site, along with and in coordination with WDNR (R. Hovey, personal communication). The Mill A Fire Department is also near the project site, and has a staff that includes less than six volunteer firefighters and no paid personnel (Carlson, 2008).

The project site is located in WDNR's West Klickitat Area. The WDNR work center closest to the project site is the Husum work center, which is staffed by one fire manager officer and one assistant fire manager (J. Weeks, personal communication). Other staff and equipment at the Husum work center includes six firefighters and two Type 6 wildfire engines (Fullerton and Helgerson 2008). The WDNR response time to the project site would vary depending on the location of the engines and the type of fire emergency at the project site, but would range from 45 minutes to one hour (R. Hovey and J. Weeks, personal communications). The engines are usually assigned to work projects in the field.

Skamania County Fire District No. 3 is located in the unincorporated community of Underwood and is staffed by 17 volunteer firefighters. The SCFD3 service area is 20 square miles. Equipment at District No. 3 includes one of each of the following: Type 1 engine, Type 2 engine, Type 3 engine, Type 7 engine, Type 2 tender, and Type 3 tender (Fullerton and

Helgerson 2008). The Washington State Ratings Bureau rating for SCFD3 at the project site is "Unprotected – 10," because the site is not located within the SCFD3 boundaries (T. Skinner, personal communication).

The project site is located outside of the Columbia River Gorge National Scenic Area. If an incident at or near the site, i.e., a wildland fire, threatens the area, the Columbia River Gorge National Scenic Area fire agency could respond. The fire agency is equipped with three Type 6 wildfire engines, one fire prevention module, two command vehicles, two cooperative engines (with the WDNR), and one cooperative engine (with the Oregon Department of Forestry). The Columbia River Gorge National Scenic Area fire agency has nine employees and is staffed seven days per week, July through September (Fullerton and Helgerson 2008).

Skamania County has prepared a Community Wildfire Protection Plan through a Title III grant from the Secure Rural Schools and Self Determination Act. This is a plan developed by a community in an area at risk from wildfire, with the goal of reducing the risk of catastrophic wildfire within the region. Topics addressed in a typical Community Wildfire Protection Plan include wildfire response, hazard mitigation, structure and water source protection, education, and community preparedness (Fullerton and Helgerson 2008).

Table 4.4-16 lists the fire departments that serve the site and surrounding area, along with the departments' staff and equipment. These fire districts have mutual aid agreements with each other (J. Carlson, personal communication).

Law Enforcement

The Skamania County Sheriff's Office would provide law enforcement services to the project site. Sheriff's Office headquarters are located at 200 Vancouver Avenue in Stevenson, approximately 15 miles southwest of the project site. The Sheriff's Office also operates a substation in Cougar that serves the northern portion of Skamania County. Cougar is located more than 50 miles northwest of the project site (Cox 2008). The Sheriff's Office staff includes 23 commissioned officers, two reserve officers, four civil staff, and 14 jail staff. At any one time, at least two officers patrol the County. Response times to the project site depend on the location of patrol vehicles when the call for service is received. The response time from Sheriff's Office headquarters to the project site is approximately 20 minutes (Cox 2008).

Other law enforcement agencies providing service near the project site include the Washington State Patrol, which patrols SR 14 south of the site. Construction and equipment delivery vehicles would travel on SR 14. Roads extending north of SR 14 are county roads, and are patrolled by the Sheriff's Office (Cox 2008). All 39 Washington State county sheriffs sign a mutual aid agreement annually.

Table 4.4-16
Fire Departments in the Whistling Ridge Energy Project Vicinity

Fire Department	Paid Full-Time Personnel	Volunteer Personnel	Equipment	Protection Class[a]
Skamania County Fire District No. 3	0	17	1 – Type 1 engine 1 – Type 2 engine 1 – Type 3 engine 1 – Type 7 engine 1 – Type 2 tender 1 – Type 3 tender	10
Mill A Fire Department	0	<6	(c)	
Washington Department of Natural Resources	6	NA[b]	2 – Type 6 wildfire engines	-
Columbia River Gorge National Scenic Area Fire Agency	9	NA[b]	3 – Type 6 wildfire engines 1 – fire prevention module 2 – command vehicles 2 – cooperative engines (with WDNR) 1 – cooperative engine (with Oregon Department of Forestry).	-

Sources: Fullerton and Helgerson (2008), Washington State Patrol (personal communication), MSRC (2008), J. Carlson (personal communication).

a. T. Skinner (personal communication): As rated by the Washington Surveying and Rating Bureau. The Bureau rates the level of fire protection provided by fire departments against four main elements: available water supply; logistical characteristics and makeup of the district fire department; available communications systems; and finally fire control and safety measures taken and ordinances in effect in the particular fire district. Ratings are used to evaluate fire protection availability for insurance purposes. Ratings range from 1 to 10, with class 1 representing the highest level of fire protection and class 10 the lowest level. Ratings were not available for the Washington Department of Natural Resources or the Columbia River Gorge National Scenic Area Fire Agency.

b. Not available.

The Vancouver District (No. 5) of the Washington State Patrol would provide law enforcement services to SR 14 near the proposed Whistling Ridge Energy Project site, but would not respond to calls for service at the project site. The Washington State Patrol Vancouver District has approximately 60 commissioned officers, and serves the population living in Cowlitz, Lewis, Clark, Klickitat, and Skamania counties. In addition to the Vancouver District, four detachment offices are located in Chehalis, Morton, Kelso, and Goldendale. The detachment office closest to the project site is the Goldendale Detachment, which covers Klickitat and Skamania counties, and more than 230 miles of state routes. In addition to SR 14, the Goldendale Detachment is also responsible for SR 97, SR 141, SR 142, and SR 197 (Washington State Patrol, personal communication).

The Goldendale detachment has nine commissioned officers (Washington State Patrol, personal communication). Table 4.4-17 shows that the staffing level per capita for the Skamania County Sheriff's Office is higher than the average for Washington State.

Table 4.4-17
Police Department Staffing Levels
in the Whistling Ridge Energy Project Vicinity

Department	2008 Population of Service Area	Number of Commissioned Officers	Ratio of Officers to 1,000 Population
Skamania County Sheriff's Office	10,700	23	2.1[a]
Washington State Patrol District 5 Goldendale Detachment	30,800[b]	9	0.3
Washington State Patrol Vancouver District 5	608,600[c]	60	0.01
Average for Washington State	6,489,490	10,541	1.6[d]

a. Cox (2008), WASPC (2008), Washington State Patrol (personal communication).
b. Includes population of Klickitat and Skamania Counties.
c. Includes population of Clark, Cowlitz, Lewis, and Skamania Counties.
d. WASPC (2008), statistics are for 2007.

Emergency Medical Services

Two ambulance companies would respond to an emergency at the Whistling Ridge Energy Project site: Skamania County Emergency Medical Service and Skyline Ambulance. Skamania County Emergency Medical Services is the functioning entity of Skamania County Hospital District No. 1, which provides ambulance service to the residents of Skamania County. Skamania County Emergency Medical Services is located in Stevenson and is equipped with three medic vehicles, one rescue vehicle, and two squad vehicles. Skyline Ambulance is based at Skyline Hospital in White Salmon, and is equipped with three ambulance vehicles (Skyline Hospital 2008). Table 4.4-18 lists characteristics of the first response ambulance service providers for the Whistling Ridge Energy Project site.

Table 4.4-18
Ambulance Service Providers in the Whistling Ridge Energy Project Vicinity

Name	Ownership	Level of Care
Skyline Ambulance	Public	Advanced Life Support
Skamania County Emergency Medical Services	Public	Advanced Life Support

Sources: Cox (2008), Skyline Hospital (2008), Skamania County EMS (2008).

The two hospitals closest to the project are Skyline Hospital in White Salmon (7 miles southeast of the project) and Providence Hood River Memorial Hospital in the City of Hood River (8 miles southeast of the project). Skyline Hospital is a 32-bed acute care hospital with a Trauma Level IV designation, serving western Klickitat County and eastern Skamania County. Services at Skyline Hospital include acute care, obstetrics, surgery, cardio-pulmonary care, radiology and laboratory services, physical therapy, a pharmacy, and emergency services. Skyline Hospital owns and operates a three-vehicle ambulance service (Skyline Hospital 2008).

Providence Hood River Memorial Hospital is a 25-bed facility that provides Cardio conditioning, counseling, diabetes treatment, a dialysis center, emergency services, obstetrics, radiology, laboratory services, nutrition, occupational medicine, a sleep center, and surgery.

Schools

In October, 2007, the total student enrollment in Skamania County public schools was 1,213 students, representing approximately one-tenth of one percent of total enrollment in Washington that year (Washington State OSPI 2008). Five school districts provide public education services

to Skamania County residents. The service areas for four of the five districts are completely within Skamania County boundaries. These four districts are Mill A School District No. 31, Stevenson-Carson School District No. 303, Skamania School District No. 2, and Mount Pleasant School District No. 029-93. The fifth district, Washougal School District No. 112-6, is under Clark County jurisdiction, but has a service area that extends into the western portion of Skamania County. Table 4.4-19 shows that over the last few years, enrollment in these five districts has not changed more than five percentage points, on average (Washington State OSPI, 2008).

Table 4.4-19
Enrollment Trends
in the Whistling Ridge Energy Project Vicinity

	Mill A School District	Mount Pleasant School District	Skamania School District	Stevenson-Carson School District	Washougal School District
Fall 2004	79	65	64	1,049	2,870
Fall 2005	76	63	72	1,069	3,015
Fall 2006	66	56	70	1,058	3,057
Fall 2007	69	56	68	1,020	3,054
Annual Average Rate of Growth, 2004-2007	-4.4%	-4.8%	2.0%	-0.9%	2.1%

Source: Washington State OSPI (2008).

Mill A School District No. 31 provides public educational services to the population in the southeastern corner of Skamania County, a service area adjacent to the project site (ESD 2008). Mill A School currently enrolls 81 students in grades K through 8. High school students living within the boundaries of the Mill A School District attend Stevenson High School in the Stevenson-Carson School District No. 303, which borders Mill A School District No. 31 on the west. Mill A School and district offices are located at 1142 Jessup Road in the community of Cook, which is located approximately 5 miles south of the project site (Mill A School District 2008).

The public school closest to the project site is the Mill A School, which is approximately 2 miles southwest of the site. The next closest public schools are in the community of Carson, approximately 10 miles west of the site. School buses may drive through neighborhoods near the project site, including the communities of Willard and Mill A, which are located approximately 2.25 and 1.5 miles respectively from the site.

The higher education facilities closest to the site include Clark College, a community college in Vancouver, and Washington State University's Vancouver campus (SCCC 2008).

Parks and Recreational Facilities

Parks and other recreational facilities are discussed in Section 4.2.4, Recreation.

Utilities

Embarq provides telephone service to the area surrounding the site (Cox 2008). The Skamania County Public Utility District (PUD) is a customer-owned utility that provides electricity service

to Skamania County. The homes and businesses in Mill A and Willard do not have sewer service or water service. They are on wells and have septic systems. Skamania County provides solid waste pick-up service to residences and businesses in the County, including those near the project site (Skamania County PUD office staff, personal communication).

Discussions of water supply systems and stormwater control systems at the Whistling Ridge Energy Project site and in the site vicinity, as well as project-related impacts on these facilities, can be found Section 2.5 Water Supply System, Section 2.10 Surface Water Runoff, and Section 3.3 Water.

4.4.2. IMPACTS

This section describes the expected impacts of the project on local socioeconomic resources. The project would generate new local employment, additional business for local service and materials providers, and additional tax revenues to Skamania County and the state. The overall permanent socioeconomic impact of the project would be positive. Impacts were estimated through a detailed review of the proposed action against existing conditions.

4.4.2.1 Construction

Business and Economic Impacts

Section 2.12, Construction and Operation Activities provides information on the construction costs and schedule and projected manpower loading for the project. Assuming the Governor approves the Site Certification agreement in April 2010, the Applicant anticipates beginning design and construction in 2010 and operation by 2011. During the estimated one-year construction period (excluding engineering, design, specifications, and survey), approximately 330 full-time and part-time workers would be employed at some point during construction. Some of these jobs would not last the entire construction period. The on-site construction work force would peak at approximately 265 workers over the construction period and average 143 workers over the 12 months.

Table 4.4-20 presents the expected average composition of the construction work force. Construction trades would be broken down as shown in Table 4.4-21.

An estimated 65 to 75 percent of the construction labor force would likely be hired from the Portland-Vancouver metropolitan area. An estimated 25 to 30 percent of the workers would be residents of the three-county area including Skamania, Klickitat, and Hood River counties (A. Barkley, personal communication). This estimate is based on the relative size of the labor force in the three-county area compared to larger labor forces in metropolitan areas that are further away. Most construction workers hired from the Portland-Vancouver metropolitan area (65 to 75 percent) are expected to commute on a daily basis due to the 61-mile distance to the site.

Table 4.4-20
Estimated Quarterly Construction Personnel

Month Before Commercial Operation	Estimated Number of Construction Personnel On Site
14	15
13	15
12	90
11	90
10	190
9	190
8	265
7	215
6	165
5	190
4	100
3	100
2	100
1	25
0	25
Cleanup	25
Average (months 1 – 12)	143
Peak (months 1 – 12)	265

Table 4.4-21
Average Power Plant Construction Workforce Composition, by Occupation

Occupation	Composition (%)
Engineering/Design/Specifications/Surveys	4.5
Road Construction	15.2
Foundations Construction	15.2
Electrical Collection System Construction	15.2
Substation Construction	12.1
Wind Turbine Assembly and Erection	22.7
Plant Energization and Commissioning	7.6
Construction Punchlist Clean-Up	7.6
Total	100.0

To ensure that the applicant uses the local labor pool to the greatest extent possible, construction contractors would be required to advertise positions locally and to employ local workers to the greatest extent possible. Top hiring priority for construction would be given to qualified in-county and in-state construction workers. Some of the more specialized skills required for certain plant construction activities may not be available in the local or state labor pools; therefore, a small percentage of the work force may have to be brought in from outside of both Washington and Oregon states. These workers (up to 15 percent of the workforce [A. Barkley, personal communication]) would likely be employed for a short period of time, and would reside in motels in the project area for the duration of their assignments.

The average of up to 21 specialized out-of-state workers (40 at peak), and an estimated average 31 (57 peak) weekly-commuting construction workers[2] (would generate additional business for

[2] These weekly-commuting construction workers represent one-third of the workers originating from the Portland-Vancouver metropolitan area, as a worst-case scenario.

the operators of transient accommodations, such as motels, recreational vehicle parks, and campgrounds, as well as for other businesses near the project area. Also, a portion of the construction materials and services needed for the project would be procured from local vendors, thus generating additional income for local suppliers.

Whistling Ridge Energy Project non-salary local procurements[3] for construction materials, services and equipment leasing associated with construction are projected to total approximately $13.2 million. These procurements would augment the revenues of many construction-related businesses in Skamania County and the three-county area in general. In addition, the consumption spending of local project workers and their households out of their wages and salaries would stimulate the retail trade and services sector of the local and regional economies. Total payroll costs for project construction, including fringe benefits and other labor overhead costs, are projected to be approximately $18 million, of which approximately $4.5 million is expected to be earned in the three-county area including Skamania, Klickitat, and Hood River Counties.

An analysis of the primary and secondary effects of these construction spending streams within the three-county area reveals that indirect and induced value added from construction would be $3.9 million, and that 71 indirect and induced jobs would be attributable to construction. The total economic impact (direct, indirect, and induced) is expected to be $8.5 million in value added and 107 jobs (IMPLAN 2008). Project construction would create a total of 107 jobs in the three-county area, which would continue throughout the construction period.

Table 4.4-22 shows the direct, indirect, and induced economic effects of construction of the project in terms of its contribution to gross regional product (value added) and creation of employment (number of jobs) in the local area, including Skamania, Klickitat, and Hood River counties. Table 4.4-22 shows the breakdown of these effects by industry.

The estimates in Table 4.4-22 were calculated using an IMPLAN economic input-output model specific for the three-county area and the Whistling Ridge Energy Project. Local expenditures related to project construction would affect the three-county area economy *directly* through the purchases of goods and services in the region, and *indirectly* as those purchases, in turn, generate other purchases of intermediate goods and services from related sectors of the economy. In addition, the direct and indirect increases in employment and income enhance the overall purchasing power of residents, thereby *inducing* further consumption and investment. Number of jobs is the full-time equivalent of person-years of construction employment.

[3]Local procurements are procurements that would occur with the three-county area including Skamania, Klickitat, and Hood River Counties.

Table 4.4-22
Economic Impacts of Construction

Sector	Direct Effects		Indirect Effects		Induced Effects		Total Effects	
	Total Value Added[a]	Number of Jobs	Total Value Added[a]	Number of Jobs	Total Value Added[a]	Number of Jobs	Total Value Added[a]	Number of Jobs
Agriculture, Forestry, Fish & Hunting	-	0	0.1	1	-	0	0.1	2
Mining	-	0	-	0	-	0	-	0
Utilities	-	0	-	0	-	0	0.1	0
Construction	4.6	35	-	1	-	0	4.6	36
Manufacturing	-	0	2.0	35	0.8	11	2.8	46
Wholesale Trade	-	0	-	0	-	0	-	0
Transportation & Warehousing	-	0	-	0	0.2	6	0.2	6
Retail trade	-	0	-	1	0.1	2	0.1	3
Information	-	0	0.2	5	0.1	5	0.4	10
Finance & insurance	-	0	0.1	1	0.1	2	0.1	3
Real estate & rental	-	0	0.1	1	0.1	0	0.1	1
Total (b)	4.6	35	2.5	45	1.4	26	8.5	107

Source: IMPLAN (2008).
a. In millions of 2008 dollars
Totals may not add due to rounding.
North American Industry Classification System categories that are 0 are not shown.

Construction activities such as earth movement and vehicle traffic would generate noise and dust, which would represent a temporary nuisance to nearby businesses. In addition, traffic delays could occur on the existing roadway network due to the maneuvering of large vehicles carrying heavy or long loads. Nuisances and traffic delays related to construction would be temporary and are not expected to affect employers' ability to conduct business.

Population and Housing Impacts

The approximately 15 percent of the construction work force that would be specialized craftsmen originating outside of Washington and Oregon would likely have relatively short assignments, so few are expected to bring their families with them when they arrive to work on the project. The population increase in the project area and elsewhere in the three-county area would therefore be limited mainly to these workers for a temporary period of time, plus, during the work week, the non-local workers who would temporarily commute on a weekly basis from the Portland-Vancouver area.

The total estimated number of workers requiring transient housing would be 52 (average) and 97 (peak) over the 12-month construction period, assuming that one-third of the workers from the Portland-Vancouver metropolitan area would commute on a weekly basis and the specialized, temporary staff also would require lodging. These construction workers are expected to seek temporary accommodation in the general vicinity of the project site, and to use motels, trailers, campers, and other forms of transient housing. Table 4.4-8 shows that approximately 1,082 hotel rooms or RV campsites exist within 25 miles of the project site. Assuming 70 percent occupancy, approximately 325 of these units (313 hotel rooms) would be available at any one time. Assuming a worst-case scenario that workers would want hotel or motel lodging, the peak demand of 97 rooms (assuming, again a worst-case scenario that no workers would share rooms) would represent approximately 31 percent of the available rooms and would therefore not stress the lodging facilities within 25 miles. Construction of the proposed project is not expected to result in a significant impact on transient accommodation availability in the project vicinity, nor is the project expected to affect median housing values, median gross rents, or new housing construction. The applicant has no plans to provide on-site temporary housing for workers or shuttle to or from hotels or other temporary lodging facilities.

Access to the proposed project site would be via Skamania County roads that extend northward from SR 14 and an existing private logging road. From SR 14, vehicles would travel along Cook-Underwood Road, Kollack-Knapp Road, Scoggins Road, and a private logging road listed as CG2930. The private logging road is located on the Applicant's (S.D.S. Co., LLC and Broughton Lumber Company) property, and would provide access to most areas where project facilities would be located.

Fiscal Impacts

Sales Tax Revenue

The total cost of construction is estimated to be approximately $150 million. In addition to the local area procurements mentioned above, the Applicant would be purchasing large amounts of

wind power generation equipment from various domestic and foreign suppliers. Depending on legislation currently under consideration in the state legislature, state sales and use tax may be levied only on procurements that are not directly related to electricity generation. Should the state sales tax exemption for wind power be extended, capital equipment such as turbines, transformers, transmission cables, and substation equipment would not be taxable.

The local procurements are estimated to be 10 percent of total procurements (approximately $13.2 million). The majority (estimated at 90 percent) of local procurements would be directly related to electricity generation. Taxable sales due to project construction would therefore be approximately $1.32 million, resulting in $92,400 in sales and use tax revenue for Washington State and Skamania County taxing districts.

The Skamania County sales and use tax rate for the unincorporated area is 7.0 percent, meaning that after the state government's share of 6.5 percent, a remaining 0.5 percent goes to the County. Due to the project's location within the unincorporated area of Skamania County, Skamania County would receive $6,600 of the $92,400 in sales and use tax revenues related to project construction. This one-time influx of revenue ($6,600) would represent an increase of one percent when compared to the sales and use tax collected in Skamania County during calendar year 2007 ($630,515) (WDOR 2008). These positive fiscal impacts to the County and the state would be a one-time occurrence resulting from project construction activities.

Modest increases in sales of goods and services would occur during construction, such as local purchases by construction workers. Sales tax revenues resulting from these types of purchases would be beneficial although small within the context of the Skamania County economy.

Property Values and Property Tax Revenue

The project site is located on undeveloped land in a forest land zone. The nearest residences are approximately 0.5 mile northwest of the site, and approximately 0.4 mile (2,000 – 2,500 feet) southeast of the site. Construction traffic would go through Underwood, which would experience additional truck traffic for a period of up to nine months. Construction activities are not likely to adversely affect property values in residential and commercial areas near the project site because the construction period would be relatively short. Construction of the project would not affect property tax revenues.

County Expenditures

Skamania County could experience a small increase in traffic-related costs due to the need for permitting and control measures related to over-size or over-weight loads carrying equipment such as tower sections, nacelle, turbines, and blades. Construction of the project would require that many construction vehicles, including trucks with over-size and over-weight loads, share the existing roadway network with the general public. As a result, some accidents could occur that would be directly attributable to construction traffic. An increase in accident occurrence during the construction of the project could take place, but any increase is expected to be minimal.

The County could experience a small increase in cost of public services such as fire suppression, law enforcement, governmental services, parks and recreation, and hospital costs during

construction due to the additional traffic and the temporary population. These potential additional costs would be temporary and negligible within the context of the total costs for services in Skamania County.

The benefits of the project, including additional jobs, income, spending, and tax revenue, would outweigh the small amount of costs Skamania County could potentially incur. Both the benefits and costs associated with construction would be temporary and would occur concurrent with the one-year construction period.

Public Services and Utilities

The influx of construction workers into project area communities on a daily and weekly basis could result in a minor and temporary increase in the demand placed on public service providers. This increase in demand could have a minor and temporary effect on local police departments, providers of emergency medical services, and local fire departments. The contractor would develop emergency plans for project construction.

The impact of project construction on local schools would be at most minor and temporary, as few out-of-state construction workers are likely to be accompanied by families. Construction-related impacts to local utilities are also expected to be minor and temporary.

Response times in the project vicinity are not expected to change due to project construction. Construction trucks would represent additional volume on area roads, but would not deter any emergency vehicles from travel. The project would be constructed entirely within land managed for commercial forestry by the Applicant.

Anticipated water uses during construction include spraying roads for dust control, construction support (such as concrete curing and hydrostatic testing of equipment), and restroom facilities for the estimated average of 143 and peak of 265 construction and support workers. Water needed for construction would be purchased by the contractor from an off-site vendor with a valid water right and transported to the project site in water-tanker trucks.

The project would require the improvement of approximately 7.2 miles of existing private logging roads. In areas near proposed wind turbine strings where no logging roads currently exist, approximately 2.4 miles of new gravel access roads would be constructed. Some of these construction roads would continue to be used during the project's operational phase.

The needs of public service providers are considered in Section 4.3, Transportation. Section 4.2.4, Recreation addresses the potential for impacts on parks and other recreational facilities.

4.4.2.2 Operation

Business and Economic Impacts

Operation of the project would result in a positive economic impact to Skamania County, the three-county area, and the State of Washington due to increased tax revenues, employment, and local expenditures. Operation of the project would likely require eight to nine full-time or part-

time Operations and Maintenance employees. Efforts would be made to hire local individuals to staff the project as much as practicable.

The estimated gross payroll (including fringe benefits and other payroll overheads) for the operational workforce is $1.5 million, or an average annual labor cost of $167,000 to $188,000 per employee. This is approximately 25 percent higher than the standard industrial wage for this industry in Skamania County (IMPLAN 2008). In addition to the regular operational workforce, a temporary workforce with appropriate skills would be utilized during major maintenance or other non-routine operational work.

Using IMPLAN regional economic modeling software for the power generation and supply industry in the three-county area including Skamania, Klickitat, and Hood River Counties, a wind power facility employing nine full-time workers would have a gross annual operating cost valued at approximately $3.75 million, which would include direct purchases from suppliers (including fuels, maintenance supplies and services, retail goods and professional services). Sales, use and other indirect business taxes on that level of spending are estimated at $200,000 (IMPLAN 2008) per year, which would accrue to state and local government jurisdictions. Employee spending from wages and salaries is estimated at around $900,000 per year, assuming an average local expenditure rate of 70 percent of compensation.

Table 4.4-23 shows the direct, indirect, and induced economic effects of operation of the project in terms of its contribution to gross regional product (value added) and creation of employment (number of jobs). The estimates in the table were calculated using an IMPLAN economic input-output model for the three-county area including Skamania County, Klickitat County, and Hood River County.

Table 4.4-23
Economic Impacts of Operation

Sector	Direct Effects		Indirect Effects		Induced Effects		Total Effects	
	Total Value Added[a]	Number of Jobs	Total Value Added[a]	Number of Jobs	Total Value Added[a]	Number of Jobs	Total Value Added[a]	Number of Jobs
Ag, Forestry, Fish & Hunting	-	0	-	0	-	0	-	0
Mining	-	0	-	0	-	0	-	0
Utilities	1.2	7	-	0	-	0	1.2	7
Construction	-	0	-	0	-	0	-	0
Manufacturing	-	0	-	0	0.2	2	0.2	2
Wholesale Trade	-	0	-	0	-	0	-	0
Transportation & Warehousing	-	0	-	0	-	1	-	1
Retail trade	-	0	-	0	-	0	-	0
Information	-	0	-	0	-	1	-	1
Finance & insurance	-	0	-	0	-	0	-	0
Real estate & rental	-	0	-	0	-	0	-	0
Total[b]	1.2	7	-	1	0.2	5	1.5	12

Source: IMPLAN (2008).
a. in millions of 2008 dollars
b. totals may not add due to rounding
North American Industry Classification System categories that are 0 are not shown.

Operation of the project would result in a total of 12 permanent jobs, including direct, indirect, and induced effects. For comparison, the Renewable Energy Policy Project estimates that every megawatt of installed wind capacity creates about 4.8 job-years of employment, both direct (manufacturing, construction, operations) and indirect (advertising, office support, etc.) (REPP 2009). Using this standard, the Whistling Ridge Energy Project, which would produce approximately 75 MW of electricity, would result in 600 job-years (60 jobs each year over 10 years, for example). In comparison, this analysis finds that the project would result in 78 jobs for the construction period, and 12 jobs each year for the estimated 30 year life of the project.

Expenditures related to project operation would affect the three-county area economy *directly* through the purchases of goods and services in the region, and *indirectly* as those purchases, in turn, generate other purchases of intermediate goods and services from related sectors of the economy. In addition, the direct and indirect increases in employment and income enhance the overall purchasing power of residents, thereby *inducing* further consumption and investment. Number of jobs is the full-time equivalent of person-years of employment.

Project operations would not affect local businesses' ability to conduct operations.

Lease Payments and Royalties

Whistling Ridge Energy LLC would lease land for the project from S.D.S. Co., LLC and Broughton Lumber Company.

Population and Housing Effects

Operation would require up to nine permanent employees. For the IMPLAN model, an estimated seven employees were assumed to originate from the three-county area. The remaining two employees could migrate to the area from other locations outside the three-county area. Assuming an average household size of 2.6 persons, the population in the area could increase by approximately five people, and two households. Assuming the most recent average housing vacancy rate available (2008) for Skamania County (16.8 percent), more than 900 housing units would be available in Skamania County along, not including the additional nearby housing in Klickitat and Hood River counties. Even if both of these new project-related households choose to locate in Skamania County, the population increase would not represent an adverse impact on population or housing demand in the area.

The project would not displace any minority or low-income populations. The project would be constructed on private land not occupied by residents or businesses owned by anyone other than the Applicant. As discussed in Section 4.4.1.1, the area near the project does not have a substantially higher minority or low-income population when compared to larger reference populations. Section 4.1, Environmental Health, states that infrasound (noise) potential impacts are considered to be either non-existent or less than significant during operation. Permanent visual changes due to project operation would be low to moderate. Therefore, this analysis finds that high and disproportionate impacts upon minority and low-income populations would not occur.

Fiscal Impacts

Property Values

Local communities near proposed wind turbine locations have expressed concern that constructing wind turbines would detract from views, which would in turn decrease their property values. In order to address this concern and potential socioeconomic impact of the Whistling Ridge Energy Project, two studies were found that (1) review literature related to property values and wind projects, and (2) analyze property value impacts of wind projects.

The first study is entitled "Economic Impacts of the Kittitas Valley Wind Project" (the Kittitas Study) (ECONorthwest 2006). The Kittitas Study was prepared in 2006 by ECONorthwest for the Economic Development Group of Kittitas County, Washington. The Kittitas Study is an update to the "Economic Impacts of Wind Power in Kittitas County" study (ECONorthwest 2002). The Kittitas Study finds that "views of wind turbines will not negatively impact property values…based on a nationwide survey conducted of tax assessors in other areas with wind power projects, [the authors] found no evidence supporting the claim that wind farms decrease property values" (ECONorthwest 2006). The authors also conducted a literature review, and testified that "information from tax assessors and related literature indicate that views of wind turbines do not negatively affect property values" (EFSEC 2006).

The second study, is entitled "The Effect of Wind Development on Local Properties," and was prepared by the Renewable Energy Policy Project, a government agency in Washington, D.C. (REPP 2003). The REPP Study states that because installed wind power capacity in the US grew 26 percent annually (on average) between 1998 and 2002, any impacts on property values would likely have been evident in 2003, when this study was conducted. The REPP Study reviewed data on property sales near wind projects and used statistical analysis to estimate whether and to what extent wind projects affected prices at which properties were sold.

The authors of the REPP Study chose 10 projects that were (1) 10 ms or greater installed wind capacity, and (2) built during the period 1998 to 2001. They chose five-mile radius study areas around each wind project because they found that wind turbines are not highly noticeable beyond five miles. The authors collected property sales data over a period of six years, straddling the on-line date of the projects. The goal was to collect data for three years preceding and three years following the on-line date of the project. The authors gathered data for the view shed, and for a community comparable to the view shed, but without the presence of the wind turbines. The database for the study held over 25,000 records of property sales in the view shed communities and the comparable communities. The REPP Study found that:

- In eight of ten cases, property values increased faster in the view shed than in the comparable community
- In a study of the view shed only (not the comparable community), in nine of ten cases, property values increased faster after the project came on line than before
- In nine of ten cases, property values increased faster in the view shed than they did for the comparable community during the period after the projects came on line

The results of the REPP Study statistical analysis provides no evidence that wind development has harmed property values within the view shed (REPP 2003).

The Whistling Ridge Energy Project would be located in an undeveloped area, away from large population or industry centers and primarily zoned as Unmapped by Skamania County (wind energy facilities are an outright permitted use in the Unmapped area). Approximately 400 homes or businesses exist within three miles of the project site—approximately one-third of these 400 are located in Willard. The closest home would be located to the southeast of the Project Site, approximately 2,000 – 2,500 feet away. Homes and businesses near the project, as well as those further away, such as across the Columbia River, could have views of the turbines. Section 4.2.3 discusses the potential impacts to views attributable to the project. Based on the findings of the two studies discussed above, the project would not likely result in decreasing property values for properties with views of the wind turbines. The Applicant is not aware of any other studies or information (of a non-anecdotal nature) that would indicate a likelihood of negative impacts on property values for a setting such as that near the project.

Sales Tax Revenues

The permanent operation employees and the local procurement of supplies and equipment for operations and maintenance would generate modest additional economic activity due to their local spending. This activity would result in a small and beneficial increase in sales tax revenue for Skamania County.

Property Tax Revenue

An increase in the tax base equal to the numbers of turbines multiplied by an estimated value of $1.75 million per turbine ($87.5 million) would represent an increase of 6.5 percent in assessed value in the County. Using the average property tax rate for Skamania County of $8.36/$1,000 assessed value (WDOR 2009b), the increase in property tax revenue to the County would be $731,500 and would represent a permanent, annual increase of 7.6 percent compared to the amount of property tax collected (current and delinquent) in calendar year 2007 ($9.6 million) (WDOR 2008). Property tax revenues would be higher to the extent that increased wages and economic activity in the County results in higher valued properties.

Using a standard for wind projects given by the National Wind Coordinating Committee of $10 to $14 in property taxes for each $1,000 investment (NWCC 2009), the $17.7 million dollars spent locally (labor and non-labor cost) due to this project would result in approximately $177,000 to $250,000 in property taxes, which is lower than the estimate above. To the extent the wind turbines depreciate over time, the assessed value of the turbines and therefore the property tax revenue would decrease.

These additional and permanent annual revenues could help satisfy the need for alternate funds to replace decreasing federal funding. Assuming that the annual tax revenue of $731,500 would be distributed among funds as shown in Table 4.4-15, funds receiving the most revenue would be the State School Fund ($185,281), School District 405 Maintenance and Operations ($149,461), the County Road fund ($115,035), and the Current Expense fund ($111,086). A portion of the

State School Fund would be returned to Skamania County for Skamania County schools (L. Moore, personal communication).

County Expenditures

Skamania County could experience a negligible increase in demand for and cost of public services (fire service, law enforcement, governmental services, parks and recreation, and hospital services) due to project operation. Changes due to the project would include additional roads and five residents living in the three-county area. An estimated two workers and their families would permanently relocate to the area. These additional costs would be negligible within the context of the Skamania County budget and the permanent economic and fiscal benefits attributable to project operation.

The benefits of the project, including permanent jobs, income, spending, and tax revenue, would outweigh the costs Skamania County could potentially incur, even as depreciation of project equipment causes a decrease in property tax revenues in the project's later years. The increase in property tax revenue would begin one year after construction is complete, and continue for the life of the project.

Public Services and Utilities

No new BPA infrastructure would be needed for the electrical transmission interconnection system. The project substation would occupy a portion of a fenced 5- to 6-acre area in the southwest part of the project site, immediately adjacent to the BPA 230-kV transmission line. The collector system would collect energy generated at 575 volts (depending on model) from each wind turbine, and transform the voltage to 34.5 kV using a pad-mounted transformer. Then, the collector would deliver the energy via underground cables to the project substation, which would further transform the energy from 34.5 kV to 230 kV and deliver it to the adjacent BPA transmission line and into the regional transmission system. The project would require approximately 8.5 miles of underground collector cable trenches.

A permanent Operations and Maintenance facility would be constructed on a 2-acre area adjacent to the substation. The Operations and Maintenance facility would have approximately 3,000 square feet of enclosed space, including office and workshop areas, a kitchen, bathroom, shower, and utility sink.

Upon completion, the project would be connected to the following established utility systems:

- Electric service: Skamania County PUD/BPA connection
- Sewer Services: on-site
- Drinking Water: on-site
- Telephone: Embarq and Sprint
- Non-hazardous waste pick-up: Allied Waste

The Applicant would develop fire, emergency, and illness plans for project operation (see Section 2.16, Security Concerns). Water and sewer facilities for the project would be developed on site by the Applicant. Water for the bathroom and kitchen would come from a new on-site well. Project operations would require less than 5,000 gallons of water per day. The bathroom and kitchen would drain into an on-site septic system. A graveled parking area for employees, visitors, and equipment would be located adjacent to the Operations and Maintenance facility. The entire project site (including Operations and Maintenance facility, parking area, utilities, and turbines) would be fenced and have a locked gate.

Considering the small number of on-site employees (eight to nine) and the use of on-site services and emergency response plans and devices, the project is not expected to place an unacceptable additional demand on local public services.

The Sheriff's Office resources are generally adequate to serve the project during construction and operation, given that onsite security is provided by a separate party (Cox 2008). The Applicant would likely contract locally for private security.

WDNR resources for fire protection and suppression services are adequate to serve the project during construction and operation (J. Weeks, personal communication).

The project would not result in a decrease in response times for area service providers during operation. The project's eight to nine permanent employees would not represent a substantial increase in traffic volumes on area roads, nor would project facilities result in additional traffic controls.

The addition of potentially two new households could mean increased demand at Mill A School District or other nearby school districts. Assuming every two households represent the addition of one school-age child, enrollment at any of these districts could increase by 1.5 percent at most, representing a less-than-significant impact.

There would be a potential positive impact on public services and utilities due to project operation. The project's assessed value could be $87.5 million, and would generate approximately $800,000 per year in generation, property and sales tax distribution to municipal, county and other local jurisdictions. A portion of these funds could be used to upgrade existing public services and utilities in the County.

4.4.3. MITIGATION

Socioeconomic impacts are expected to be beneficial in the form of additional jobs, increased sales, and increased tax revenues. Temporary increases in population due to worker relocation during construction are likely to be less than significant in view of the availability of housing, transient accommodations, and other public services in the region. Specific mitigation measures to lessen the impacts of the construction phase on public service providers in the Whistling Ridge Energy Project vicinity include:

- Construction activities would be coordinated with local police and fire departments, as well as emergency medical service providers, to ensure access to all locations in the project site vicinity in the case of an emergency.

- To help mitigate loss of access and other traffic-related impacts, adequate traffic control and signage, indicating closures and alternate routes, would be provided where needed.

- Construction vehicle trips in and out of the immediate construction zone would be coordinated and scheduled away from peak travel periods as much as possible, to minimize general traffic disruption.

- Noise and dust problems generated by construction would be mitigated through the use of properly muffled construction equipment, and by the use of approved dust control methods.

For related discussions of impacts and mitigation, see Section 3.2 Air, Section 4.1 Environmental Health, and Section 4.3 Transportation.

SECTION 5.1 AIR EMISSIONS PERMITS AND AUTHORIZATIONS (WAC 463-60-536)

Pursuant to WAC 463-60-115, Whistling Ridge Energy LLC requests a waiver of the information required by WAC 463-60-536, which calls for a PSD permit application and a Notice of Construction Application.

The fuel source for the Whistling Ridge Energy Project is wind transformed from kinetic energy into electrical energy by wind turbine generators. The project would not be subject to PSD regulations since it would not emit more than 100 tons per year of a regulated pollutant. As no air emissions would be generated from operation of the wind turbine generators, a PSD Permit and Notice of Construction Application would not be required.

SECTION 5.2 WASTEWATER/STORMWATER DISCHARGE PERMIT APPLICATION (WAC 463-60-537)

5.2.1 WASTEWATER DISCHARGE

EFSEC has jurisdiction regarding the NPDES Permit over the project pursuant to WAC Chapter 463-38. Construction of the facility would disturb more than five acres of land, and EFSEC may determine that the Whistling Ridge Energy Project obtain coverage under Ecology's Stormwater General Permit for construction activities.

If coverage is deemed necessary by EFSEC, at least 30 days prior to beginning construction, Whistling Ridge Energy LLC would develop and submit to EFSEC a notice of intent to be covered by Ecology's 2005 Construction Stormwater General Permit for discharges associated with construction. Pursuant to the general permit, Whistling Ridge Energy LLC would prepare SWPPPs that identify appropriate BMPs to reduce the pollution loadings resulting from construction activities and industrial operations. These BMPs would be incorporated into project design, and Whistling Ridge Energy LLC would ensure that they are observed during construction of the project. Monitoring and reporting would be carried out in accordance with permit requirements.

Appendix B

Geotechnical Report
November 2007

Preliminary Geotechnical Report
Saddleback Wind Energy Project
White Salmon, Washington



Prepared for

SDS Lumber Company

November 2007

Prepared by

URS Corporation
URS Job #33758687

URS

November 5, 2007

SDS Lumber Company
PO Box 266
Bingen, WA 98605

Attn: Jason S. Spadaro, President

Re: Preliminary Geotechnical Report
Saddleback Wind Energy Project
SDS Lumber Company
White Salmon, Washington
URS Job No: 33758687

Dear Mr. Spadaro:

We are pleased to submit herewith our report entitled "Preliminary Geotechnical Report – Saddleback Wind Energy Project, White Salmon, Washington." This report presents our findings, conclusions, and recommendations regarding the proposed project.

It has been our pleasure to assist you with this project. Should you have any questions regarding the contents of this report, please call us at your convenience.

Yours very truly,

URS CORPORATION

Dan B. Meier, LEG
Senior Engineering Geologist

State of Washington
ENGINEERING GEOLOGIST
2382
Licensed Geologist
DANIEL B. MEIER
EXP 2/27/08

Brian M. Willman, PhD, PE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
60468P
OREGON
MAY 17, 1999
BRIAN M. WILLMAN
EXPIRES: 6/30/03

URS Corporation
111 SW Columbia, Suite 1500
Portland, OR 97201-5850
Tel: 503.222.7200
Fax: 503.222.4292

TABLE OF CONTENTS

		Page
TABLE OF CONTENTS		I
1	INTRODUCTION	1-1
	1.1 GENERAL	1-1
	1.2 PROPOSED CONSTRUCTION	1-1
	1.3 SCOPE OF WORK	1-2
	1.4 EXPLORATION AND LABORATORY TEST RESULTS	1-4
2	FIELD AND LABORATORY INVESTIGATIONS	2-1
	2.1 SUBSURFACE INVESTIGATIONS	2-1
	2.1.1 Test Pits	2-1
	2.1.2 Dynamic Cone Penetration Test	2-1
	2.1.3 Field Soil Electrical Resistivity Testing	2-2
	2.2 LABORATORY TESTING	2-2
3	SITE DESCRIPTION	3-1
	3.1 REGIONAL GEOLOGY	3-1
	3.2 SITE GEOLOGY	3-1
	3.3 SUBSURFACE CONDITIONS	3-3
	3.4 GEOLOGIC HAZARDS	3-4
	3.4.1 Description of Geologic Hazards	3-4
	3.4.2 Landslide Hazards	3-4
	3.4.3 Seismic Hazards	3-5
	3.4.4 Volcanic Hazards	3-6
	3.5 GROUNDWATER CONDITIONS	3-6
4	SEISMIC DESIGN	4-1
	4.1 REGIONAL SEISMICITY	4-1
	4.2 2006 IBC SEISMIC DESIGN	4-1
5	CONCLUSIONS AND RECOMMENDATIONS	5-1
	5.1 GENERAL	5-1
	5.2 WIND TURBINE GENERATOR FOUNDATIONS	5-1
	5.2.1 Settlement of WTG Foundation	5-2
	5.2.2 Earth Pressure and Friction Factors	5-2
	5.2.3 Rock Anchor Design and Installation	5-2

URS

Preliminary Geotechnical Report
Saddleback Wind Energy Project
White Salmon, Washington



Prepared for

SDS Lumber Company

November 2007

Prepared by

URS Corporation
URS Job #33758687

URS

URS

November 5, 2007

SDS Lumber Company
PO Box 266
Bingen, WA 98605

Attn: Jason S. Spadaro, President

Re: Preliminary Geotechnical Report
Saddleback Wind Energy Project
SDS Lumber Company
White Salmon, Washington
URS Job No: 33758687

Dear Mr. Spadaro:

We are pleased to submit herewith our report entitled "Preliminary Geotechnical Report – Saddleback Wind Energy Project, White Salmon, Washington." This report presents our findings, conclusions, and recommendations regarding the proposed project.

It has been our pleasure to assist you with this project. Should you have any questions regarding the contents of this report, please call us at your convenience.

Yours very truly,

URS CORPORATION

Dan B. Meier, LEG
Senior Engineering Geologist

State of Washington
ENGINEERING GEOLOGIST
2382
Licensed Geologist
DANIEL B. MEIER
EXP 2/27/08

Brian M. Willman, PhD, PE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
60468P
OREGON
MAY 17, 1999
BRIAN M. WILLMAN
EXPIRES: 6/30/03

URS Corporation
111 SW Columbia, Suite 1500
Portland, OR 97201-5850
Tel: 503.222.7200
Fax: 503.222.4292

TABLE OF CONTENTS

		Page
TABLE OF CONTENTS		I
1	INTRODUCTION	1-1
	1.1 GENERAL	1-1
	1.2 PROPOSED CONSTRUCTION	1-1
	1.3 SCOPE OF WORK	1-2
	1.4 EXPLORATION AND LABORATORY TEST RESULTS	1-4
2	FIELD AND LABORATORY INVESTIGATIONS	2-1
	2.1 SUBSURFACE INVESTIGATIONS	2-1
	2.1.1 Test Pits	2-1
	2.1.2 Dynamic Cone Penetration Test	2-1
	2.1.3 Field Soil Electrical Resistivity Testing	2-2
	2.2 LABORATORY TESTING	2-2
3	SITE DESCRIPTION	3-1
	3.1 REGIONAL GEOLOGY	3-1
	3.2 SITE GEOLOGY	3-1
	3.3 SUBSURFACE CONDITIONS	3-3
	3.4 GEOLOGIC HAZARDS	3-4
	3.4.1 Description of Geologic Hazards	3-4
	3.4.2 Landslide Hazards	3-4
	3.4.3 Seismic Hazards	3-5
	3.4.4 Volcanic Hazards	3-6
	3.5 GROUNDWATER CONDITIONS	3-6
4	SEISMIC DESIGN	4-1
	4.1 REGIONAL SEISMICITY	4-1
	4.2 2006 IBC SEISMIC DESIGN	4-1
5	CONCLUSIONS AND RECOMMENDATIONS	5-1
	5.1 GENERAL	5-1
	5.2 WIND TURBINE GENERATOR FOUNDATIONS	5-1
	5.2.1 Settlement of WTG Foundation	5-2
	5.2.2 Earth Pressure and Friction Factors	5-2
	5.2.3 Rock Anchor Design and Installation	5-2

5.3 RETAINING WALLS 5-5
5.3.1 Retaining Wall Design Parameters 5-5
5.3.2 Equivalent Fluid Densities (Soil) 5-6
5.3.3 Retaining Wall Backfill 5-6
5.4 TOWER FOUNDATION EXCAVATION 5-7
5.4.1 Temporary Shoring 5-7
5.4.2 Dewatering 5-7
5.4.3 Rock Excavation 5-7
5.5 SHALLOW FOUNDATIONS (ANCILLIARY STRUCTURES) 5-7
5.5.1 Passive Loads and Friction Factor 5-8
5.5.2 Slabs on Grade 5-8
5.6 CONSTRUCTION CONSIDERATIONS 5-9
5.6.1 Site Work Preparation 5-9
5.6.2 Shallow Foundation Excavation 5-9
5.6.3 Dry Weather Earthwork 5-9
5.6.4 Wet Weather Earthwork 5-10
5.6.5 Structural Fill Material 5-10
5.6.6 Embankment Design 5-11
5.6.7 Temporary Slopes 5-11
6 CONSTRUCTION QUALITY ASSURANCE 6-1
7 LIMITATIONS 7-1
8 REFERENCES 8-1

LIST OF TABLES

Table 4-1: 2006 IBC Seismic Design Values 4-2
Table 5-1: Rock Anchor Test Recommendations 5-5

LIST OF FIGURES

Figure 1 Vicinity Map
Figure 2 General Site Layout
Figure 3 Site Geology
Figure 4 Mat-Slab Foundation Concept
Figure 5 Design Capacity of Polyester Resin Grout Anchor

Figure 6 Design Capacity of Concrete Grout Anchor

LIST OF APPENDICES

Appendix A Logs of Test Pits
Appendix B Field Soil Resistivity and Laboratory Testing
Appendix C Pavement Engineering
Appendix D Landslide Hazards

1 INTRODUCTION

1.1 GENERAL

The purpose of this report is to provide preliminary geotechnical feasibility and recommendations regarding design of wind turbine tower-foundations and approach roads for the Saddleback Wind Energy Project (SWEP). This is at site located approximately 7 miles west of the town of White Salmon, Washington, and approximately 2 miles east of the Little White Salmon River. The location of the site is shown on Figure 1, Vicinity Map.

The project area is located on private land immediately north of the Columbia River Gorge National Scenic Area boundary. The area of the proposed project is approximately 3.2 square miles (2000 acres). The Project site is located on a series of north trending ridges that range in elevation from approximately 2100 to 2300 feet above mean sea level (msl). The land west of the proposed Project site drops sharply to a narrow river terrace and then to an elevation of less than 800 feet above msl in the Little White Salmon River valley. The topography to the northeast of the site drops gradually toward the White Salmon River or climbs gently up the northeast flank of Underwood Mountain (2,728 ft above msl). To the south, the topography drops to the Columbia River.

1.2 PROPOSED CONSTRUCTION

The SWEP project involves the installation of approximately forty eight wind energy turbines at its White Salmon, Washington site. As of the date of this report, the tower designer and tower locations have not been finalized. Because of this, the exact bearing capacity of the foundations required to support the Wind Turbine Generators (WTG) is not known. URS received information from a proposed turbine construction contractor, D.H. Blattner & Sons, Inc. which preliminarily assumed installation of 80-meter high GE 1.5 WTG which will be supported by 30 foot-deep concrete foundations. Each turbine tower will be coupled to the foundation with 128 rock anchor (consistent with GE towers). Final foundation design will be developed after detailed investigation and when designs are finalized.

Construction and Maintenance access to the proposed tower locations will be achieved by improving existing roadways that have historically been used primarily in support of logging activity and for access to existing BPA transmission lines. Modification of the roadways will be necessary to support the long and heavy loads that will be required for delivery of the wind turbine systems.

1.3 SCOPE OF WORK

To complete this preliminary report, URS has completed the following scope of work.

County Roads - Pavement Engineering – Upon speaking with the County personnel URS recommends that best pavement approach at this time would be to develop a "pavement assessment and design" strategy rather than a comprehensive field effort – as the field conditions will likely change over the next couple of years. The plan entails the following and is located in Appendix C:

- Anticipated routes for the project
- Existing pavement sections along the route – as they are best known (field verification of the actual sections later)
- Estimate axle weights and number of trips for trucks
- Strategy and design parameters for the haul roads on SDS property
- Strategy for pavement assessment just prior to heavy hauls, and strategy for pavement assessment upon completion of the heavy hauls

Landslide Hazards – URS completed a landslide assessment which should be repeated just prior to site development so that we would be able to note changed conditions. This work is presented in a Appendix D of this report and entails the following:

- Review of existing published geologic and geologic hazards literature for the site.
- Review of Sections of the County Code that address Geologically Hazardous Areas;
- Review of aerial photographs if they are available. URS will also review public groundwater records for the immediate area, as available.
- Conduct a site visit to evaluate site conditions. This will include evaluating the geologic conditions and existing slopes as well as geologic activities (slides, faulting, rupture, etc.) that may have influenced geologic hazards at the site. URS anticipates this will take approximately one day of field work.

Preliminary Geotechnical Engineering – URS has developed a preliminary foundation design based on the encountered foundation conditions. To complete this, URS did the following:

- Reviewed of the URS / Dames & Moore project files for information pertaining to this project. URS will review geologic maps of the area to further understand the soils prior to investigation.
- URS personnel met with the Owner's site representative just prior to investigation. **The tower designer has not been identified for the project site, and the exact locations of the towers have not been identified. Therefore, URS will not perform any deep subsurface explorations at the site.** We will, however, perform up to twelve 15-foot deep test pits that will be excavated by a SDS Employee. The test pits will be backfilled with the excavated soils.

- Along the roadway areas, URS assessed the near surface capacity and modulus of the onsite soils by performing a total of 30 dynamic cone penetrometer tests (DCP) located selectively across the existing roads. Each DCP probe was advanced to approximately 3 feet, or refusal, whichever is greater, below existing grade or the pavement surface to accurately determine the *insitu* subgrade characteristics. The DCP will furthermore clearly delineate between layers of weak and strong subgrade soils. The DCP is an inexpensive, manually driven exploration device designed for pavement assessments with limited subgrade exposure.
- Five field resistivity tests to assess the electrical resistivity of the near surface soils. We will use the 4 point "Wenner" method with electrodes spaced at 5, 10, 20 and 30 feet. The design engineers, to assess cathodic protection and grounding grid requirements, will use this data.
- URS will be doing limited laboratory testing for the project. We anticipate moisture contests, visual manual identification and atterberg limits. All will be done to applicable ASTM standards.

- ***Preliminary Recommendations for Spread Footings, Mat Foundations,*** - Allowable soil bearing pressure, stated as net or gross pressure at the underside of foundation level. State how allowable pressure changes with depth.
  - Vertical Subgrade Reaction Modulus "k" for slab on grade design.
  - Lateral sliding friction coefficients between soil and concrete.
  - Active and at-rest equivalent fluid pressures for the design of earth retaining structures.
  - Passive equivalent fluid pressures used to resist horizontal forces.
  - Soil unit weights dry and saturated.
  - Backfill material specifications and installation specifications for subgrade and base material, including Preliminary Recommendations for preparation, placement, and compaction. Comment on the use of native materials for backfill material.
  - Settlement values (total and differential, including long term settlements over period of several years for the reciprocating machinery).
  - Minimum depth to bottom of footing based on frost depth and bearing values.
  - Comment on the appropriateness of increased allowable soil bearing and lateral resistance for short duration loads.
  - Anchorage requirements for the shallow foundations.

- ***Preliminary Seismic Considerations***
  - Discuss past seismic activity, including known faults, and potential for a future event.
  - Discuss potential for liquefaction during a seismic event.
  - Define the Site Class and Soil Profile per 2006 edition of the IBC.

2 FIELD AND LABORATORY INVESTIGATIONS

2.1 SUBSURFACE INVESTIGATIONS

The field exploration program was conducted between September 18 and September 25, 2007. The subsurface investigation included the completion of twelve test pits to assess near surface soil and rock characteristics, and thirty dynamic cone penetration (DCP) tests along the roadway alignments to evaluate the near surface bearing capacity and moduli of onsite soils.

2.1.1 Test Pits

The test pit exploration program was conducted between September 18 and September 19, 2007. The program consisted of 12 test pits excavated to depths of 7 to 16 feet below ground surface (bgs). Approximate test pit locations are shown on the Figure 2. Test pit logs are presented in Appendix A.

A representative from URS maintained a log of conditions observed in the test pits, visually classified the soils encountered according to the Unified Soil Classification System and obtained representative bulk samples at selected intervals. The test pits were backfilled with excavated materials and compacted using the bucket of the backhoe. The stratigraphic contacts indicated within the test pit logs represent the approximate boundaries between soil and rock types; actual transitions may be more gradual and indistinct. The subsurface conditions depicted are only for the specific locations reported, and therefore, are not necessarily representative of other locations. The sample intervals are shown on the test pit logs attached in Appendix A.

2.1.2 Dynamic Cone Penetration Test

Roadway subgrade testing was conducted using the Dynamic Cone Penetrometer (DCP). A total of 30 DCP tests were performed for the proposed site access roads to depths of between 1 and 3 feet bgs. The DCP is a widely used device to determine *in situ* strength properties of base materials and subgrade soils. The four main components of the DCP include the cone, rod, anvil, and hammer. The cone is attached to one end of the DCP rod while the anvil and hammer are attached to the other end. Energy is applied to the cone tip through the rod by dropping the 17.64-lb hammer a distance of 22.6-inches against the anvil. The diameter of the cone is 0.1575-inch larger that the rod to ensure that only tip resistance is measured. The number of blows required to advance the cone into the subsurface materials is recorded. The DCP index is the ratio of the depth of penetration to the number of blows of the hammer. This can then be correlated to a variety of material properties, including California Bearing Ratio (CBR) and

Resilient Modulus, both of which are used in pavement design. Logs of the DCP test results are included in Appendix C to this report. Approximate DCP test locations are shown on Figure 2.

2.1.3 Field Soil Electrical Resistivity Testing

Resistivity tests for the proposed Wind Energy Project site were performed on September 24, 2007 to assess the electrical resistivity of the near surface soil. The locations of the tests are noted on Figure 2, Site Plan. Test locations were selected to correspond with the sites of the proposed Wind Turbine Generators. A Strata-Scout Model R-40CY resistivity meter was used to measure the resistance by the 4-point (Wenner) configuration at equal spacing of 5, 10, and 20 feet for tests R-1 through R-5. A Nilsson Model 400 meter was used in the same configuration at equal spacing of 5, 15, and 20 feet for tests R-1 through R-5. The resistance and spacing were used to calculate the resistivity at each location. Results of the resistivity tests are presented in Appendix B. These indicators can be used for determinations regarding corrosion potential and grounding grid design.

2.2 LABORATORY TESTING

Upon completion of the field investigation, samples obtained from test pits were transported to our Portland, Oregon laboratory for further examination and testing. The laboratory tests included the following:

- Visual soil classification performed in general accordance with ASTM D 2487;
- Moisture content performed in general accordance with D 2216;
- Grain size analysis performed in general accordance with ASTM D 422 and D 1140;
- Atterberg Limits in general accordance with ASTM D4318..

Complete individual laboratory test results are shown in Appendix B of this report.

3 SITE DESCRIPTION

3.1 REGIONAL GEOLOGY

The White Salmon, Washington area is located within the Cascade Range and the Columbia Intermontane Physiographic Province. The project area is located just within the western boundary of the Columbia Plateau, which is located at the western edge of the Columbia Intermontane Physiographic Province (Freeman et al, 1945). This lowland province is surrounded on all sides by mountain ranges and highlands, and covers a vast area of eastern Washington and parts of northeastern Oregon and western Idaho. The Columbia Plateau is underlain by a series of layered basalt flows extruded from vents (located mainly in southeastern Washington and northeastern Oregon) during the Miocene epoch (between 5.3 and 23.8 million years before present [B.P.]). Collectively, these basalt flows are known as the Columbia River Basalt Group (CRBG). Individual basalt flows range in thickness from a few millimeters to as much as 300 feet. Where significant time elapsed between successive flows, interflow zones developed. The interflow zones are characterized by the presence of highly weathered basalt and paleosols. These interflow zones are generally significantly weaker than the surrounding basalt and sometimes form basal failure surfaces for large landslide complexes within the CRBG.

A variety of younger volcanic rocks and sedimentary materials that range from Pliocene (1.8 to 5.3 million years B.P.) to Holocene (less than 10,000 years B.P. in age) overlie the CRBG in the project area. Sedimentary rocks are generally thought to underlie the basalts in the Project area.

3.2 SITE GEOLOGY

The proposed Project site is located within the northern boundary of the structural Hood River Valley, which extends a few miles into southern Washington. In general, the geology of the area consists of basalt flows extruded from local vents, layered with conglomerate, tuff, tuff breccias, and other volcanoclastic deposits. These formations are typically overlain by silt and clay soil of varying thickness in the Project vicinity.

The bedrock underlying the proposed Project site consists of Grande Ronde Basalt of the CRBG and Quaternary basalt of Underwood Mountain - a shield volcano that lies approximately midway between the lower reaches of the Little White Salmon and White Salmon Rivers. Its southern slopes drain to the Columbia River. Site geology is presented on Figure 3.

Underwood Mountain Basalt Unit: The Pleistocene-epoch (1.8 million years to 10,000 years B.P.) basalts and cinders erupted from the Underwood Mountain vents and overlie the Tertiary

CRBG Grande Ronde and Wanapum basalts. Public records of wells located within the Underwood volcanic field indicate a 310-foot thick repetitive sequence of thin lava flows (2 to 8 feet thick), cinders and silty-clays overlying a productive confined aquifer consisting of intensely fractured Grande Ronde basalt (Yinger, 2000 and 2001). The Miocene-epoch Grand Ronde Basalt consists of multiple basalt flows that are a subgroup of the CRBG, and has been described to have a thickness of up to 1000 feet, although the thickness in the Project vicinity is not known.

Field observations of rock outcrop and test pits excavated during a geotechnical investigation at the proposed site indicate that the near-surface rock consists of yellow-gray volcanoclastic rocks, medium to dark gray, fine-grained to medium-grained basalt and andesite, which is fractured into angular gravels, cobbles, and boulders. The basalt observed in the test pits was most commonly vesicular, very soft to moderately hard, and decomposed to slightly weathered. Some zones displayed non-vesicular characteristics and were generally harder. In most exposures the basalt was moderately to highly weathered, with fractures and vesicles filled by clayey residual soil. In most of the test pits excavated in this basalt, the rock is weathered into varying layers of residual (clay) soil, and clayey gravelly cobble-sized basalt. The residual soil layers often exhibit remnant rock structure.

Unconsolidated Deposits: Unconsolidated deposits are thin to absent in the Project vicinity. Based on observations made during field reconnaissance, the surficial materials consisted primarily of a thin veneer of brown, silty topsoil that is likely derived from forest duff and wind-blown deposits. The thickness of this material varied across the site from a few inches to three feet, based on test pit observations. In several areas bedrock and talus were observed at the ground surface.

Landslide Deposits: Regional Geologic maps indicate the presence of Quaternary-age mass wasting landslide deposits located to the north of Underwood Mountain (Korosec, 1987, excerpted in Figure 3, this report). These deposits are mapped as a large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long. A URS Engineering Geologist reviewed stereo aerial photographs that were flown specifically for this project in 2007 and performed a one day site reconnaissance. There is no obvious evidence, based on the review, to suggest the presence of a landslide as mapped on the 1:100,000 scale geologic map. If landslide deposits are present, they are so old that most or all of the geomorphic evidence has been removed by erosion. A separate Landslide Hazard Report for the project is presented as Appendix C to this report.

Faults: No faults are mapped within the footprint of the proposed Project area. However, faults are mapped approximately 1.5 miles southwest and northeast of the proposed Project area. Many

of these faults are inferred and shown as dotted lines buried by younger surficial deposits. The activity of the area faults is unknown. However, a review of aerial photography shows no indication of recent movement along the trace of the inferred faults.

3.3 SUBSURFACE CONDITIONS

The following is a general summary of the soil conditions encountered in the explorations conducted at the site to date. More detailed description of the soils encountered in the test pits are provided on the logs included in Appendix A.

Based on the current test pits and field observations, we anticipate that unconsolidated soils extend up to 3 feet below ground surface (bgs). The surficial soils are primarily characterized as soft, moist sandy SILT [ML] to CLAY with sand [CL], and clayey SAND [SC]. Immediately beneath the unconsolidated soils, rock with variable strength and weathering properties is present. The test pit data is limited to depths no greater than 16 feet bgs. It is anticipated that rock quality of the basalts will improve with depth but that weaker interflow zones consisting of volcaniclastic material and paleosols are possible at any depth. Prior to final design of the tower foundations, additional subsurface investigations (boreholes) will be required to provide geotechnical data at foundation and anchor depths.

The United States Department of Agriculture National Resources Conservation Service (NRCS) describes the soils in the project vicinity as follows (USDA, 2003):

- **Chemawa Series**: The Chemawa series consists of very deep soils (up to 5 feet) formed in alluvium from volcanic ash and basalt. The soils exist on terraces, footslopes and backslopes at elevations between 800 and 2500 feet in southeast Skamania County and southwest Klickitat County. Chemawa Soils are well drained with slow to medium runoff and moderate permeability.

- **McElroy Series**: The McElroy series consists of very deep soils (up to 5 feet) formed in colluvium and residuum from basalt with a mantle of volcanic ash that influences soils in the top 9 to 13 inches. The soils exist on the footslopes and backslopes of mountains on slopes from 5 to 90 percent at elevations from 400 to 2600 feet in eastern Skamania County and western Klickitat County. McElroy Soils are well drained with medium to rapid runoff and moderate permeability. The series was established in 1981 following the introduction of volcanic ash from the eruption of Mt. St. Helens.

- **Timberhead Series**: The Timberhead series consists of very deep soils (up to 5 feet) formed in residuum and colluvium from basalt mixed with volcanic ash. The soils exist on mountain slopes between 5 and 65 percent at elevations from 2000 to 3600 feet in Skamania County and western Klickitat County. McElroy Soils are well drained with medium to rapid runoff and moderate

permeability. The series was established in 1981 following the introduction of volcanic ash from the eruption of Mt. St. Helens.

- **Underwood Series**: The Underwood series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 2 and 50 percent at elevations between 500 and 2700 feet in southeast Skamania County and west Klickitat County. Chemawa Soils are well drained with slow to medium runoff and moderately slow permeability.

- **Undusk Series**: The Undusk series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 2 and 50 percent at elevations between 500 and 2700 feet in southeast Skamania County and west Klickitat County. Chemawa Soils are well drained with slow to medium runoff and moderately slow permeability.

3.4 GEOLOGIC HAZARDS

3.4.1 Description of Geologic Hazards

In general, geologic hazards are geologic processes or geological conditions that constitute a threat to human safety, improved property, and the natural environment. For the purposes of this report, the focus is on geologic hazards associated with the construction and operation of the proposed wind energy project. The primary geologic hazards present in the project area can be divided into three categories; landslides, seismic, and volcanic. Landslide hazards include rotational-translational slides, earthflows, debris slides, and debris flows. Seismic hazards can include ground shaking, fault surface rupture, settlement, liquefaction, and lateral spreading. Volcanic hazards at the project site are generally limited to ash fall from any of three nearby Cascade volcanoes. By identifying areas prone to specific geologic hazards, design and construction details can be modified to avoid dangers to human safety, improved property, and environmentally sensitive areas from such hazards as a result of project construction and operation.

3.4.2 Landslide Hazards

The most common types of landslides in the Pacific Northwest include rock falls, topples, rotational-translational slides, earthflows, debris slides, and debris flows. Most slope failures are complex combinations of these distinct types, but the generalized groupings enable the investigator to communicate the types of hazards anticipated and observed.

Landslides can be initiated in marginally stable slopes by a number of natural and human disturbances. Processes and conditions that can trigger slope failure include earthquake shaking, volcanic eruption, deforestation, intense rainfall, and rapid snowmelt. Two of the most common triggering events in southern Washington are intense precipitation and human alterations.

The Pacific Northwest is subject to severe rainfall storm events, particularly in the wet winter and spring months of November through April. These relatively high-precipitation storm events can trigger slope failures through a number of mechanisms. Water infiltration into zones of weakness can trigger failures by reducing the frictional resistance to sliding, increasing pore pressures within slope masses and adding weight acting downslope. Typically, all three mechanisms combine during longer duration, heavy precipitation or rain on snow events to trigger slope stability problems.

Landslide hazards were assessed as part of the public document review, aerial photograph investigation, and field reconnaissance. Results of the landslide hazard review are presented as a separate technical report in Appendix D to this report.

3.4.3 Seismic Hazards

Liquefaction is a phenomenon whereby soils undergo significant loss of strength and stiffness when they are subjected to vibration or large cyclic ground motions produced by earthquakes. Typically, cyclic loading of saturated soils leads to the build up of excess pore-water pressure as a result of soil particles being rearranged with a tendency toward denser packing. Under undrained conditions (such as during earthquake shaking), loads are transferred from the soil skeleton to the pore-water with consequent reduction in the soils' shear strength.

Saturated granular soils without cohesive fines (i.e. gravels, sands and silts) are most susceptible to liquefaction. Other factors affecting the potential for liquefaction in soils are density, amplitude of loading, confining pressure, past stress history, age of soil deposit, the size, shape and gradation of particles, and the soil fabric structure. Liquefaction-induced ground settlement and lateral spreading have been the primary cause for extensive damage to aboveground structures, foundations and pipelines during many earthquakes.

Test pits excavated at the project site encountered shallow bedrock covered with a combination of cohesive and cohesionless soil. No groundwater was observed in any of the test pits. Based on the soils encountered during the field explorations, it is URS' opinion that the potential for liquefaction is very low at this site.

The risk of seismically inducted settlement and lateral spreading is low due to the low

liquefaction potential. It is URS' opinion settlements and lateral spread induced by a seismic event will be minimal.

Coseismic surface rupture occurs when a fault breaks to the land surface during an earthquake. Surface rupture is usually associated with moderate to large earthquakes (magnitude 6.5 or greater) or, rarely during smaller, very shallow events. There are no mapped faults crossing the site. Therefore, the potential for coseismic primary surface rupture at the proposed project site is small.

3.4.4 Volcanic Hazards

Within the region of the site, the USGS recognizes three volcanoes as either active or potentially active: Mount Hood, Mount Adams, and Mount St. Helens. In the last 200 years, only Mount St. Helens has erupted more than once (USGS, 2002b). Impacts in the geographic region surrounding the Project site from volcanic activity can be either direct or indirect. Direct impacts include the effects of lava flows, blast, ash fall, and avalanches of volcanic products. Indirect effects include mudflows, flooding, and sedimentation. Data accumulated as a result of the 1980 Mount St. Helens eruption indicate that there could be ash fallout in the geographic region surrounding the Project site if one of the three regional volcanoes were to erupt.

In the event that a volcanic eruption would damage or impact Project facilities, the Project facilities would be shut down until safe operating conditions return. If an eruption occurred during construction, a temporary shut-down would most likely be required to protect human health and equipment.

3.5 GROUNDWATER CONDITIONS

During the current subsurface exploration ground water was not encountered in the site up to a depth of 16 feet bgs. It should be noted that these observations reflect groundwater levels at the time of the field investigation and actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors not observed during this investigation. There may be regional or perched water tables at greater depth. Prior to final design of the tower foundations, additional subsurface investigations (boreholes) will be required to provide geotechnical data at foundation and anchor depths. Future deep foundation investigations will include observation of groundwater, if encountered.

4 SEISMIC DESIGN

4.1 REGIONAL SEISMICITY

The Pacific Northwest has four types of seismic sources due to the presence of the Cascadia subduction zone. These sources include (1) the subduction zone megathrust, which represents the boundary (interface) between the subducting Juan de Fuca plate and the overriding North American plate; (2) faults located within the Juan de Fuca plate (referred to as the intraplate or intraslab region); (3) crustal faults principally in the North American plate; and (4) volcanic sources beneath the Cascade Range (Wong and Silva, 1998). Each of these events has different causes, and therefore produces earthquakes with different characteristics (that is, peak ground accelerations, response spectra, and duration of strong shaking).

Because of their proximity, crustal faults are possibly the most significant seismic sources to inland sites. Studies by Pezzopane (1993) and Geomatrix Consultants (1995) show that at least 70 crustal faults having earthquake potential exist in southwest Washington and northwest Oregon. Many of these faults were unknown or not recognized as being seismogenic a decade ago. Although the largest known crustal earthquake in south-west Washington and western Oregon is only about M_W 6 (Wong and Bott, 1995), potential exists for events of M_W 6½ or greater along several recognized faults.

4.2 2006 IBC SEISMIC DESIGN

We recommend that all structures on the site be built in accordance with the seismic design provisions presented in the 2006 version of the IBC, and ASCE/SEI 07-05. At this time, and without unconfined compressive strengths of the bedrock, URS best describes these soils as Soft Rock (Soil Site Class B) Based on the site location and site conditions described above, we recommend that the values listed in Table 4-1 be used for seismic design of the project in accordance with Section 1613.5.3 of the 2006 IBC. The occupancy category of the proposed structure is assumed III as per Section 1613.5.6 of the 2006 IBC.

Table 4-1: 2006 IBC Seismic Design Values

Parameter	Value	2006 IBC/ASCE 7-05 Reference
Soil Profile Site Class	B	Table 1613.5.2
0.2 Second Spectral Acceleration S_s	0.513 g	Figure 1613.5 (1)
1.0 Second Spectral Acceleration S_1	0.193 g	Figure 1613.5 (2)
Peak Ground Acceleration ($0.4S_{Ds}$)	0.136 g	ASCE 7-05 equation 11.4-5
Site Coefficient F_a	1	Table 1613.5.3 (1)
Site Coefficient F_v	1	Table 1613.5.3 (2)
Seismic Design Category[1]	B	Tables 1613.5.6 (1) & (2)

1. Assumes Seismic Use Group III

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

In support of this report, URS has conducted a limited site investigation, including several test pits, to determine the near-surface properties of the soil and rock. Rock, with varying strength and weathering characteristics, was encountered at shallow depths (ranging between 3 to 12 feet bgs). Because of the presence of relatively shallow rock, and the high potential overturning loads anticipated for the turbine towers, URS recommends rock anchored mat-slab foundations to support the turbines for this preliminary assessment (see Figure 4). However, a drilled shaft foundation concept may prove to be more beneficial in the future, as the design advances. The viability of this foundation concept will be determined with the final geotechnical engineering report for this site.

5.2 WIND TURBINE GENERATOR FOUNDATIONS

As of the date of this report, the tower designer and tower locations have not been finalized. Because of this, the exact loads on the foundations required to support the turbines is not known. One proposed turbine construction contractor, D.H. Blattner & Sons, Inc. has preliminarily assumed installation of 80-meter high GE 1.5 Wind Turbine Generators (WTG) which will be supported by 30 foot-deep concrete foundations. Each turbine tower will be coupled to the foundation with 128 anchor bolts (consistent with GE towers). Based on the soil conditions present at the site, URS preliminarily recommends that mat-slab foundations be used to support the proposed wind turbine tower structures. Once the final exploration is completed, URS may also recommend that the foundation system be drilled shafts.

Due to the anticipated high axial and lateral loads exerted by the towers, URS recommends that the base of the foundation excavation be established in competent rock and be properly leveled to provide uniformity of support. Following excavation, the bearing surfaces should be thoroughly cleaned of loosened or disturbed rock, by hand if necessary. This removed rock should be A URS inspector should manually probe the area within the excavation bottom for confirmation of the bearing surface and to identify any soft areas. Any soft or unsuitable rock encountered at the base of foundation excavations should be removed. URS anticipates that the excavation base would irregular, but if completed properly, the allowable bearing capacity on the excavated base would be on the order of 30,000 psf with an allowable increase of 1/3 to this value for temporary loading conditions. This would have to be verified with additional borings and laboratory testing of the cored rock.

5.2.1 Settlement of WTG Foundation

The WTG foundations are anticipated to be established in rock. Because of this, elastic settlement of the foundation is anticipated to occur as the loads are applied, however, once the tower is constructed, additional settlements would be negligible.

5.2.2 Earth Pressure and Friction Factors

Passive earth pressures acting against the toe of the shallow foundations and friction on the base of the foundations may be considered to provide resistance to lateral forces tending to cause translational sliding. These structural members should be considered for counteracting lateral forces only if the member is placed in direct contact with tested and approved soils. If the foundation is constructed by using forms, lean concrete may be placed between the foundation and the undisturbed wall of the adjacent excavation in order to provide the direct contact required to consider passive pressure for counteracting lateral movement. The lean concrete should have a minimum 28-day compressive strength of 1,500 psi. An allowable passive pressure of 8,000 psf may be used for the underlying bedrock, for the foundation face located more than one-foot below the adjacent elevation of the bedrock. This is based on a factor of safety of two and requires confirmation with the final deisng..

An ultimate friction factor of 0.5 for mass concrete on the compacted granular fill can be used for design for those portions of the foundations with full positive pressure on the base of the foundation. Only long-term dead loads should be considered in calculating the available friction on the foundation base.

5.2.3 Rock Anchor Design and Installation

We anticipate that rock anchors are used in the final foundation designs to resist overturning loads and provide lateral stability, we recommend nominally prestressed anchors consisting of high-strength reinforcing bars grouted into the rock using polyester resin grout such as Fasloc or Celtite. These commercially available, two-component grouts are contained in plastic cartridges. The grout cartridges are placed in the hole and the bar is driven into the hole while being rotated in order to expose and mix the grout. The use of the concrete grout is an acceptable alternative, but will generally require longer anchors and a larger diameter drilled anchor hole for a given bar diameter. Due to the possible fractured and vesicular nature (presence of small voids within the rock mass) of the basalt (the extent of which needs to be determined with a final geotechnical report), the concrete grout alternative may be necessary to prevent reduction of anchor strength due to loss of resin grout into voids. Prior to final design of the tower foundations, additional

subsurface investigations (boreholes) will be required to provide geotechnical data at foundation and anchor depths. Core samples from the borehole investigations will provide information on the prevalence of voids in the rock mass, which will allow URS to develop recommendations for rock anchor construction.

5.2.3.1 Rock Anchor Capacity

The load bearing capacity of each anchor depends on the "fixed anchor length" (L), the spacing of the anchors, and engineering properties of the grout and rock. For this project, we anticipate that rock anchors will be generally be used singly, or in single rows, where anchor spacing is greater than 0.25L. If anchor spacing is greater than 0.25L or consisting of multiple rows, we should be contacted to evaluate the effects of a single anchor capacity. Preliminary anchor design charts have been prepared (See Figures 5 and 6) to assist in the selection of anchor length to achieve a designed anchor capacity. The charts have been prepared based upon an analysis of the possible failure mode of the anchors, including the following:

- Bond failure between bar and grout;
- Bond failure between grout and rock;
- Pullout of inverted cone of rock surrounding the anchored tendon;
- Tensile yield of the tendon.

Based upon the properties of the rock and grout, and if the anchors meet the spacing and the distance requirements specified above, failure at the grout/rock interface will control the allowable anchor capacity up to 60% of the bar yield strength. Anchors used to resist lateral movements should not be placed at an angle shallower than 45 degrees to the surface.

Figure 5 presents anchor design of polyester resin grout with unconfined compressive strength of approximately 13,000 psi. Figure 6 presents alternative anchor design curve if 15,000-psi compressive strength concrete grout is used instead of the resin grout. The concrete grout may be placed by gravity flow prior to inserting the steel bar. Each bar should be fitted with centralizers that center the bar in the hole.

Holes may be drilled using an air track or similar rotary percussion device. Hole diameters should be at least ½-inches greater than the bar thread diameter if concrete grout is used. All holes must be thoroughly cleaned of debris prior to placement of the anchor.

In order to attain the higher anchor capacities required for the project, we recommend he use of steel alloy anchor bars with an ultimate tensile strength of 150 kips per square inch (ksi)

conforming to ASTM standard A-722. Threaded and deformed bars of this type are available from DYWIDAG Systems International, Inc. The anchor should be nominally prestressed to approximately 10 percent of the design load to take up slack in the system and provide an appropriately stiff anchorage. A portion of this prestress will bleed off due to creep and to downward deformation of the foundation when the dead and live loads are applied. A sufficient residual prestress is expected to remain to ensure that excessive anchor system deformation during uplift does not occur before full uplift resistance is mobilized. Direct-pull hydraulic jacks or a torque wrench may be used to apply prestress. Following prestressing, the free anchor length may be grouted with low-strength concrete to protect against corrosion. Overall, based on the resistivity determinations, the site is not corrosive.

5.2.3.2 Rock Anchor Testing

It is important that each anchor performs satisfactorily, therefore, we recommend that each anchor be tested using either performance testing or proof testing criteria. At a minimum, the ten percent of the at each site should be performance tested. Following satisfactory completion of performance testing, we recommend that each remaining rock anchor be proof tested. Proof testing evaluates the as-built anchor capacity. Performances and proof testing should be completed by incrementally loading the anchors in accordance with the schedule below. At each increment, the movement of the anchor should be recorded to the nearest of 0.001 inch with reference to an independently fixed anchor point. The jack load should be monitored with a properly calibrated pressure gauge or load cell. The test load sequences presented in Table 5-1 should be employed.

Each load should be held at each increment just long enough to obtain the movement reading, but not more than one minute. The testing should not exceed the 80% of the bar yield strength. The 1.33P test load should be held for 10 minutes. Total movements should be recorded at 1, 2, 3, 4, 5, 6, and 10 minutes.

Performance and proof test acceptance criteria should be developed in conjunction with URS when details of the anchor design and materials are known. A URS representative should monitor all rock anchorage installation and testing to determine whether the rock layer has been sufficiently penetrated and to monitor the proof and performance tests.

Table 5-1: Rock Anchor Test Recommendations

Terminology
P= Design Load AL= Alignment Load (2-10 percent of Design Load)
Performance Test Load Sequence*
AL .25P, AL .25P, .50P, AL .25P, .50P, .75P, AL .25P, .50P, .75P, 1.00P, AL .25P, .50P, 1.00P, 1.20P, AL .25P, .50P, 1.00P, 1.20P, 1.33P (Test Load), Adjust to Lock-off Load
Proof Test Load Sequence*
AL, .25P, .50P, .75P, 1.00P, 1.20P, 1.33P (Test Load), Adjust to Lock-off Load *1986, Post-Tensioning Institute, "Recommendations for Prestressed Rock and Soil Anchors," Phoenix, Arizona.

5.3 RETAINING WALLS

Following are typical design parameters for wall types that we believe represent the range of systems that may be constructed at this site. Walls may be required to provide a level working pad at the tower pads or for the embankment modifications. Please contact us if any additional design values or wall types need to be addressed.

5.3.1 Retaining Wall Design Parameters

Lateral soil pressures on a retaining wall depend on several factors including retained soil type, wall fixity, drainage provisions and the influence of surface loads imposed behind the wall. We have provided typical design parameters for wall types that we believe represent the range of retaining wall systems that are likely to be constructed at this site. Our recommendations are based on the following assumptions:

- Retaining walls will be designed to restrain both existing soils and constructed fills.

- Retaining walls will be backfilled with free draining crushed rock, in accordance with Section 5.3.3 (Retaining Wall backfill) of this report.
- Adequate subsurface drainage will be provided.

5.3.2 Equivalent Fluid Densities (Soil)

Unrestrained walls have no fixity at the top and are free to rotate about their base through tilting or translation. Most cantilever retaining walls fall into this category (unless they are attached to buildings or other structures). A lateral movement of 0.005 times the height of the retaining wall may be required to achieve this active pressure. For these walls, we recommend that a lateral equivalent fluid density of 40 pcf be used for design. If the retaining walls are used to restrain sloping backfill, URS should be contacted for additional designs.

Restrained walls are rigid structures where essentially no relative movement occurs between the structure and the soil. Most basement walls and other rigid walls that are restrained by buildings, parking decks, floor slabs or other perpendicular walls fall into the category of restrained walls. For restrained walls, we recommend that a lateral equivalent fluid density of 60 pcf be used for design. If the retaining walls are used to restrain sloping backfill, URS should be contacted for additional designs.

5.3.3 Retaining Wall Backfill

Backfill within 3 feet of retaining walls should consist of free draining crushed rock, free of organics and debris. This material should meet the requirements of the 2006 WSDOT Standard Specifications for Road, Bridge and Municipal Construction, Section 9-03.14(1). Backfill beyond 3 feet from the wall should meet requirements described in Section 5.6.5 (Structural Fill Material). We recommend that all fill be compacted to 95% of the maximum dry density as determined by the Modified Proctor test (ASTM 1557). Additionally, we recommend that any backfill that is placed within 5 feet of the wall (measured horizontally) be compacted with lightweight, hand operated compaction equipment. Over-compaction of this fill can increase wall pressures.

We recommend the placement of a 4-inch diameter slotted PVC pipe wrapped in non-woven geotextile fabric at the base of the wall backfill to facilitate drainage of this area depending on the final elevation of the basement slab. These pipes should be drained to a collection point and sumped.

5.4 TOWER FOUNDATION EXCAVATION

5.4.1 Temporary Shoring

It is the responsibility of the contractor to deal with the temporary construction excavation and site safety including overseeing the means, methods, and sequencing of construction operations. URS does not assume any responsibility for the contractor's activities or construction site safety for the information provided in this section. In this site the rock layer is relatively at shallow depth (3 feet to 10 feet bgs) and there is sufficient space left for providing the adequate slope as per OSHA requirement for the basement excavations, and hence, the temporary shoring is not recommended. URS does anticipate, however, that the rock will be able to be constructed with a near vertical face, possibly using shallow anchor bolts and gunite to seal its surface. This will be determined with the final construction.

5.4.2 Dewatering

During the excavation of test pits at the site, no ground water was encountered up to a depth of 16 feet bgs. Hence it is anticipated that seepage of ground water will not be a problem within foundation excavation at the site. Presence of groundwater will be determined during subsequent geotechnical investigations to be performed in support of final foundation design.

5.4.3 Rock Excavation

It should be anticipated that hard rock will be encountered during excavation work. Machinery capable of removing these this large intact rock, such as heavy duty backhoes with rock ripping teeth, hydraulic thumbs or pneumatic rock breaking equipment, should be anticipated for this work. There is also a possibility that the rock will have to be blasted, pre-split or utilize expansive materials prior to excavation, depending on the final depth of excavation. The actual methods will be developed with final design.

5.5 SHALLOW FOUNDATIONS (ANCILLIARY STRUCTURES)

We understand that new footings may be utilized to support ancillary structures such as the transformer pads. For footings that bear on shallow, undisturbed native soils, we recommend a net allowable bearing pressure of 2,500 pounds per square foot (psf). This bearing capacity is based on a settlement limit of 0.5 inches.

Allowable bearing pressures may be increased by one-third when considering load cases that include transient loads such as wind and seismic forces. We recommend that a unit weight of 115 pcf be used to calculate the reduction of overburden pressure due to excavation. Backfill

soils will be slightly heavier than excavated soils but not enough to significantly influence the bearing pressure.

Exterior footings could be turned down footings from the slab and should be founded at least 18 inches beneath the lowest exterior grade to provide frost protection. Continuous wall footings should have a minimum width of 18 inches and isolated column footing should have a minimum plan dimension of 24 inches.

For foundations designed and constructed as specified in this report, we estimate settlements on the order of 0.5-inches. We anticipate the majority of the settlement will occur during construction, essentially as the loads are applied. The remainder of the settlement will likely occur within three weeks following the application of the load.

5.5.1 Passive Loads and Friction Factor

Passive earth pressures acting on the sides of shallow foundations and friction on the base of the foundations may be considered to provide resistance to lateral forces tending to cause translational sliding. These structural members should be considered for counteracting lateral forces only if the member is placed in direct contact with tested and approved soils. If the foundation is constructed by using forms, lean concrete may be placed between the footing and the undisturbed soil of the adjacent excavation in order to provide the direct contact required to consider passive pressure for counteracting lateral movement. The lean concrete should have a minimum 28-day compressive strength of at least 1,500 psi. An allowable passive pressure having an equivalent fluid pressure of 250 pcf may be used for design. This is based on a factor of safety of two.

An ultimate friction factor of 0.3 for mass concrete on compacted tested and approved native subgrade can be used for design for those portions of the foundations with full positive pressure on the base of the foundation. Only long-term dead loads should be considered in calculating the available friction on the foundation base.

5.5.2 Slabs on Grade

The subgrade under all floor slab areas should be prepared in accordance with Section 5.5.1 We recommend that floor slabs be underlain by a granular base course at least 6-inch thick to provide uniformity of support and to act as a capillary break against moisture migration through the slab. The granular base course should consist of well-graded gravel or crushed rock with a maximum nominal size of ¾ inch and having less than 5 percent by weight passing the No. 200 sieve. The base course should be compacted to at least 95 percent of its maximum dry density as measured

by the modified Proctor test (ASTM Standard D 1557). We recommend a modulus of subgrade reaction of 200 pounds per cubic inch (pci) for the base course.

Even with a capillary break as outlined above, there is the possibility of some floor moisture or dampness. If floor moisture is a critical consideration due to storage of materials directly on the floor slab, or because of the use of glued-down impervious floor coverings such as tile or linoleum, we recommend the use of an under-slab impermeable membrane placed directly below the slab. To maximize water tightness, the membrane must be installed in accordance with the manufacturer's recommendations.

5.6 CONSTRUCTION CONSIDERATIONS

5.6.1 Site Work Preparation

Prior to construction of any new foundations, all areas that will receive fill, base rock, or structures should be stripped of all surface vegetation, organic topsoil, and any deleterious materials that might be encountered. Any soft or unsuitable soils encountered during stripping or excavation should be removed and replaced with structural fill meeting the requirements described in Section 5.6.4 (Wet Weather Earthwork). All subgrades should be approved by the Engineer prior to the placement of any materials or foundation elements.

5.6.2 Shallow Foundation Excavation

We recommend that excavations for foundations in soil and weathered rock be accomplished with a straight-edged grading bucket to minimize disturbance of the bearing surfaces. Following excavation, the bearing surfaces should be thoroughly cleaned of loosened or disturbed soil, by hand if necessary. Any soft or unsuitable soils encountered at the base of foundation excavations should be removed and replaced with compacted structural fill meeting the requirements described in Section 5.6.4 (Wet Weather Earthwork).

5.6.3 Dry Weather Earthwork

After areas are stripped or excavated to design elevations, we recommend scarification of the resulting subgrade in all areas that will receive fill or structures to a depth of 8 inches. The scarified soil should be compacted to at least 95% of its maximum dry density as determined by the standard proctor test, ASTM D698.

5.6.4 Wet Weather Earthwork

We anticipate that the native soils found at the site will be sensitive to moisture and erosion. Therefore, during or after wet weather, it may be necessary to import granular materials for structural fill to protect open subgrade materials. It may also be necessary to install a granular working pad to support construction equipment. Delays in site earthwork activities should be anticipated during periods of heavy rainfall. Additionally, site clearing and stripping activities may expose subgrade material that may be damaged if subjected to disturbance from construction traffic. During wet weather, we recommend that site stripping and excavation be performed using an excavator with a straight-edged bucket that does not traverse the final subgrade.

When a granular working base is used to protect open subgrade material and construction equipment, the base should consist of a suitable thickness of crushed rock or ballast placed by end-dumping off an advancing pad of rock fill. Because construction practices can greatly affect the amount of rock required, we recommend that if conditions require the installation of a granular working blanket, the design, installation, and maintenance be made the responsibility of the contractor. After installation, the working blanket should be compacted with a minimum of 4 passes with a smooth-drum roller.

We recommend that the contractor minimize soil exposure during the rainy season by proper timing of grading and construction activities and be prepared to shut down all earthwork if heavy precipitation occurs. We recommend that water runoff be diverted from foundations and equipment pads, and that all runoff water be directed to proper drainage areas and not be allowed to pond.

5.6.5 Structural Fill Material

We recommend that all fills intended to support structures be placed in horizontal lifts not exceeding about 8 inches in loose thickness and be compacted to at least 95 percent of the maximum dry density as determined by the Modified Proctor method (ASTM D 1557), unless where specified above.

Imported structural fill should be clean, well-graded granular material, free of organics and debris and meeting the requirements of the 2006 WSDOT Standard Specifications for Road, Bridge and Municipal Construction, Section 9-03.14(1). The procedure to achieve proper density of a compacted fill depends on the size and type of compacting equipment, the number of passes, thickness of the layer being compacted, and certain soil properties. When the size of the

excavation restricts the use of heavy equipment, smaller equipment can be used, and the soil must be placed in lifts thin enough to achieve the required compaction. We recommend that methods of compaction be left to the discretion of the contractor, with compaction testing provided by URS.

We do not recommend the use of on-site soils for structural fill. This material may be used for miscellaneous fill and landscaping applications provided these areas are not intended to support structures. On-site soils should be compacted to at least 95% of the maximum dry density as determined by the standard proctor test, ASTM D698.

5.6.6 Embankment Design

Once the required roadway improvements on the SDS property are determined for the construction traffic equipment, URS could develop a formal embankment design that will have a static Factor of Safety (FOS) of 1.3. URS anticipates the majority of embankments will be relatively small and constructed over level ground. URS envisions that the general embankment section will consist of two zones and have finished slopes of 2H:1V. The final designs for the embankments will come with the final geotechnical engineering report.

5.6.7 Temporary Slopes

Depending on the Contractor's proposed excavation and shoring plan, temporary cut slopes or shoring may be required during construction. If open cuts are utilized, maximum slope inclinations must be made in accordance with regulations established by OSHA. In accordance with OSHA, the sands and silty sand overburden soils encountered on site are classified as Type C. The maximum allowable temporary slope for Type C soils is 1½ horizontal to 1 vertical (1½H: 1V) if fully dewatered. Flatter slopes will be required if dewatering provisions are not considered for the site. The slopes should be inspected and maintained as required by OSHA. For the excavations into the underlying bedrock, URS will provide site specific designs from the borings to be advanced for the final report.

6 CONSTRUCTION QUALITY ASSURANCE

We recommend that URS be retained to provide construction monitoring and testing services during foundation construction. The purpose of our field monitoring services is to confirm that site conditions are as anticipated, to provide field recommendations as required based on conditions encountered, and to document the activities of the contractor to assess compliance with the project recommendations provided by URS. We also recommend that URS review and comment on the foundation plans. The purpose of this review would be to identify any potential problem areas and to provide cost saving or efficiency improving suggestions, if possible.

7 LIMITATIONS

This report presents recommendations pertaining to the proposed structures as represented to URS, as described herein. The findings and recommendations presented in this report are based upon soil conditions observed the available subsurface explorations, interpolation of the soil conditions between test pits, and extrapolation of these conditions throughout the proposed site area. They are further based on the assumption that the subsurface conditions do not deviate appreciably from those reported and those assumed. However, the possibility of different conditions cannot be discounted.

In the event that changes in design loads or structural characteristics described in this report are made, URS should be retained to review our design recommendations and their applicability to the revised design plans. In this way, any required supplemental recommendations can be made in a timely manner.

This report has been prepared for the specific project, purpose, and client stated in the report; the report may not be adequate for other uses. The use of the recommendations of this report for other projects or purposes or by other parties is not authorized.

Although URS has endeavored to characterize the surface and subsurface conditions at the site, URS is not as able to assess potential construction difficulties as is a contractor specializing in the work to be performed. Consequently, the Contractor is responsible, and URS is not, for final evaluation of potential construction difficulties.

This report has been prepared in accordance with the care and skill generally exercised at the present time by reputable professionals in the field of geotechnical engineering, under similar circumstances, for projects in the project locality. No other warranty, either expressed or implied, is made as to the professional advice presented herein.

8 REFERENCES

Bartlett, S.F., and Youd, T.L., 1992, "*Empirical Analysis of Horizontal Ground Displacement Generated by Liquefaction-induced Lateral Spread*", Technical Report NCEER-92-0021, National Center for Earthquake Engineering Research, Buffalo, New York.

Blakely, R.J., Wells., R.E., Yelin, T.S., Madin, I.P., and Beeson, M.H., 1995, "*Tectonic Setting of the Portland-Vancouver area, Oregon And Washington: Constraints From Low-Altitude Aeromagnetic Data*", Geological Society of America Bulletin 107, p. 1051-1062.

Geomatrix Consultants, Inc., 1995, "*Seismic Design Mapping State of Oregon: Final Report*", prepared for the Oregon Department of Transportation, Contract 11688.

Guffanti, M., and Weaver, C.S., 1988, *Distribution of late Cenozoic volcanic events in the Cascade Range: Volcanic arc segmentation and regional tectonic considerations*, Journal of Geophysical Research, v. 93, p. 6513-6529

International Code Council, Inc., 2006, *2006 International Building Code.*

Isihara, K., and Yoshimine, M., 1992, "Evaluation of Settlements in Sand Deposits Following Liquefaction of Sand Under Cyclic Stresses", Soils and Foundations, Vol. 32, No. 1, pp. 173-188.

Korosec, M.A., 1987, Geologic map of the Hood River quadrangle,Washington and Oregon: Washington State Department of Natural Resources, Division of Geologyand Earth Resources Open-File Report 87–6, 42 p.

Washington Department of Transportation (WSDOT), 2006, *Stanadard Specifications for Road, Bridge, and Municipal Construction,* Olympia, Washington.

Raytheon Engineers & Constructors, 2002, *Pacific Northwest Project Pile Location Plan, Sheet 02C0135E,* prepared for the BHP Coated Steel Corporation, Kalama, Washington, Drawing No. 59800-D-110012, Revision C, 10/18/2002.

Sherrod, D.R., and Smith, J.G., 1990, Quaternary extrusion of the Cascade Range, northwestern United States and southern British Columbia, Journal of Geophysical Research, v. 95, p. 19465-19474.

Skamani County Code, October, 2006, Chapter 21A.06.10 - Chapter 21A.06.40.

U.S. Soil Conservation Service, 1986. Technical Release 55: Urban Hydrology for Small Watersheds, U.S. Department of Agriculture.

U.S. State Plane Zones (NAD 1993).

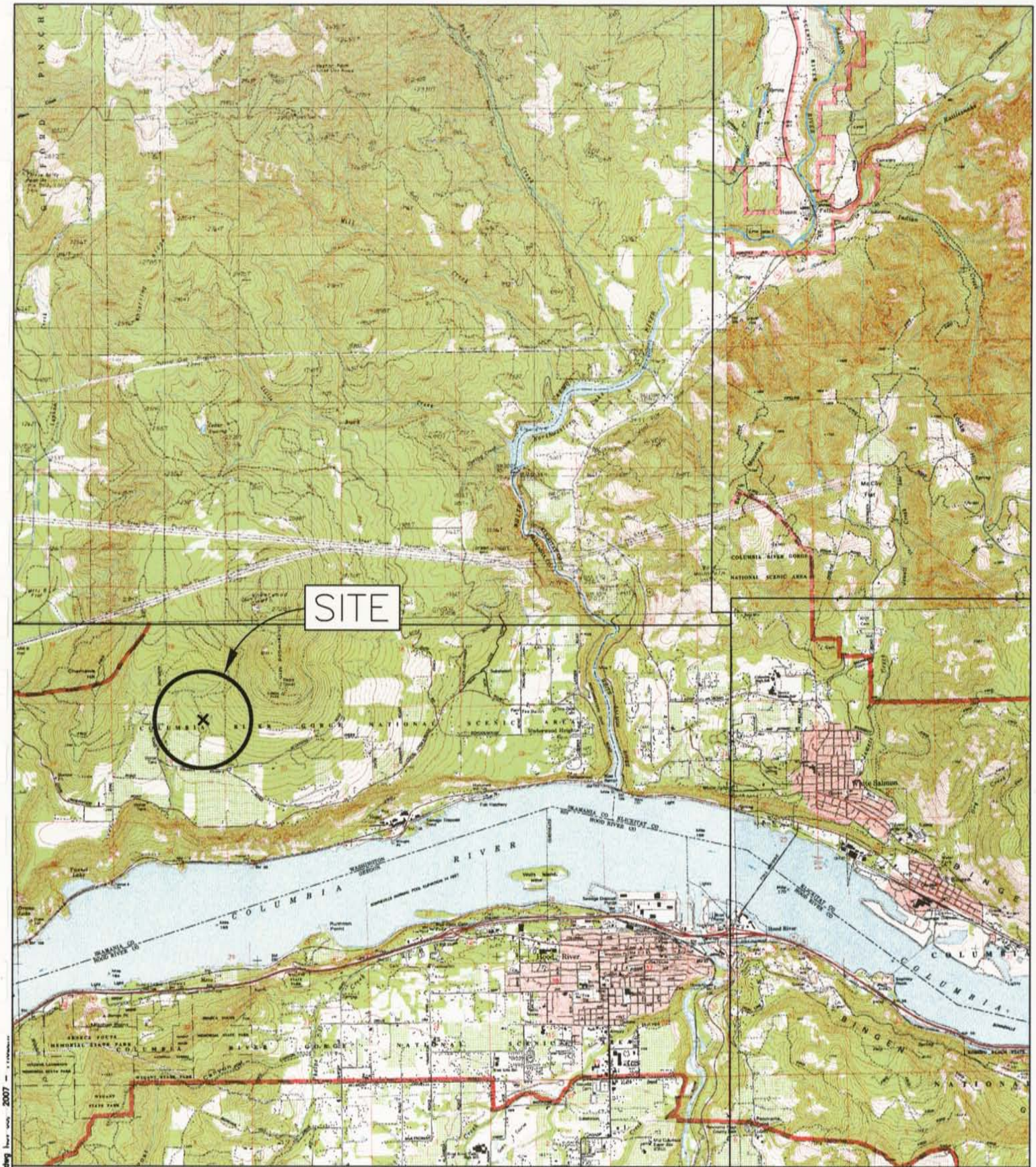
Winterkorn, H.F. and Fang, H-Y., 1975, *Foundation Engineering Handbook,* Van Nostrand

Reinhold Company, New York, New York.

Wells, R.E., Weaver, C.S., and Blakely, R.J., 1998. Forearc Migration in Cascadia and its Neotectonic Significance: *Geology*, v. 26, p. 759-762.

Youd, T.L., Idriss, I.M., Andrus, R.D., Arango, I., Castro, G., Christian, J.T., Dobry, R., Finn, W.D.L., Harder, Jr., L.F., Hynes, M.E., Ishihara, K., Koester, J.P., Liao, S.S.C., Marcuson III, W.F., Martin, G.R., Mitchell, J.K., Moriwaki, Y., Power, M.S., Robertson, P.K., Seed, R.B., and Stokoe II, K.H., 2001. *"Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils"*, ASCE Journal of Geotechnical and Geoenvironmental Engineering, Vol. 127, No. 10, pp. 817-833.

FIGURES



VICINITY MAP

SDS LUMBER
November 2007 SADDLEBACK WIND ENERGY PROJECT
33758687 WHITE SALMON, WA

URS

Figure 1

LEASE BOUNDARY

TP-12 D3 D2 D1

TP-02 C5 C4 C3 TP-01 C2 C1

R-05

E1 E2

TP-03

DCP-18 DCP-17 DCP-14 R-03 B4 B3 B2 B1

TP-07 F2 F1 R-02

DCP-13 B5 DCP-15 B8 B7 B6 TP-05 DCP-12 TP-06

B9 B10 B11 B12 DCP-16 B13 B14 B17 TP-04 R-04

DCP-11 DCP-20 DCP-21 DCP-22 DCP-25 DCP-26 DCP-27 DCP-28 DCP-29 DCP-30

DCP-19 DCP-23

DCP-10 DCP-09

DCP-08 DCP-24

B15 B16 A14 A13 A12 A11 A10 A9 A8 TP-11 DCP-07 DCP-03 DCP-06 TP-10

DCP-05 A7 A6 A5 R-01 A4 DCP-04 TP-09 A3 DCP-02 A2 DCP-01 A1 TP-08

LEGEND:

- PROPOSED LOCATION OF WIND TOWER
- LOCATION OF URS TEST PIT
- LOCATION OF URS DCP TEST
- LOCATION OF URS RESISTIVITY TEST

600 0 600 1200

SCALE IN FEET

URS

SITE PLAN

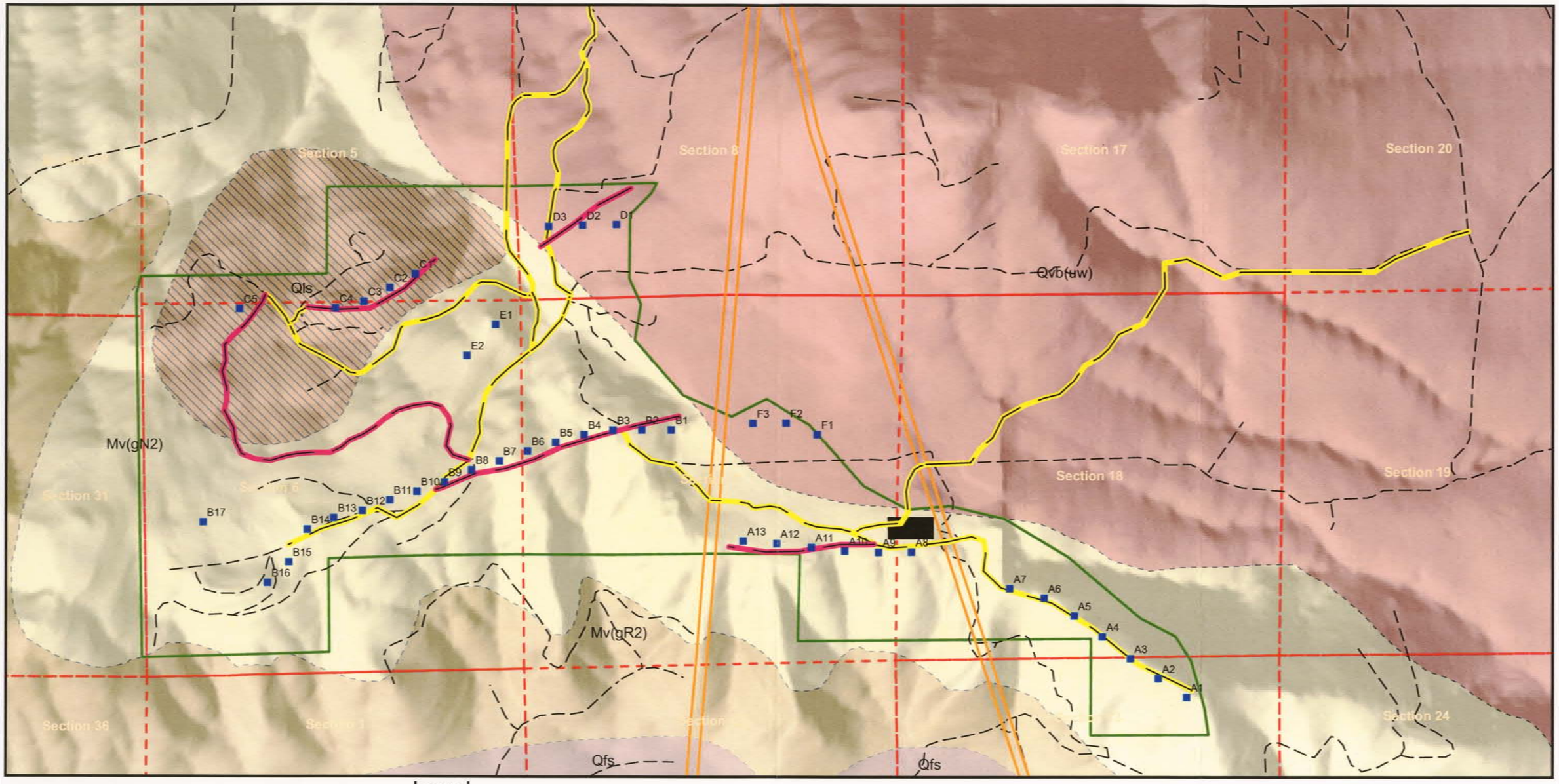
SDS LUMBER

November 2007 SADDLEBACK WIND ENERGY PROJECT

33758687 WHITE SALMON, WA

Figure 2

O:\33758687 SDS Lumber\CAD\SDS Site Plan.dwg Nov 05, 2007 - 11:00am



Legend

- Proposed Turbine Locations
- Proposed Access Road
- Proposed Improved Road
- Existing Transmission Lines
- Local Road
- LeaseBoundary
- Proposed Substation
- Section Line

Geologic Rock Units (Legend)

- Mv(gN2)--Basalt Flows (Grande Ronde Basalt, upper flows of norm.mag.pol.)
- Mv(gR2)--Basalt Flows (Grande Ronde Basalt, upper flows of rev.mag.pol.)
- Qfs--Outburst Flood Deposits, Sand and Silt, Late Wisconsin
- Qls--Mass-Wasting Deposits, Mostly Landslides
- Qvb(uw)--Basalt Flows

N E S W

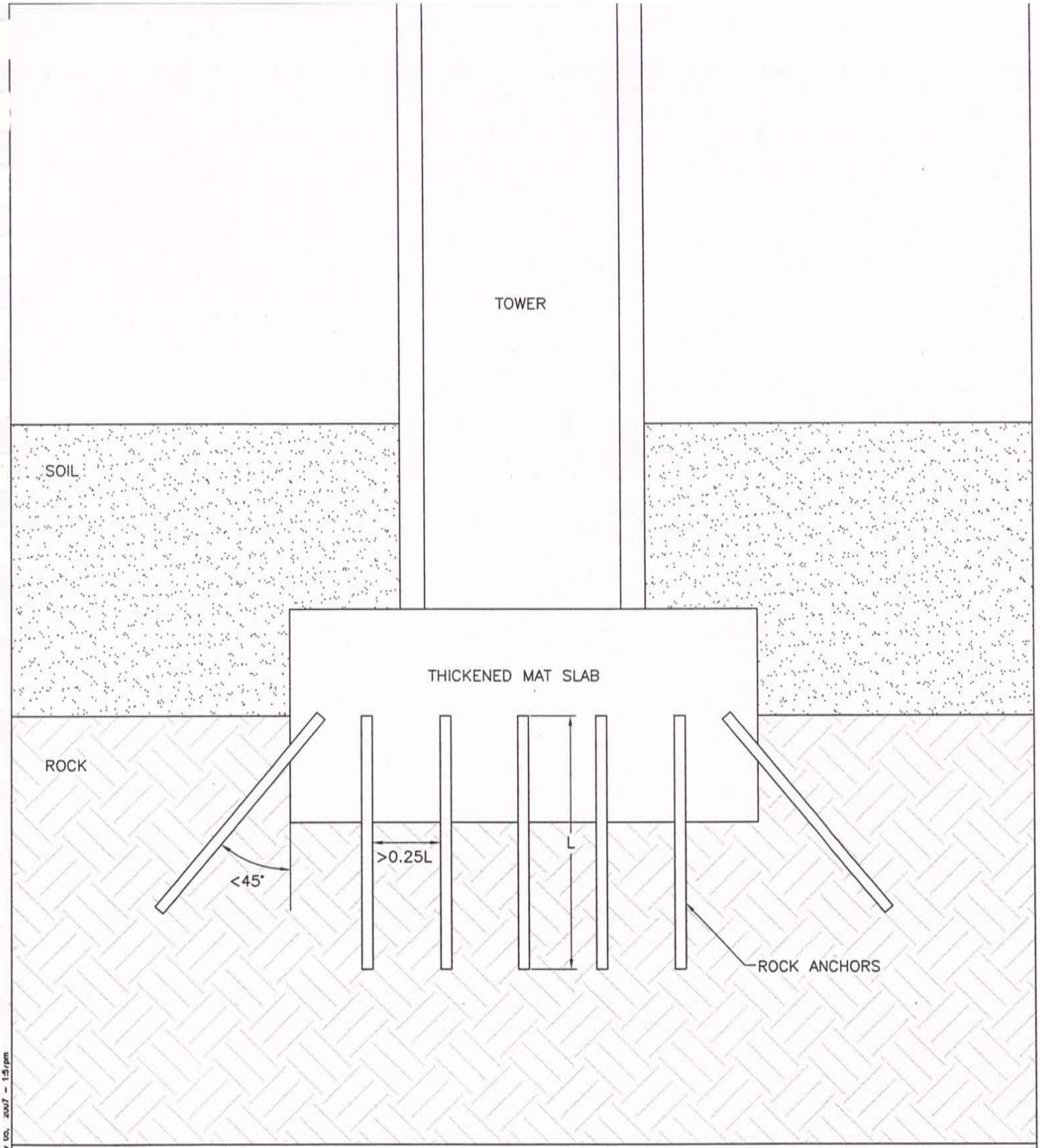
0 5001,000 2,000 3,000 4,000 Feet

GeoDataScape

File Path: P:\Projects\Sds Lumber\geology.mxd, Date: 10 18, 2007;7:11:41 AM, User: TW

Figure 3, Site Geology
Saddleback Wind Project

URS SDS Lumber



MAT-SLAB FOUNDATION CONCEPT

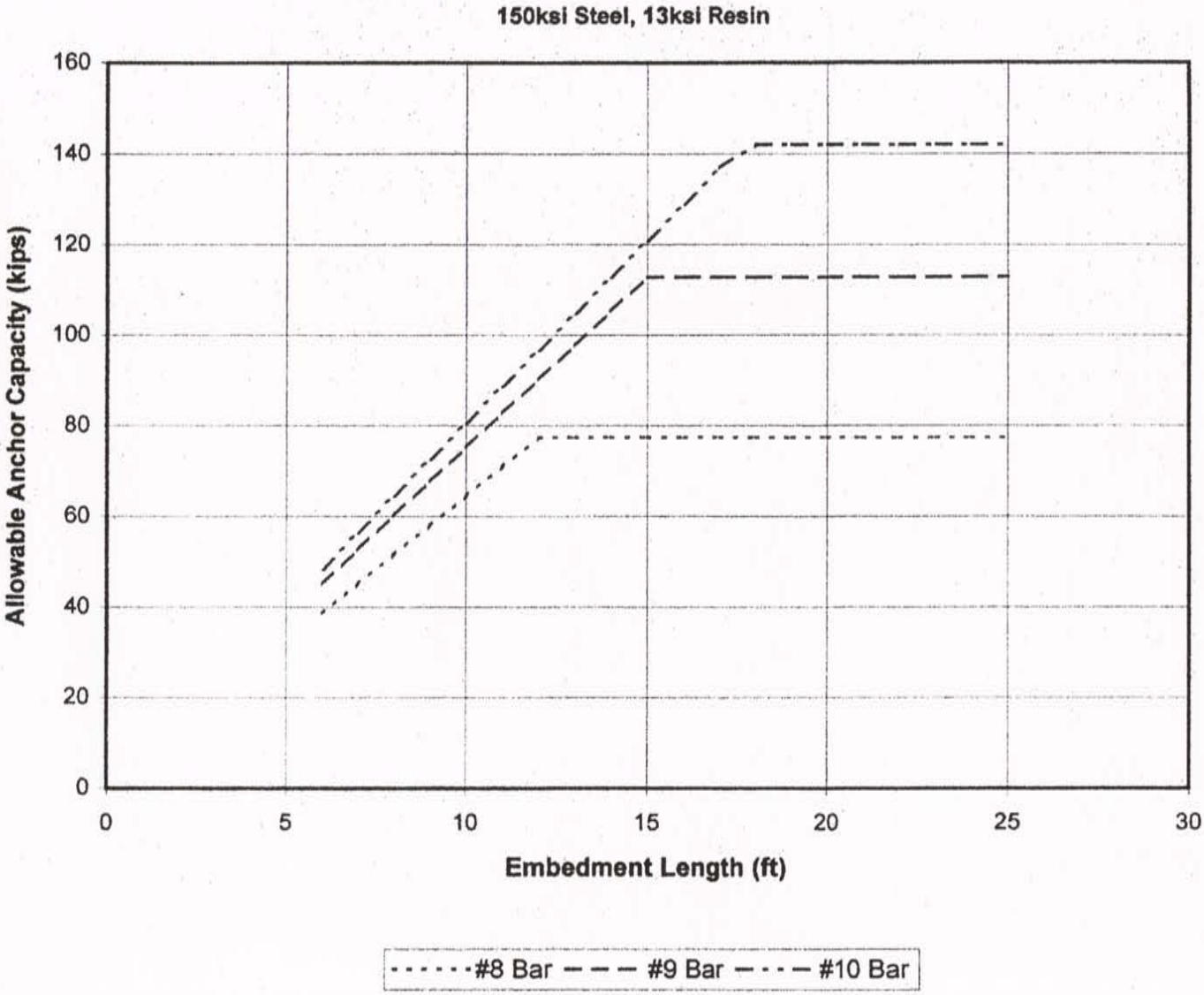
URS

November 2007
33758687

SDS LUMBER
SADDLEBACK WIND ENERGY PROJECT
WHITE SALMON, OREGON

FIGURE 4

O:\33758687 SDS Lumber\CAD\plots detail.dwg Nov 05, 2007 - 1:51pm



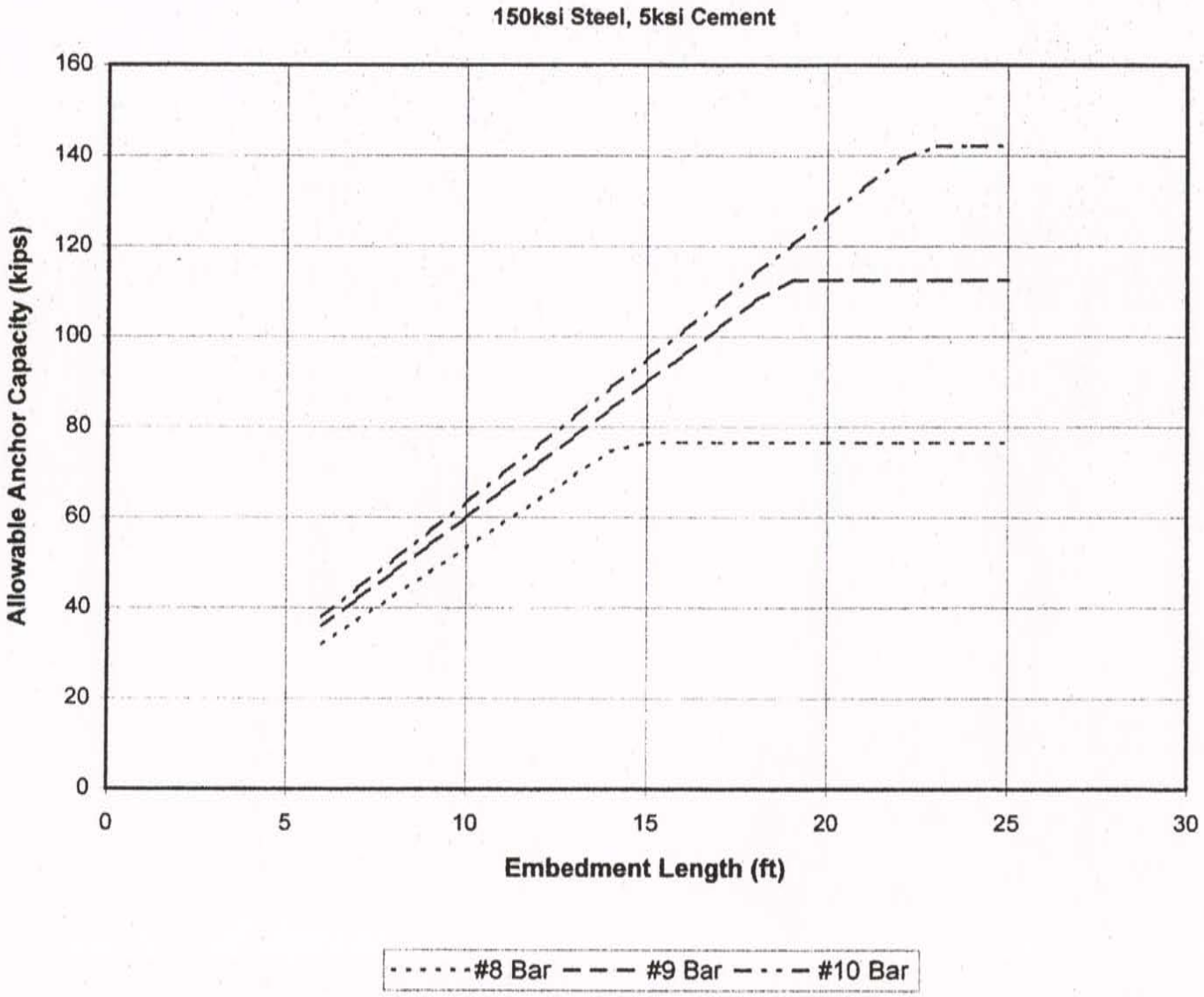
PRELIMINARY ROCK ANCHOR CAPACITY - RESIN

URS

November 2007
33758687

SDS LUMBER
SADDLEBACK WIND ENERGY PROJECT
WHITE SALMON, WA

FIGURE 5



PRELIMINARY ROCK ANCHOR CAPACITY - CEMENT

URS

November 2007
33758687

SDS LUMBER
SADDLEBACK WIND ENERGY PROJECT
WHITE SALMON, WA

FIGURE 6

APPENDIX A
LOGS OF TEST PITS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	Log of Test Pit TP-01

Date(s) Excavated	9/18/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	13.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2134 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type / Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2134	0			ML	**SANDY SILT [ML]**, brown, moist, soft, contains roots and rock [Topsoil/Disturbed Material]				
	1			CH	**SANDY FAT CLAY [CH]**, orange-brown, moist, medium stiff, mottled with yellow-brown, rock fragments, blocky, occasional roots. [Residuum]				
2132	2	1			*Becomes gray-brown*	57.2	52.1	3.5	
	3			SC	**CLAYEY SAND [SC]**, yellow-brown, possible decomposed bedrock			2.5	
2130	4				**BEDROCK**, orange-brown, gray-black mottled, highly to moderately weathered, very soft to soft, fine grained, slightly vesicular, black mineral coatings in vesicles, spheroidal weathering observed, grades to moderately weathered with depth				
	5								
2128	6								
	7								
2126	8	2							
	9								
2124	10								Difficult excavating
	11								
2122	12								
	13				End test pit at 13.0 feet bgs on 9/18/2007 due to refusal. Backfilled with excavated soils upon completion.				
2120	14								
	15								
2118	16								
	17								
2116	18								
	19								
2114	20								

Report: PORT_TP_MC-PP_200_USCS; File: WINDFARM.GPJ; 11/5/2007 TP-01

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	Log of Test Pit TP-02

Date(s) Excavated	9/18/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	14.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2208 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type	Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2208	0				ML	**SANDY SILT [ML]**, brown, moist, soft, contains roots [Topsoil]				
	1					**BEDROCK**, light orange-brown, tuffaceous, highly weathered, black staining on fracture surfaces, very soft, large boulders of fresh rock, boulders are very soft to soft, subrounded				
2206	2									
	3		1							
2204	4									
	5					*Becomes dark orange-brown*				
2202	6									
	7					*Becomes light gray mottled with orange and black, highly to moderately weathered, highly fractured*				
2200	8									
	9									
2198	10									
	11									
2196	12									
	13									
2194	14					End test pit at 14.0 feet bgs on 9/18/2007 due to extent of excavator. Backfilled with excavated soils upon completion.				
	15									
2192	16									
	17									
2190	18									
	19									
2188	20									

Report: PORT_TP_MC-PP_200_USCS; File: WINDFARM.GPJ; 10/22/2007 TP-02

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-03**

Date(s) Excavated	9/18/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	12.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2173 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type	Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
	0				ML	**SANDY SILT [ML]**, brown, moist, soft, occasional rock fragments [Topsoil]				
2172	1				SM	**SILTY SAND [SM]**, yellow-brown, moist, medium dense. [Colluvium]				
	2								4.5	
2170	3				SM	**SILTY SAND [SM]**, white and light orange mottled, dense [Decomposed Bedrock]			4.5+	
	4									
2168	5									
	6									
2166	7									
	8		1			*Contains breccia, angular, medium gray pieces of tuff in red-orange silty clay matrix*				
2164	9									
	10									
2162	11					Some structure and bedding observed				
	12					End test pit at 12.0 feet bgs on 9/18/2007. Backfilled with excavated soils upon completion.				
2160	13									
	14									
2158	15									
	16									
2156	17									
	18									
2154	19									
	20									

Report: PORT_TP_MC-PP_200_USCS; File: WINDFARM.GPJ; 10/22/2007 TP-03

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-04**

Date(s) Excavated	9/18/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	14.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2302 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2302	0			ML	**SANDY SILT [ML]**, brown, moist, soft [Topsoil]				
	1				**BEDROCK**, yellow-brown to gray mottled, tuffaceous, decomposed to highly weathered, pummice, rock fragments in dark orange soil, very small vesicles				
2300	2								
	3	1							
2298	4								
	5				*Becomes gray or salt and peppered, black staining on fracture surfaces, highly weathered, very soft*				
2296	6								
	7								
2294	8								
	9				*Becomes gray with orange-white specks, highly to moderately weathered, soft, spheroidal weathering patterns observed, large rounded boulders observed (~2.5 feet diameter)*				
2292	10								
	11								
2290	12								
	13								
2288	14				End test pit at 14.0 feet bgs on 9/18/2007. Backfilled with excavated soils upon completion.				
	15								
2286	16								
	17								
2284	18								
	19								
2282	20								

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-05**

Date(s) Excavated	9/19/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	14.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2205 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
	0			ML	**SANDY SILT [ML]**, brown, moist, soft [Topsoil]				
2204	1	1		SM	**SILTY SAND [SM]**, moist, brown, dense. [Colluvium]	48.6	16.4	4.5+	
	2								
2202	3				**BEDROCK**, gray with orange specks, tuffaceous, highly weathered to decomposed, very soft, spheroidal weathering patterns observed				
	4								
2200	5								
	6								
2198	7								
	8								
2196	9								
	10				*Becomes highly to moderately weathered, black mineral deposits on fractures*				
2194	11								
	12								
2192	13								
	14	2			End test pit at 14.0 feet bgs on 9/18/2007. Backfilled with excavated soils upon completion.				
2190	15								
	16								
2188	17								
	18								
2186	19								
	20								

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	Log of Test Pit TP-06

Date(s) Excavated	9/19/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	14.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2142 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2142	0			ML	**SANDY SILT [ML]**, brown, moist, soft [Topsoil]				
	1			ML	**SANDY SILT [ML]**, brown, moist, medium dense, occasional rock fragments [Colluvium]				
2140	2							3.0	
	3	1				60.6	25.7	4.5	
2138	4								
	5								
2136	6								
	7								
2134	8								
	9								
2132	10								
	11	2			**BEDROCK**, brown, black mottled, highly weathered to decomposed, very to extremely soft, no fractures or structure observed (Decomposed Volcanics/Volcaniclastics)				
2130	12								
	13								
2128	14				End test pit at 14.0 feet bgs on 9/18/2007. Backfilled with excavated soils upon completion.				
	15								
2126	16								
	17								
2124	18								
	19								
2122	20								

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-07**

Date(s) Excavated	9/19/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	8.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2184 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type	Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2184	0				SM	**SILTY SAND [SM]**, brown, moist, medium dense, contains highly weathered to decomposed rock fragments [Colluvium]				
	1								3.5	
2182	2		1							
	3					**BASALT**, gray-brown, highly weathered				
2180	4									
	5									
2178	6		2			*Becomes gray, yellow staining on fractures, moderate to slightly weathered, hard, vesicular*				Difficult excavating
	7									
2176	8		3			End test pit at 8.0 feet bgs on 9/18/2007 due to refusal. Backfilled with excavated soils upon completion.				
	9									
2174	10									
	11									
2172	12									
	13									
2170	14									
	15									
2168	16									
	17									
2166	18									
	19									
2164	20									

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-08**

Date(s) Excavated	9/19/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	7.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2214 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type	Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2214	0				ML	**SANDY SILT [ML]**, brown, moist, soft [Topsoil]				
	1					**BEDROCK**, medium gray with black and orange specks, orange black staining on surfaces, tuffaceous, highly to moderately weathered, very soft to soft, vesicles present				
2212	2									
	3		1							
2210	4					*Becomes moderately weathered, soft to medium hard*				
	5									
2208	6									Difficult excavating
	7					End test pit at 7.0 feet bgs on 9/19/2007 due to refusal. Backfilled with excavated soils upon completion.				
2206	8									
	9									
2204	10									
	11									
2202	12									
	13									
2200	14									
	15									
2198	16									
	17									
2196	18									
	19									
2194	20									

Report: PORT_TP_MC-PP_200_USCS; File: WINDFARM.GPJ; 10/22/2007 TP-08

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-09**

Date(s) Excavated	9/19/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	11.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2176 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type	Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2176	0				ML	**SANDY SILT [ML]**, brown, mosit, soft [Topsoil]				
	1					**BEDROCK**, light gray to black, salt and pepper, some yellow-brown, orange and black staining on surfaces, tuffaceous, highly to moderately weathered, very soft, spheroidal weathering patterns observed				
2174	2									
	3		1							
2172	4									
	5									
2170	6					*Becomes dark gray, moderately weathered, soft, traces of mica?*				Excavator notes material encountered at 6.0 feet bgs would be used for road bed
	7									
2168	8		2			*Becomes green-gray*				
	9									
2166	10									
	11					End test pit at 11.0 feet bgs on 9/19/2007. Backfilled with excavated soils upon completion.				
2164	12									
	13									
2162	14									
	15									
2160	16									
	17									
2158	18									
	19									
2156	20									

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-10**

Date(s) Excavated	9/18/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	8.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2181 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type / Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
	0			ML	**SANDY SILT [ML]**, brown, moist, soft, rock fragments observed [Topsoil]				
2180	1								
	2				**BEDROCK**, meidum gray to brown with black and yellow specks, tuffaceous, highly weathered, very soft with hard core stones				
2178	3	1							
	4				*Becomes black and orange stained on fracture surfaces, highly to moderately weathered, spheroidal weather patterns observed*				
2176	5								
	6				*Becomes gray with black staining, soft to hard*				
2174	7								
	8				End test pit at 8.0 feet bgs on 9/18/2007 due to refusal. Backfilled with excavated soils upon completion.				
2172	9								
	10								
2170	11								
	12								
2168	13								
	14								
2166	15								
	16								
2164	17								
	18								
2162	19								
	20								

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-11**

Date(s) Excavated	9/18/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	16.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2119 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type / Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
	0			ML	**SANDY SILT [ML]**, brown, moist, soft [Topsoil]				
2118	1	1		SM	**SILTY SAND [SM]**, brown, yellow and gray, moist, rock fragments. [Colluvium]	48.9	30.6	3.0	
	2			ML	**SANDY SILT [ML]**, reddish brown with medium gray core stones, black and orange on fracture surfaces, sandy silt, some structure observed including remnant vesicles [Decomposed Bedrock]				
2116	3	2							
	4							4.5	
2114	5								
	6				*Becomes highly weathered to decomposed*				
2112	7								
	8								
2110	9								
	10				**BEDROCK**, brown to gray, orange-black staining on fracture surfaces, tuffaceous, highly weathered to decomposed				
2108	11								
	12								
2106	13								
	14								
2104	15	3							
	16				End test pit at 16.0 feet bgs on 9/19/2007. Backfilled with excavated soils upon completion.				
2102	17								
	18								
2100	19								
	20								

Report: PORT_TP_MC-PP_200_USCS; File: WINDFARM.GPJ; 10/22/2007 TP-11

URS

Project: Saddleback Wind Energy Project Project Location: White Salmon, Washington Project Number: 33758687	**Log of Test Pit TP-12**

Date(s) Excavated	9/18/2007	Logged By	EAM	Checked By	DBM
Length of Excavation	~10 feet	Width of Excavation	~5 feet	Depth of Excavation	8.0 feet
Excavation Equipment	Track Mounted Excavator	Excavation Contractor	SDS Lumber	Approximate Surface Elevation	2070 feet MSL
Water Observations	N/A			Weather	Sunny, 60's
Location	See site map			Surface Condition	

Elevation feet	Depth, feet	Sample Type Sample Number	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Fines (%)	Moisture (%)	Pocket Penetrometer (tsf)	REMARKS AND OTHER TESTS
2070	0			ML	**SANDY SILT [ML]**, brown, moist, soft [Topsoil]				
	1			SM	**SILTY SAND [SM]**, brown, moist to dry, loose, occasional rock fragments [Colluvium]				
2068	2	1				38.7	15.3		
	3				**BEDROCK**, rock fragments in silty sand matrix, ~20% rock fragments, fragments are gray, decomposed to highly weathered, soft, porous [Decomposed Basalt]				
2066	4								
	5								
2064	6				*Rock becomes light gray with black mottles and yellow coatings, moderately to highly weathered, large boulders encountered (2-3 feet diameter)*				
	7								Difficult excavating
2062	8	2			End test pit at 8.0 feet bgs on 9/18/2007 due to refusal. Backfilled with excavated soils upon completion.				
	9								
2060	10								
	11								
2058	12								
	13								
2056	14								
	15								
2054	16								
	17								
2052	18								
	19								
2050	20								

URS

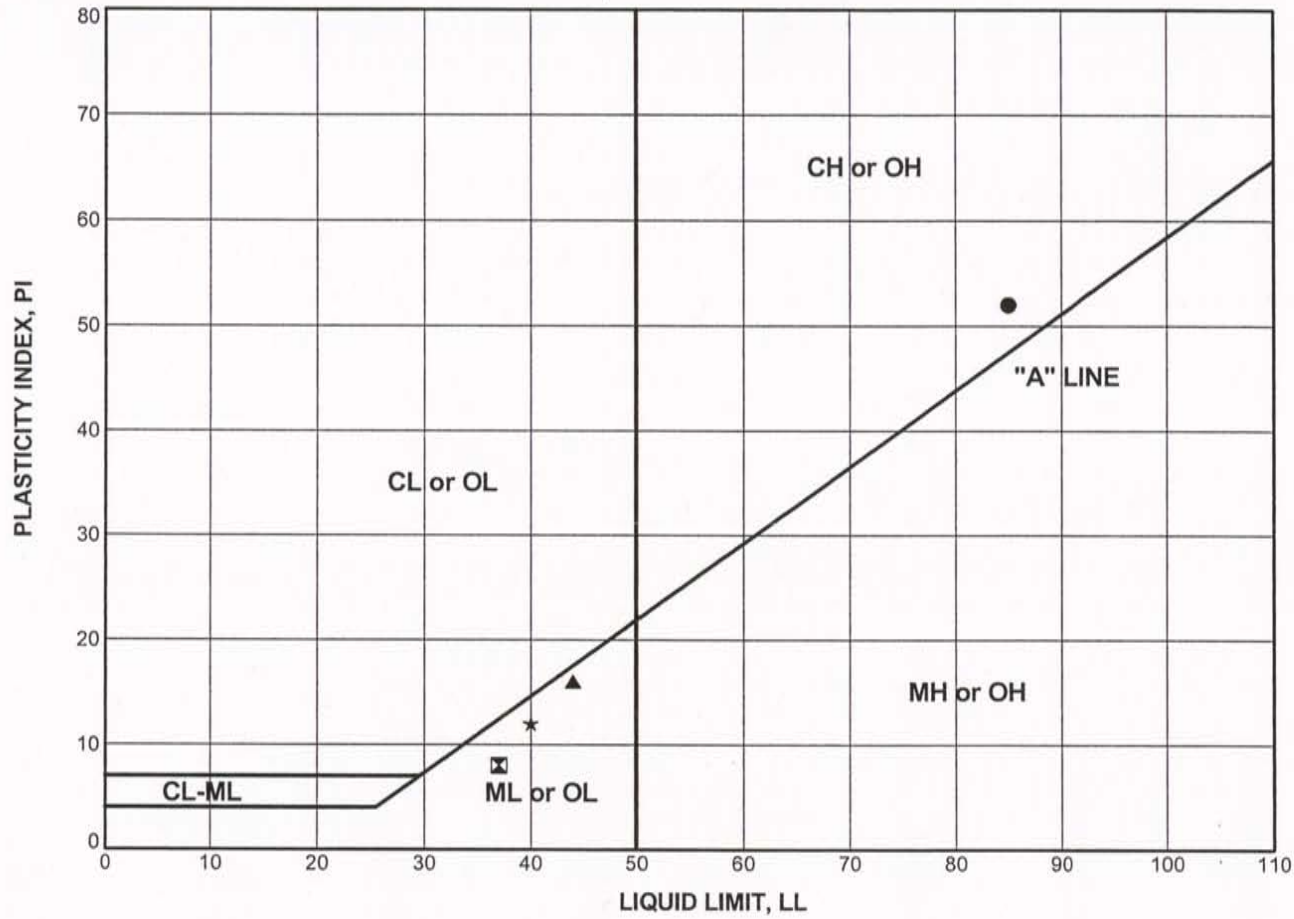
APPENDIX B
FIELD SOIL RESISTIVITY AND LABORATORY TESTING

Resistivity tests for the proposed Wind Energy Project site were performed on September 24, 2007 to assess the resistivity of the near surface soil. Table B-1 presents the results of these measurements. The soil resistivity at locations R-1, R-2, R-3, and R-5 are shown graphically in Figure B-1. Soil resistivity at location R-4 is shown in Figure B-2.

Table B-1: Measured Resistivity (ohm-cm)

Date Completed	Location	Spacing (ft)	Effective Depth (ft)	Reading	Multiplier	Resistivity (Ω cm)
9/24/2007	**R-1**	5.0	10.0	7.1	10	**67983**
9/24/2007	**R-1**	10.0	20.0	1.6	10	**30640**
9/24/2007	**R-1**	20.0	40.0	4.2	1	**16086**
9/24/2007	**R-2**	5.0	10.0	3.8	100	**363850**
9/24/2007	**R-2**	10.0	20.0	2.4	100	**459600**
9/24/2007	**R-2**	20.0	40.0	1.4	100	**536200**
9/24/2007	**R-3**	5.0	10.0	0.9	100	**86175**
9/24/2007	**R-3**	10.0	20.0	0.4	100	**76600**
9/24/2007	**R-3**	20.0	40.0	2.6	10	**99580**
9/24/2007	**R-4**	5.0	10.0	11.0	100000	*
9/24/2007	**R-4**	10.0	20.0	10.6	1000	*
9/24/2007	**R-4**	20.0	40.0	11.0	100000	*
9/24/2007	**R-5**	5.0	10.0	3.0	10	**28725**
9/24/2007	**R-5**	10.0	20.0	2.0	10	**38300**
9/24/2007	**R-5**	20.0	40.0	1.2	10	**45960**

* Field Resistivity found to be in excess of 1,000,000 ohm-cm.



Boring ID	Sample #	Depth (feet)	Symbol	Sample Moisture %	LL	PL	PI	Classification
TP-01	1	2.0-2.5	●	52.1	85	33	52	Sandy Fat Clay [CH]
TP-05	1	1.0-1.5	⊠	16.4	37	29	8	Silty Sand [SM]
TP-06	1	2.5-3.0	▲	25.7	44	28	16	Sandy Silt [ML]
TP-11	1	1.0-1.5	★	30.6	40	28	12	Silty Sand [SM]

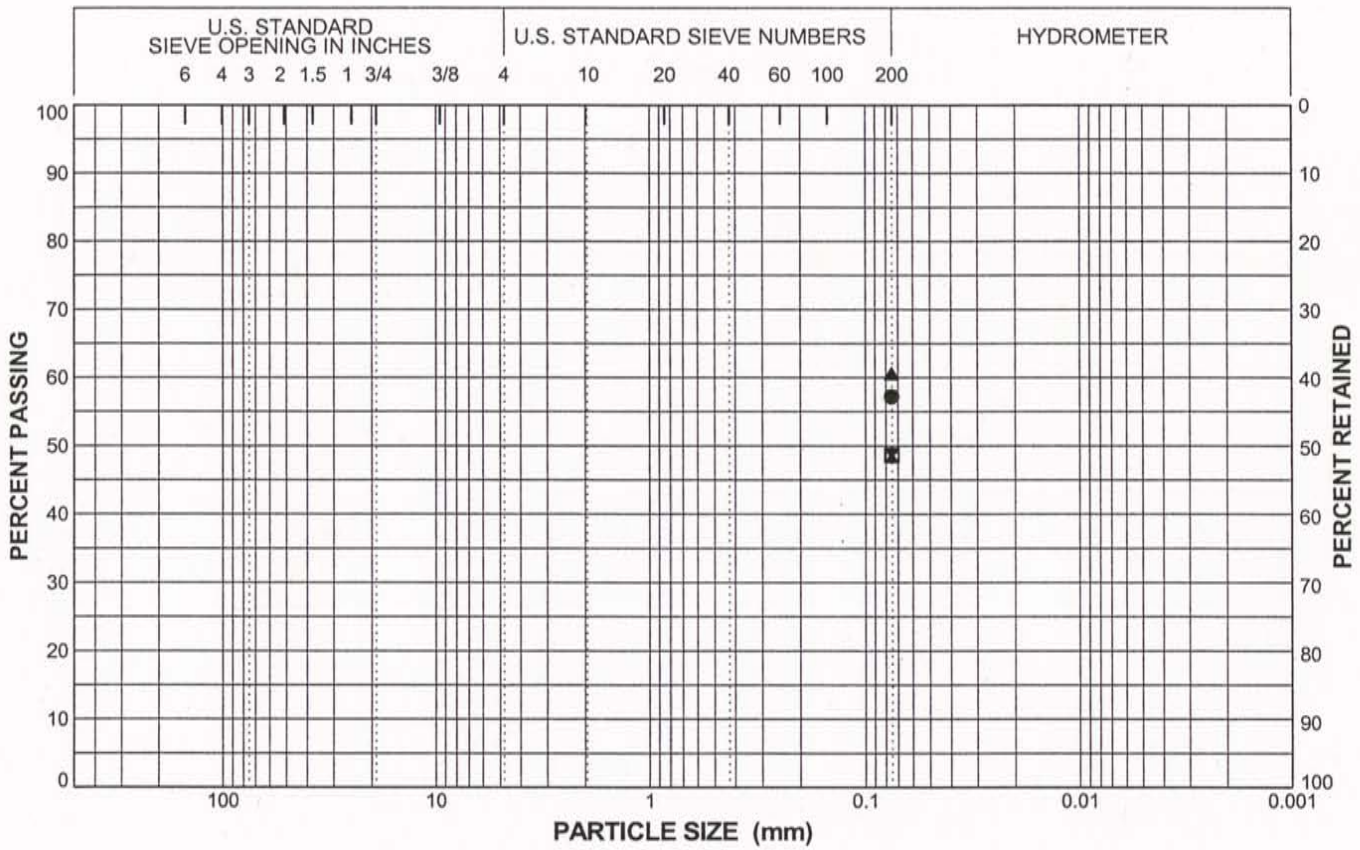
Report: ATTERBERG_PLOT_12 PTS;. File: WINDFARM.GPJ; 11/5/2007 TP-11

Saddleback Wind Energy Project
White Salmon, Washington
33758687

PLASTICITY CHART

URS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring ID	Sample #	Depth (feet)	Sample Moisture (%)	Dry Density (lbs/ft³)	Symbol	LL	PI	% G	% S	% F	Classification
TP-01	1	2.0-2.5	52.1		●	85	52			57.2	Sandy Fat Clay [CH]
TP-05	1	1.0-1.5	16.4		⊠	37	8			48.6	Silty Sand [SM]
TP-06	1	2.5-3.0	25.7		▲	44	16			60.6	Sandy Silt [ML]
TP-11	1	1.0-1.5	30.6		★	40	12			48.9	Silty Sand [SM]

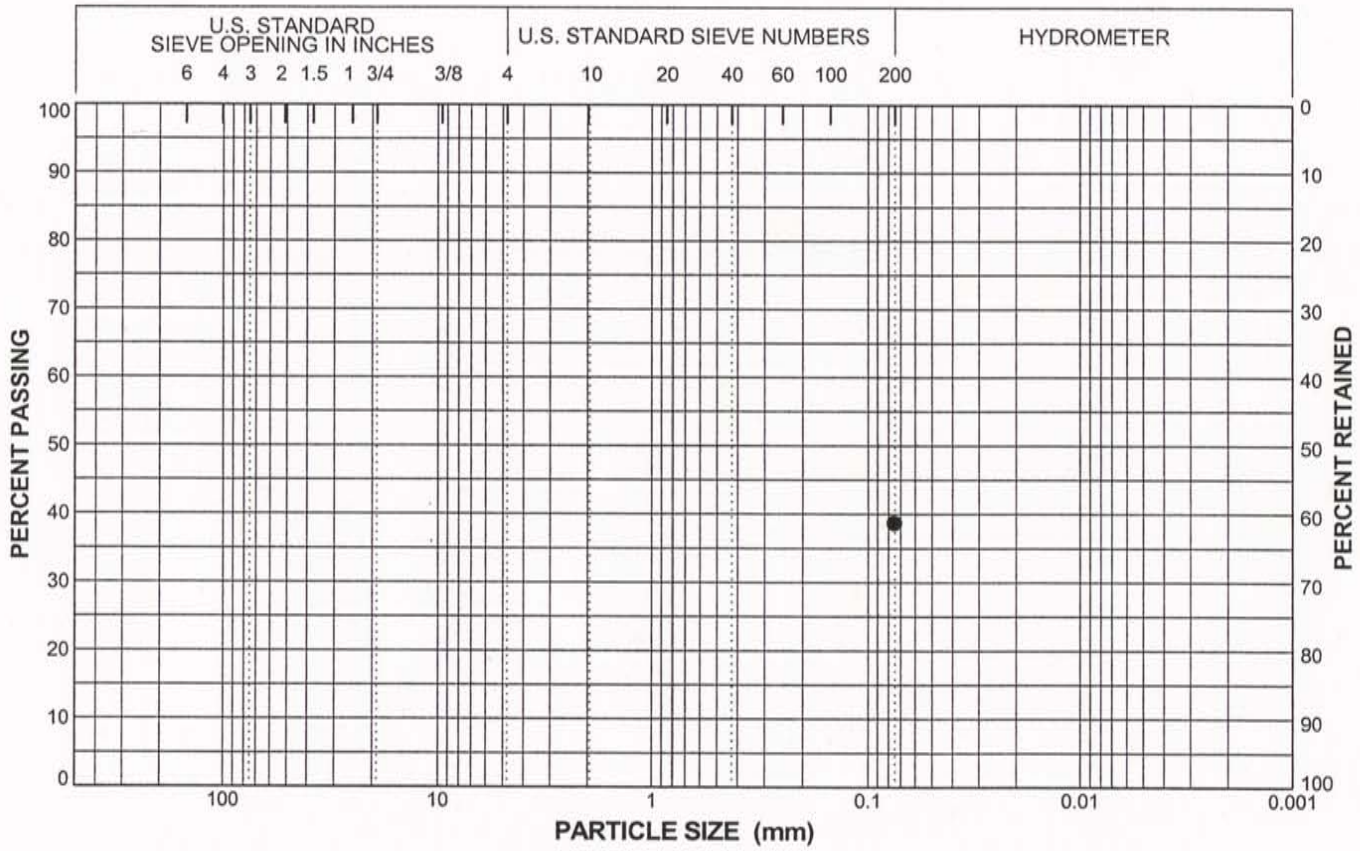
Report: SIEVE_4_PORT; File: WINDFARM.GPJ; 10/23/2007 TP-11

Saddleback Wind Energy Project
White Salmon, Washington
33758687

PARTICLE SIZE DISTRIBUTION CURVES

URS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring ID	Sample #	Depth (feet)	Sample Moisture (%)	Dry Density (lbs/ft^3)	Symbol	LL	PI	% G	% S	% F	Classification
TP-12	1	1.5-2.0	15.3		●					38.7	Silty Sand [SM]

Report: SIEVE_4_PORT; File: WINDFARM.GPJ; 10/23/2007 TP-12

Saddleback Wind Energy Project
White Salmon, Washington
33758687

PARTICLE SIZE DISTRIBUTION CURVES

URS

APPENDIX C
PAVEMENT ENGINEERING

PAVEMENT ENGINEERING REPORT

Anticipated Haul Route

URS observed the anticipated haul route from the SDS Lumber facility to the Saddleback site during a site visit in September, 2007. We anticipate the route to run along SR 14 to Cook-Underwood Road, up Cook-Underwood Road to Kollock-Knapp Road, up Kollock-Knapp Road to a sharp right hand turn onto Scoggins Road, and then a left onto the logging road on SDS property (CG-2930) to the Saddleback site.

Anticipated Haul Routes

Very little information is available about the existing pavement and base thicknesses along the haul route. From observations made while driving along the haul route, the pavements appear to be generally in good condition however, we understand that the pavements along Cook-Underwood Road had been recently improved with a chip seal and/or minor overlay. Some areas of the Kollock-Knapp Road showed signs of distress.

Construction for the proposed project is not anticipated to start for about three years. Therefore, three years of local traffic will traverse the pavement prior to the initiation of construction traffic. URS recommends that just prior to the initiation of construction for the project a comprehensive pavement assessment program be undertaken to establish the condition of the existing pavements. This would then be coupled with a mechanistic-empirical approach for establishment of remaining pavement life just prior to construction traffic. Once this is done, the potential effects of construction traffic on the pavements current state could be captured. For the proposed project URS recommends a comprehensive investigation of the existing pavements including: a visual pavement condition survey; Falling Weight Deflectometer testing; pavement coring; laboratory testing; and Dynamic Cone Penetrometer testing. This program will give a baseline metric for the pavement, base and subgrade conditions prior to the construction traffic.

No information was available at the time of this report regarding the existing average daily traffic (ADT) volumes along the proposed haul route. This information will be necessary during the analysis portion of the work, just prior to the construction traffic. If this information is not readily available, a traffic survey should be performed to determine the ADT and type of vehicle traffic along the proposed haul route. This information will be used to determine the remaining life of the existing pavement section and the pavement section that will be required post construction.

Truck Hauling Information

In order to mobilize the sections of wind tower equipment to the site, it is anticipated that they will arrive on rail to the SDS Lumber facility, be off loaded onto specialized trucks, and then transported up hill to the Saddleback site. URS understands that they could possibly arrive by barge also, but this is to be determined. The final vendor for the wind towers has not been selected at the time of this report. URS has made some general assumptions regarding typical tower configuration for the purpose of this report. URS understands that at the time of this report, the towers will be about 250 feet in height, with blades that are approximately 135 feet in length. We assume that each wind tower consist of the tower section, hub, blades and a nacelle. Heavy and oversized pieces, such as the tower sections and blades will be trucked to the site individually, while other components will be bundled together for transport from SDS Lumber.

Tubular towers are typically transported in 60 to 90-foot long sections that weight from 42 to 59 tons. Three rotor blades are required for each tower and are about 135 feet in length and about 7 tons each. The entire rotor assembly weighs approximately 35 tons. The nacelle is approximately 30 feet long, 12 feet wide by 12 feet high and weighs approximately 57 tons. Specialized trucking equipment is required to transport the tower pieces from SDS Lumber to the Saddleback site. Truck size and axle loading depends on the piece of equipment being transported and any anticipated restrictions that will be encountered along the haul route such as low overhead conditions, uneven traveling surfaces and load restrictions. URS anticipates that approximately 8-10 truck hauls will be required for each tower installed. Therefore, more than 500 heavy haul trips will be required over the county roads for the towers only, in addition to construction equipment. This quantity does not include delivery of construction materials such as concrete required for the foundation, grading equipment to construct roads and prepare the site or other construction traffic associated with neighborhood construction and deliveries.

URS is able to obtain information from Anderson Trucking Services, Inc. (ATS), who specialize in wind turbine transportation, on typical axle loading information for the 80-meter high, GE 1.5 Wind Turbine Generators. URS will include this information in our final report.

Strategy and Design Parameters for Haul Roads On SDS Property

URS drove and observed the haul roads on SDS property during our September, 2007 site visit. The existing logging road (CG-2930) to the Saddleback site has primarily been used for accessing stands of timber for harvesting and exporting timber from the site. The dirt road is currently surfaced with soil and rock and is in poor condition. In its current state the road is not suitable for the trucks that will be carrying the wind tower equipment.

URS will analyze the existing topography and work within the equipment limitations of the haul trucks that will be transporting the equipment to the site. Likely this will include rebuilding large sections of the existing road and surfacing with rock. For areas with steep slopes, we anticipate flattening and rebuilding the slopes and placing asphalt in select areas to allow access by the hauling equipment. The asphalt could remain in place or be removed at the end of the project. URS will develop design parameters for the pavement suitable to protect the section through construction.

Strategy and Design Parameters for Haul Roads On SDS Property

URS drove and observed the haul roads on SDS property during our September, 2007 site visit. The existing logging road (CG-2930) to the Saddleback site has primarily been used for accessing stands of timber for harvesting and exporting timber from the site. The dirt road is currently surfaced with soil and rock and is in poor condition. In its current state the road is not suitable for the trucks that will be carrying the wind tower equipment.

URS will analyze the existing topography and work within the equipment limitations of the haul trucks that will be transporting the equipment to the site. Likely this will include rebuilding large sections of the existing road and surfacing with rock. For areas with steep slopes, we anticipate flattening and rebuilding the slopes and placing asphalt in select areas to allow access by the hauling equipment. The asphalt could remain in place or be removed at the end of the project. URS will develop design parameters for the pavement suitable to protect the section through construction.

Pre and Post Heavy Haul Strategy for Pavement Assessments

URS will implement a thorough investigation program to capture the existing pavement, aggregate base and subgrade conditions along the alignment prior to heavy hauls. This program will consist of the following:

- A visual pavement condition survey and report of the surface of the existing pavements along the haul route to quantify weak or deteriorated areas that may need repair
- Pavement core holes to obtain the pavement thicknesses along the haul route
- Sampling of the near surface soils for classification
- Laboratory testing, as necessary, of the soils to further refine their classification and strength parameters

- Dynamic Cone Penetrometer (DCP) testing in selected locations where pavement widening may need to occur to determine the strength of the near surface subgrade soils

- Falling Weight Deflectometer (FWD) testing along the haul route to assess the *insitu* strength of the asphalt, aggregate base and subgrade soils

URS will use the results of this investigation to determine the capacity of the existing pavement section and what, if any, modification to the pavement section may be required to support the heavy haul trucks. URS concern is that the heavy loading may significantly deteriorate the existing pavement section, which was likely not designed for such heavy loads. URS will provide design recommendations for improving the pavement section, as necessary, prior to the beginning of the hauling program.

Design parameters critical to this analysis include determining the number of equivalent single axle loads (ESALs), which are based on trailer loading, number of axles and their configuration, and the thickness and resilient modulus of the subgrade, aggregate base and pavement materials. These factors combined with recommended values for initial serviceability, standard deviation, reliability, and a terminal serviceability as outlined by the American Association of State Highway and Transportation Officials (AASHTO) make up the main components of this analysis. Using these values, URS will determine minimum acceptable asphalt and aggregate base thicknesses to support the proposed loading.

At the completion of the hauling program and construction, URS proposes to perform a visual assessment of the surface conditions of the pavement, similar to what was performed before the construction began. The visual assessment will identify weak or deteriorated areas along the haul route which may require mitigation. Depending on the outcome of the preconstruction pavement analysis and the visual observation of post construction conditions, URS may prepare a mitigation design to repair the pavements to pre-construction conditions or better. 20 years is the typical pavement design life.

DCP TEST DATA

DCP-01

Project: *Saddleback Windfarm*
Location: White Salmon, WA

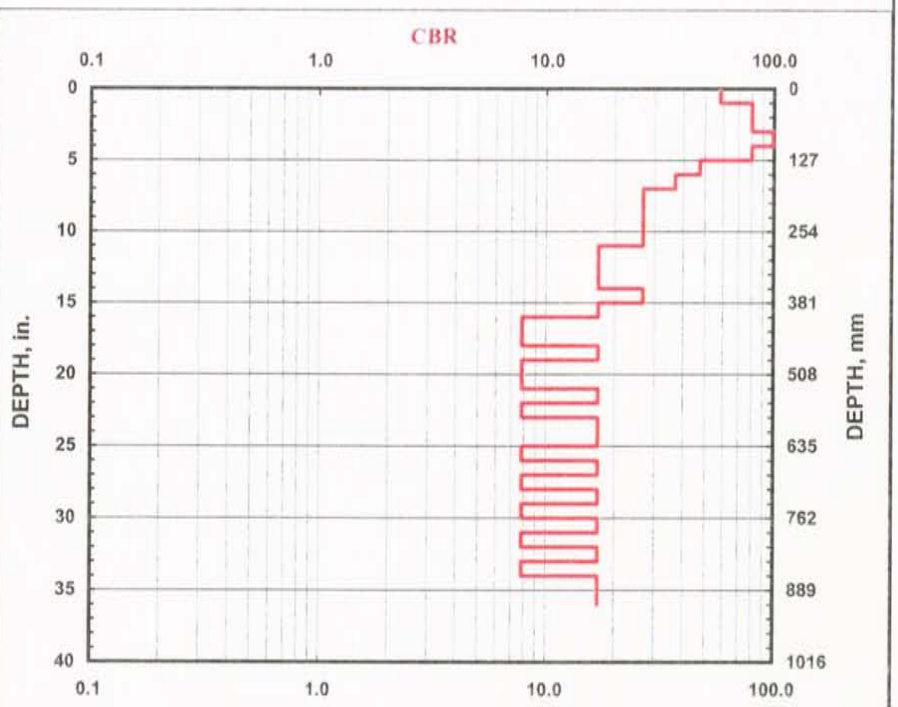
Date: 9/19/2007
Project No.: 33758687
Start: 0 feet bgs

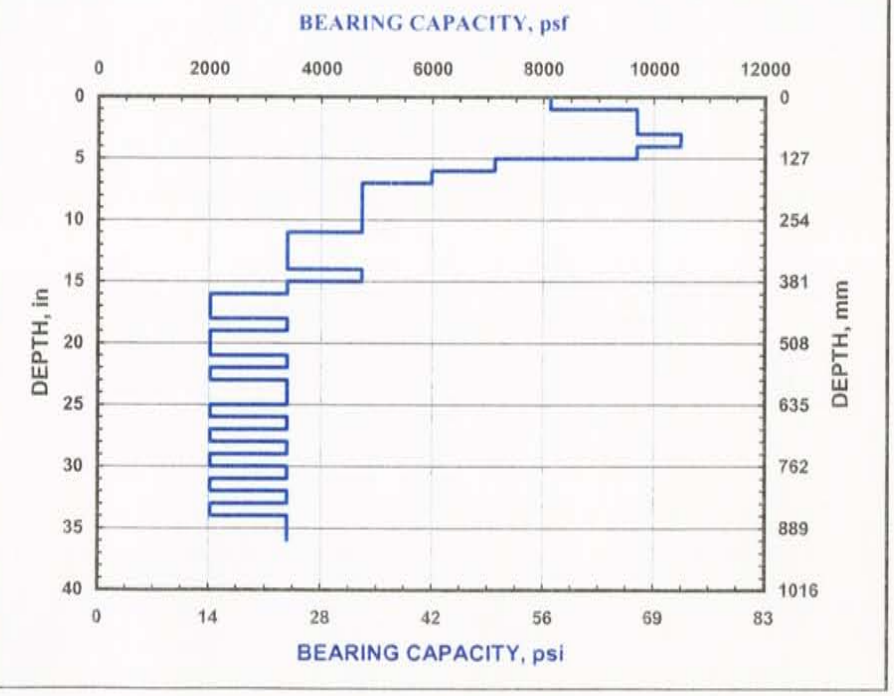
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
6	25	1	1.0
8	51	1	2.0
8	76	1	3.0
10	102	1	4.0
8	127	1	5.0
5	152	1	6.0
4	178	1	7.0
3	203	1	8.0
3	229	1	9.0
3	254	1	10.0
3	279	1	11.0
2	305	1	12.0
2	330	1	13.0
2	356	1	14.0
3	381	1	15.0
2	406	1	16.0
1	432	1	17.0
1	457	1	18.0
2	483	1	19.0
1	508	1	20.0
1	533	1	21.0
2	559	1	22.0
1	584	1	23.0
2	610	1	24.0
2	635	1	25.0
1	660	1	26.0
2	686	1	27.0
1	711	1	28.0
2	737	1	29.0
1	762	1	30.0
2	787	1	31.0
1	813	1	32.0
2	838	1	33.0
1	864	1	34.0
2	889	1	35.0
2	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-02

Project: *Saddleback Windfarm*
Location: White Salmon, WA

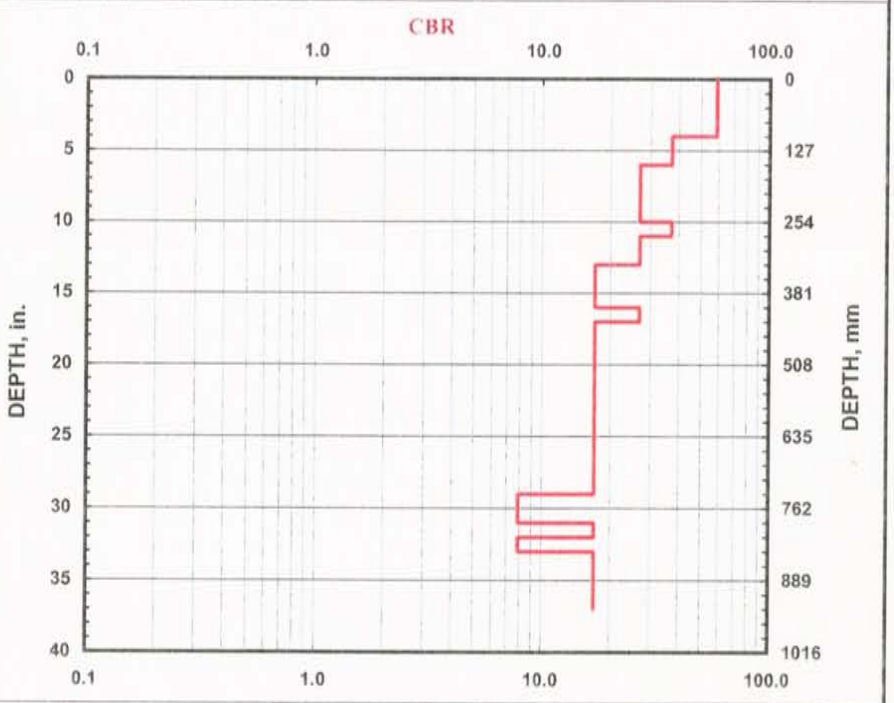
Date: 9/19/2007
Project No.: 33758687
Start: 0 feet bgs

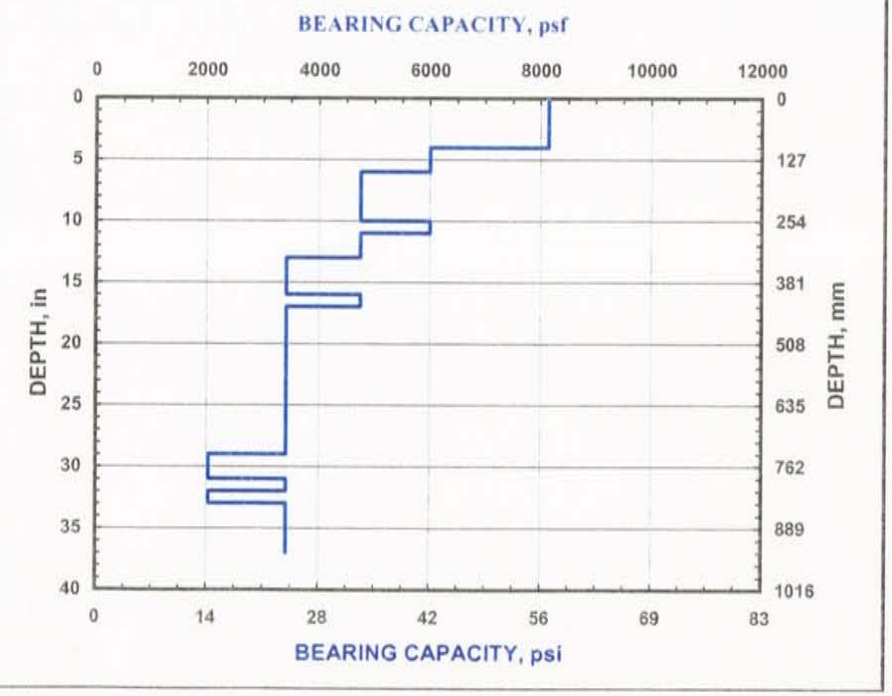
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
6	25	1	1.0
6	51	1	2.0
6	76	1	3.0
6	102	1	4.0
4	127	1	5.0
4	152	1	6.0
3	178	1	7.0
3	203	1	8.0
3	229	1	9.0
3	254	1	10.0
4	279	1	11.0
3	305	1	12.0
3	330	1	13.0
2	356	1	14.0
2	381	1	15.0
2	406	1	16.0
3	432	1	17.0
2	457	1	18.0
2	483	1	19.0
2	508	1	20.0
2	533	1	21.0
2	559	1	22.0
2	584	1	23.0
2	610	1	24.0
2	635	1	25.0
2	660	1	26.0
2	686	1	27.0
2	711	1	28.0
2	737	1	29.0
1	762	1	30.0
1	787	1	31.0
2	813	1	32.0
1	838	1	33.0
2	864	1	34.0
2	889	1	35.0
2	914	1	36.0
2	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-03

Project: *Saddleback Windfarm*
Location: White Salmon, WA

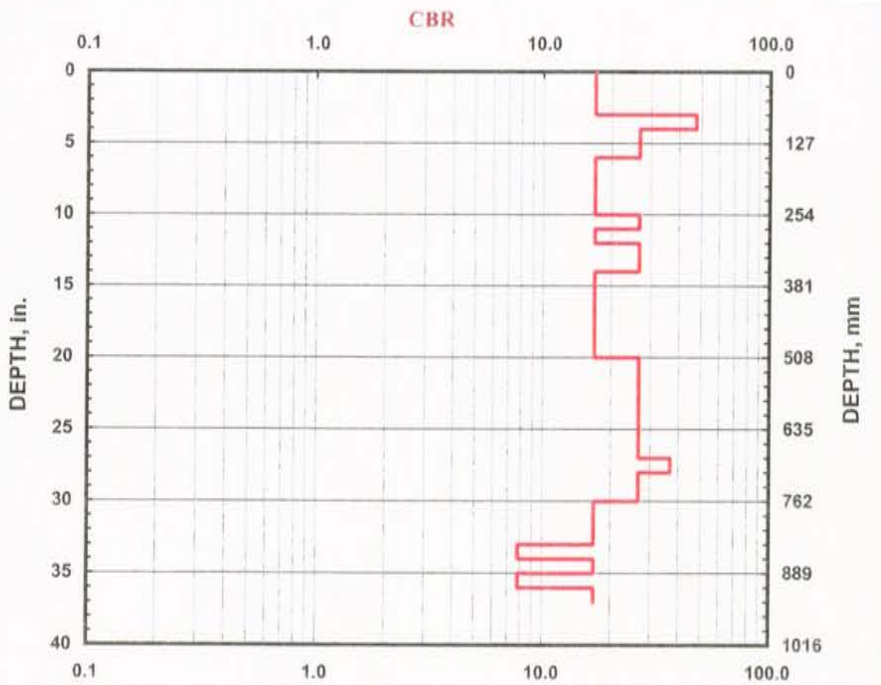
Date: 9/19/2007
Project No.: 33758687
Start: 0 feet bgs

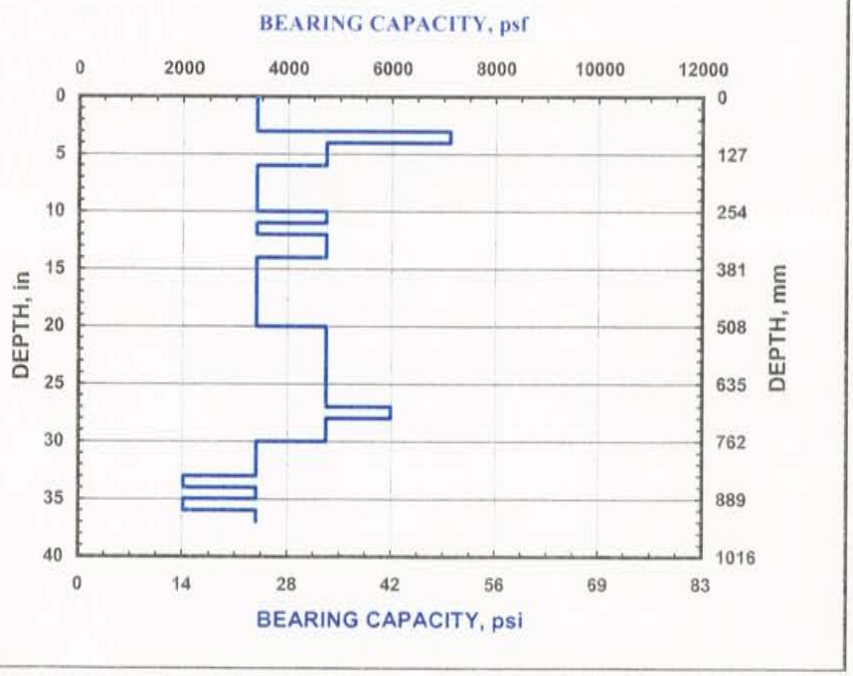
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
2	51	1	2.0
2	76	1	3.0
5	102	1	4.0
3	127	1	5.0
3	152	1	6.0
2	178	1	7.0
2	203	1	8.0
2	229	1	9.0
2	254	1	10.0
3	279	1	11.0
2	305	1	12.0
3	330	1	13.0
3	356	1	14.0
2	381	1	15.0
2	406	1	16.0
2	432	1	17.0
2	457	1	18.0
2	483	1	19.0
2	508	1	20.0
3	533	1	21.0
3	559	1	22.0
3	584	1	23.0
3	610	1	24.0
3	635	1	25.0
3	660	1	26.0
3	686	1	27.0
4	711	1	28.0
3	737	1	29.0
3	762	1	30.0
2	787	1	31.0
2	813	1	32.0
2	838	1	33.0
1	864	1	34.0
2	889	1	35.0
1	914	1	36.0
2	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-04

Project: *Saddleback Windfarm*
Location: White Salmon, WA

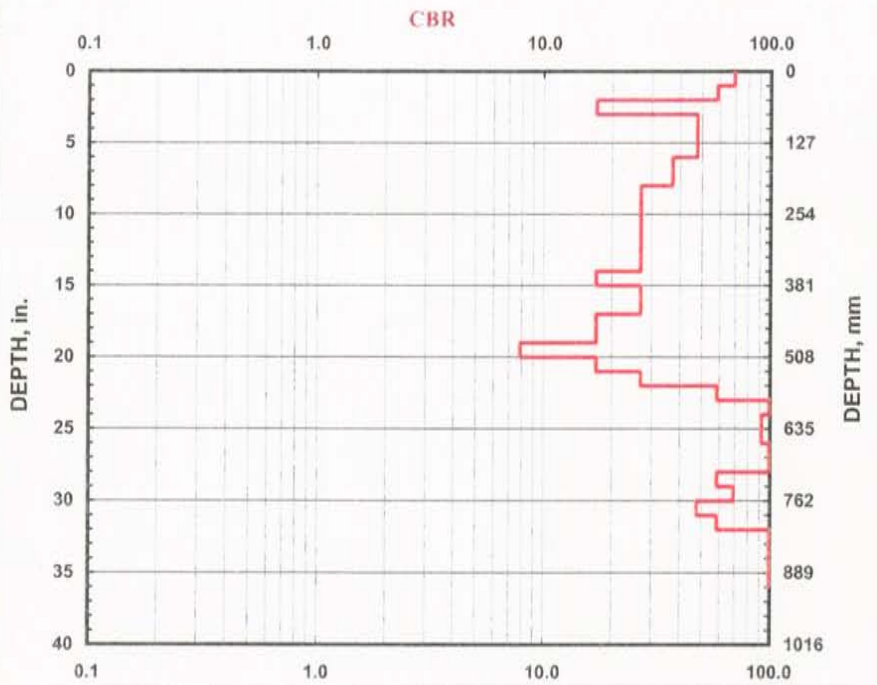
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

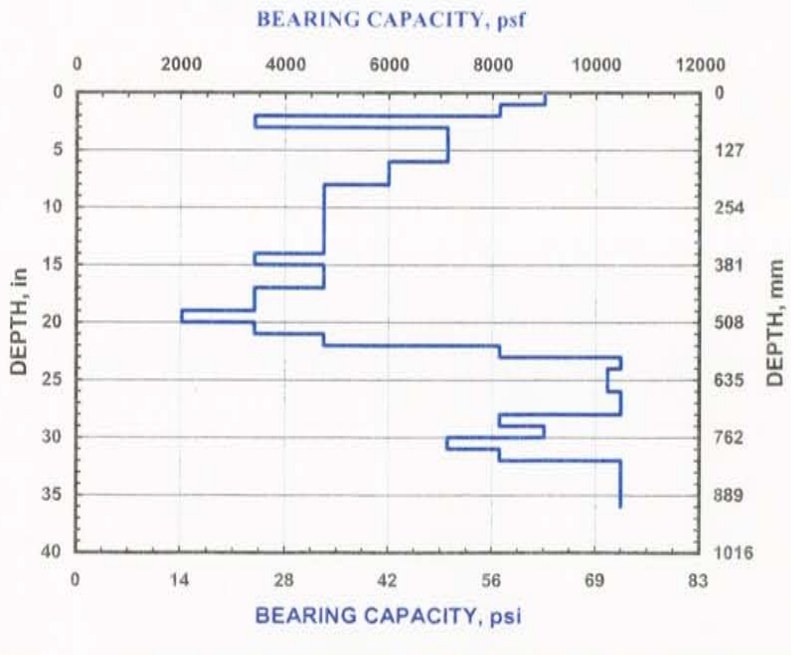
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
7	25	1	1.0
6	51	1	2.0
2	76	1	3.0
5	102	1	4.0
5	127	1	5.0
5	152	1	6.0
4	178	1	7.0
4	203	1	8.0
3	229	1	9.0
3	254	1	10.0
3	279	1	11.0
3	305	1	12.0
3	330	1	13.0
3	356	1	14.0
2	381	1	15.0
3	406	1	16.0
3	432	1	17.0
2	457	1	18.0
2	483	1	19.0
1	508	1	20.0
2	533	1	21.0
3	559	1	22.0
6	584	1	23.0
10	610	1	24.0
9	635	1	25.0
9	660	1	26.0
11	686	1	27.0
10	711	1	28.0
6	737	1	29.0
7	762	1	30.0
5	787	1	31.0
6	813	1	32.0
10	838	1	33.0
23	864	1	34.0
19	889	1	35.0
12	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-05

Project: *Saddleback Windfarm*
Location: White Salmon, WA

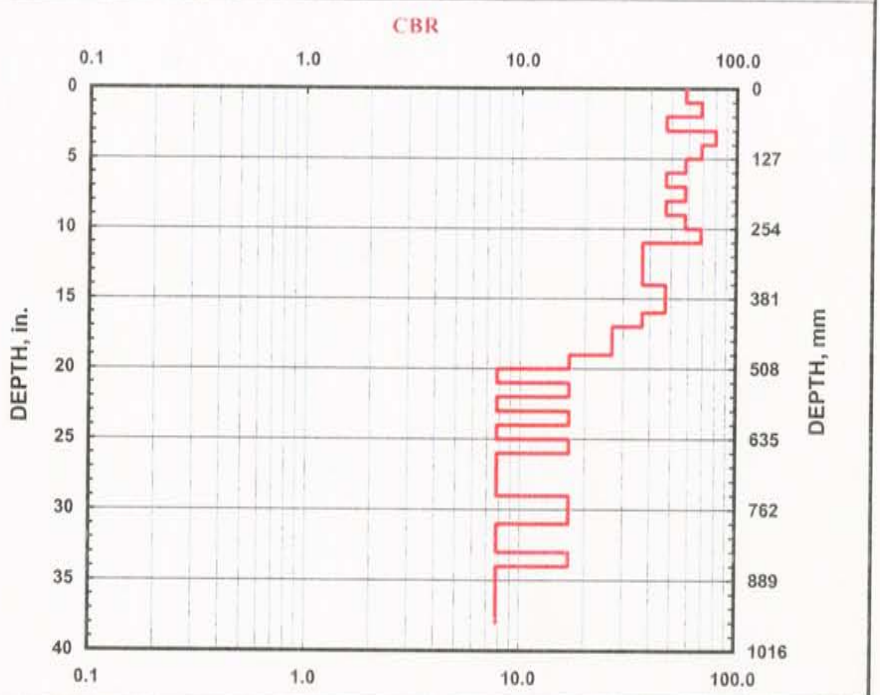
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

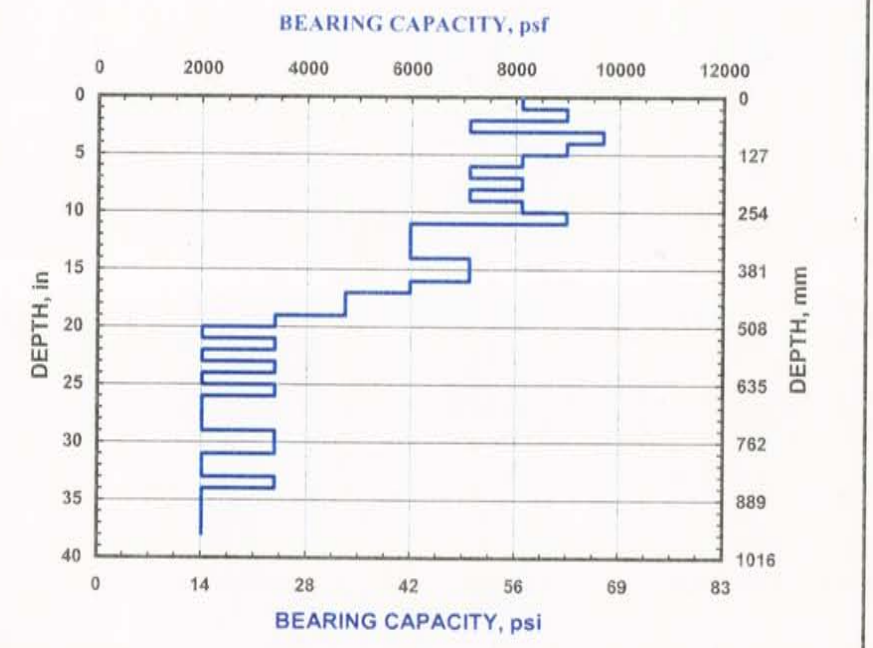
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
6	25	1	1.0
7	51	1	2.0
5	76	1	3.0
8	102	1	4.0
7	127	1	5.0
6	152	1	6.0
5	178	1	7.0
6	203	1	8.0
5	229	1	9.0
6	254	1	10.0
7	279	1	11.0
4	305	1	12.0
4	330	1	13.0
4	356	1	14.0
5	381	1	15.0
5	406	1	16.0
4	432	1	17.0
3	457	1	18.0
3	483	1	19.0
2	508	1	20.0
1	533	1	21.0
2	559	1	22.0
1	584	1	23.0
2	610	1	24.0
1	635	1	25.0
2	660	1	26.0
1	686	1	27.0
1	711	1	28.0
1	737	1	29.0
2	762	1	30.0
2	787	1	31.0
1	813	1	32.0
1	838	1	33.0
2	864	1	34.0
1	889	1	35.0
1	914	1	36.0
1	940	1	37.0
1	965	1	38.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-06

Project: *Saddleback Windfarm*
Location: White Salmon, WA

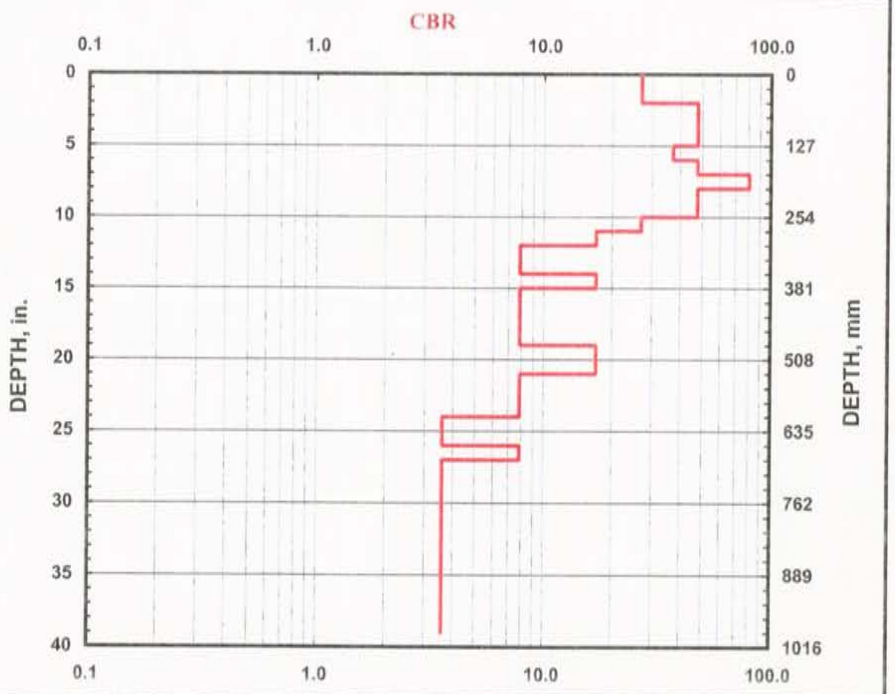
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

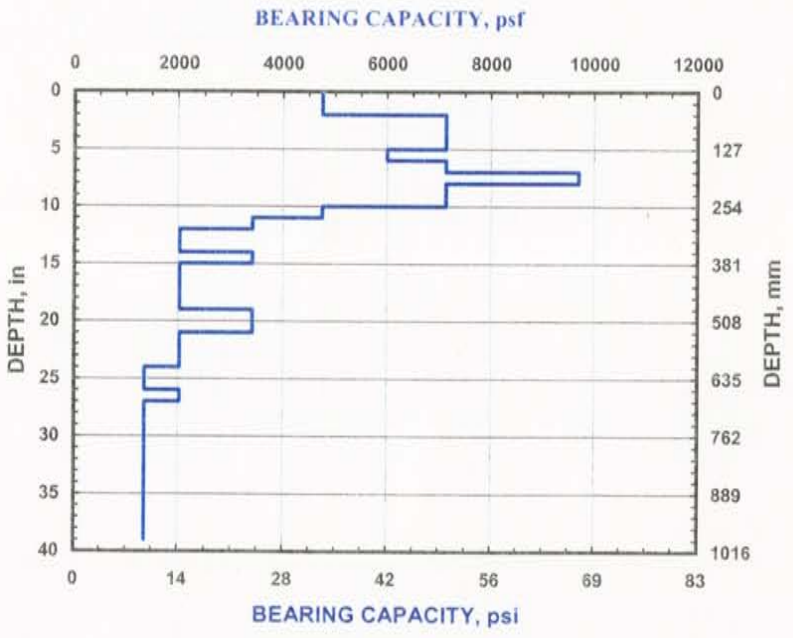
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
3	25	1	1.0
3	51	1	2.0
5	76	1	3.0
5	102	1	4.0
5	127	1	5.0
4	152	1	6.0
5	178	1	7.0
8	203	1	8.0
5	229	1	9.0
5	254	1	10.0
3	279	1	11.0
2	305	1	12.0
1	330	1	13.0
1	356	1	14.0
2	381	1	15.0
1	406	1	16.0
1	432	1	17.0
1	457	1	18.0
1	483	1	19.0
2	508	1	20.0
2	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	610	1	24.0
1	660	1	26.0
1	686	1	27.0
1	737	1	29.0
1	787	1	31.0
1	838	1	33.0
1	889	1	35.0
1	940	1	37.0
1	991	1	39.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-07

Project: *Saddleback Windfarm*
Location: White Salmon, WA

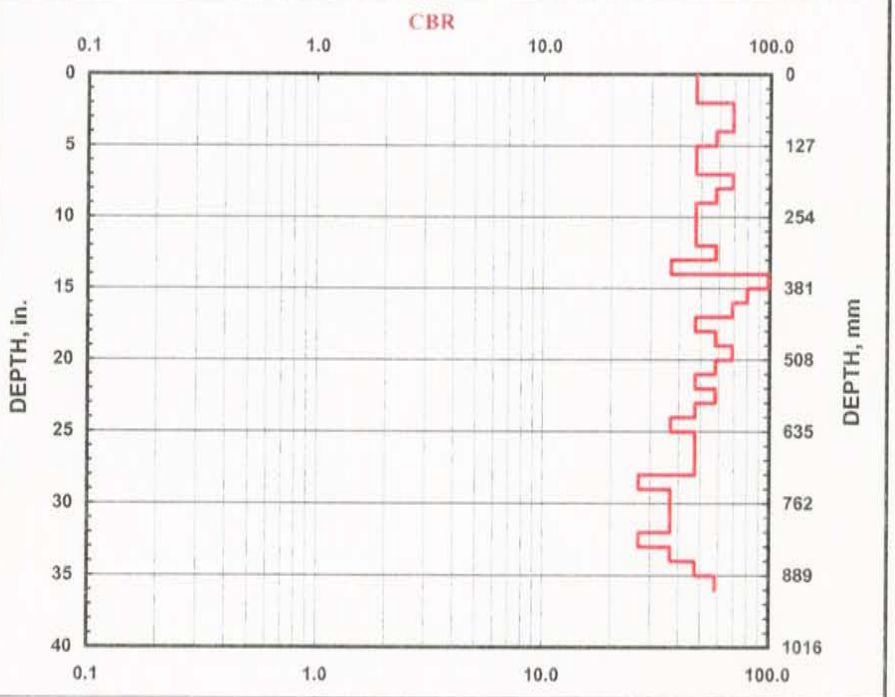
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

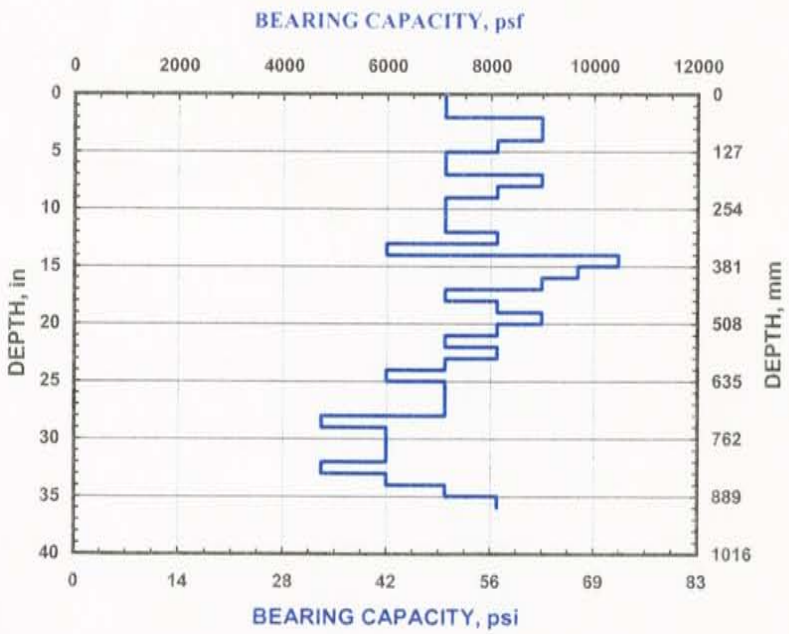
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
5	25	1	1.0
5	51	1	2.0
7	76	1	3.0
7	102	1	4.0
6	127	1	5.0
5	152	1	6.0
5	178	1	7.0
7	203	1	8.0
6	229	1	9.0
5	254	1	10.0
5	279	1	11.0
5	305	1	12.0
6	330	1	13.0
4	356	1	14.0
10	381	1	15.0
8	406	1	16.0
7	432	1	17.0
5	457	1	18.0
6	483	1	19.0
7	508	1	20.0
6	533	1	21.0
5	559	1	22.0
6	584	1	23.0
5	610	1	24.0
4	635	1	25.0
5	660	1	26.0
5	686	1	27.0
5	711	1	28.0
3	737	1	29.0
4	762	1	30.0
4	787	1	31.0
4	813	1	32.0
3	838	1	33.0
4	864	1	34.0
5	889	1	35.0
6	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-08

Project: *Saddleback Windfarm*
Location: White Salmon, WA

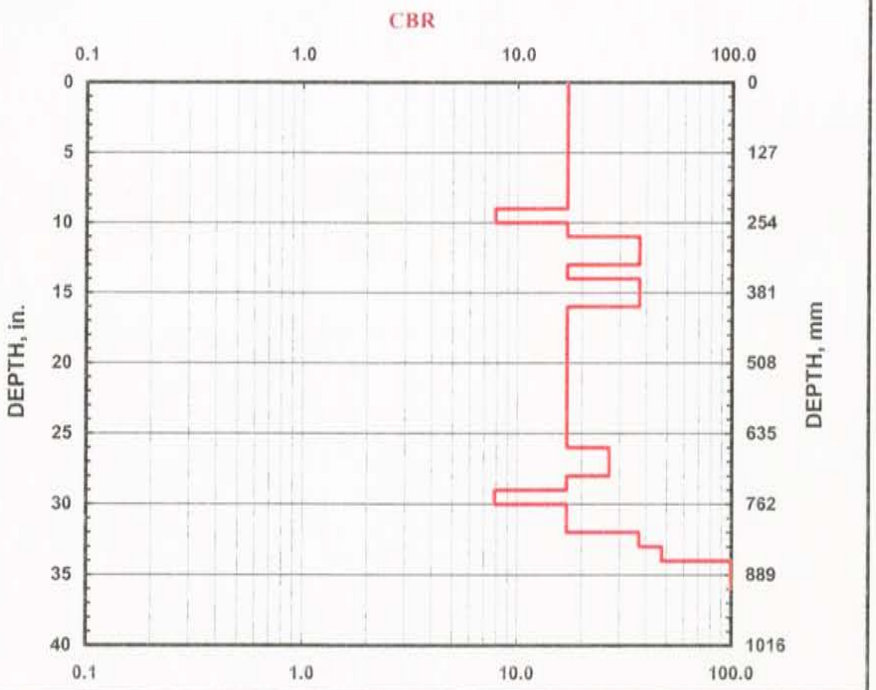
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

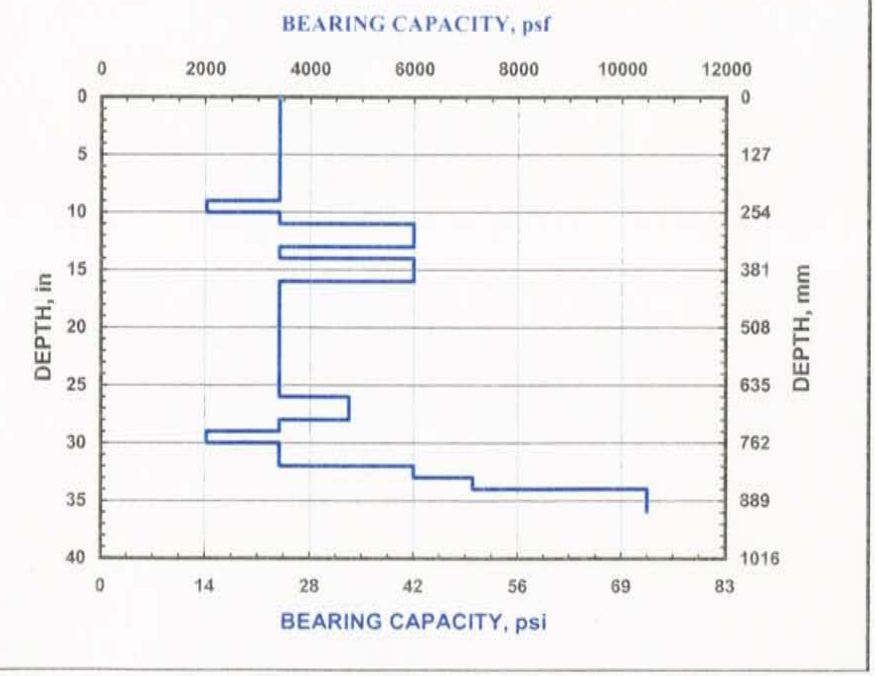
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
2	51	1	2.0
2	76	1	3.0
2	102	1	4.0
2	127	1	5.0
2	152	1	6.0
2	178	1	7.0
2	203	1	8.0
2	229	1	9.0
1	254	1	10.0
2	279	1	11.0
4	305	1	12.0
4	330	1	13.0
2	356	1	14.0
4	381	1	15.0
4	406	1	16.0
2	432	1	17.0
2	457	1	18.0
2	483	1	19.0
2	508	1	20.0
2	533	1	21.0
2	559	1	22.0
2	584	1	23.0
2	610	1	24.0
2	635	1	25.0
2	660	1	26.0
3	686	1	27.0
3	711	1	28.0
2	737	1	29.0
1	762	1	30.0
2	787	1	31.0
2	813	1	32.0
4	838	1	33.0
5	864	1	34.0
12	889	1	35.0
11	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-09

Project: *Saddleback Windfarm*
Location: White Salmon, WA

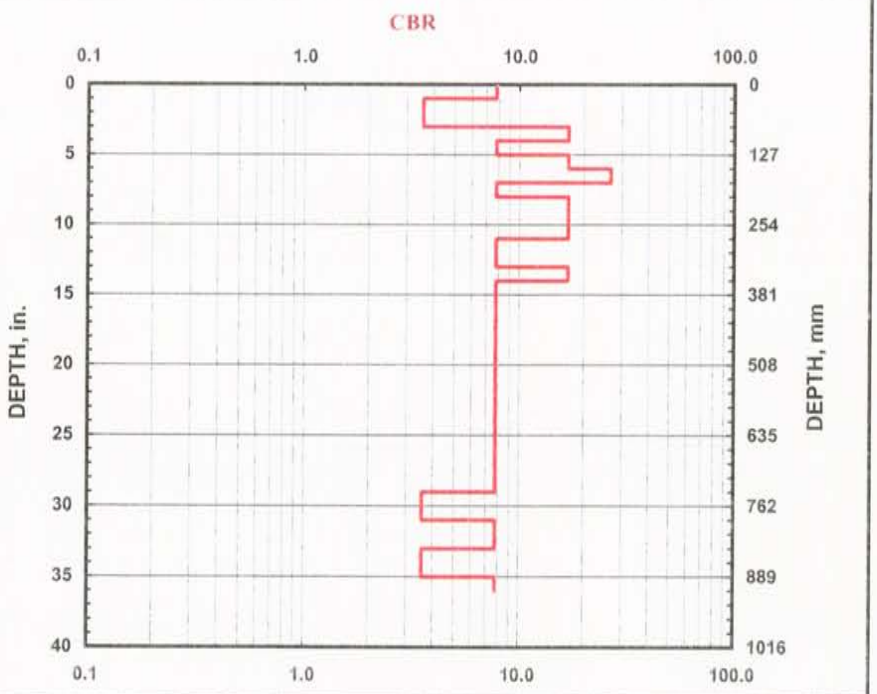
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

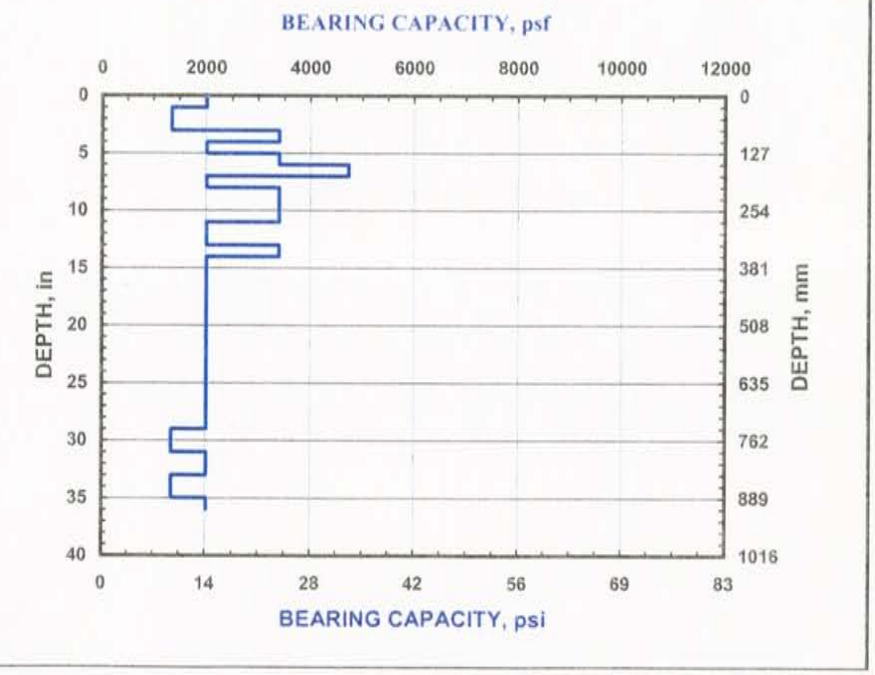
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
1	25	1	1.0
1	76	1	3.0
2	102	1	4.0
1	127	1	5.0
2	152	1	6.0
3	178	1	7.0
1	203	1	8.0
2	229	1	9.0
2	254	1	10.0
2	279	1	11.0
1	305	1	12.0
1	330	1	13.0
2	356	1	14.0
1	381	1	15.0
1	406	1	16.0
1	432	1	17.0
1	457	1	18.0
1	483	1	19.0
1	508	1	20.0
1	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	610	1	24.0
1	635	1	25.0
1	660	1	26.0
1	686	1	27.0
1	711	1	28.0
1	737	1	29.0
1	787	1	31.0
1	813	1	32.0
1	838	1	33.0
1	889	1	35.0
1	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-10

Project: *Saddleback Windfarm*
Location: White Salmon, WA

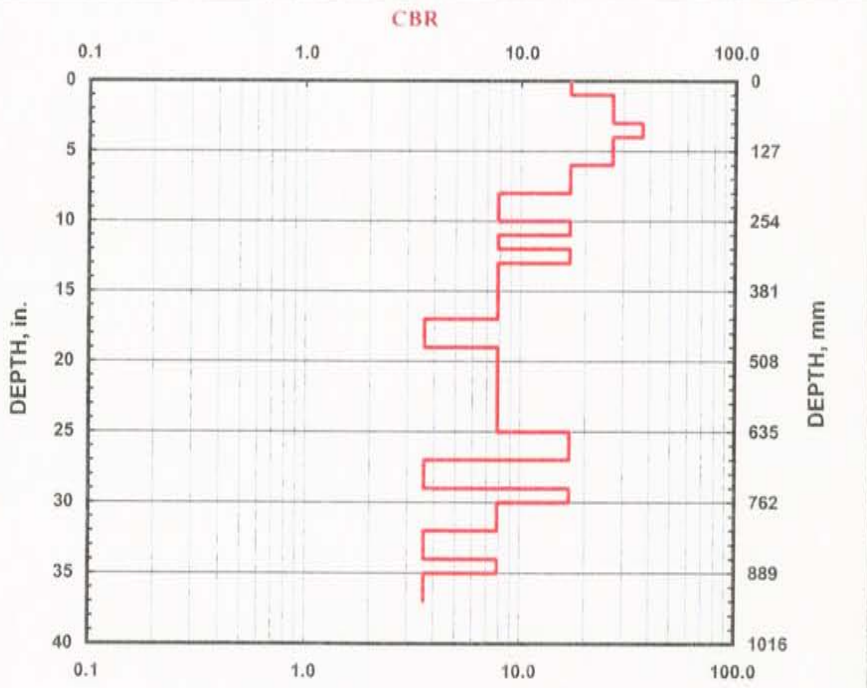
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

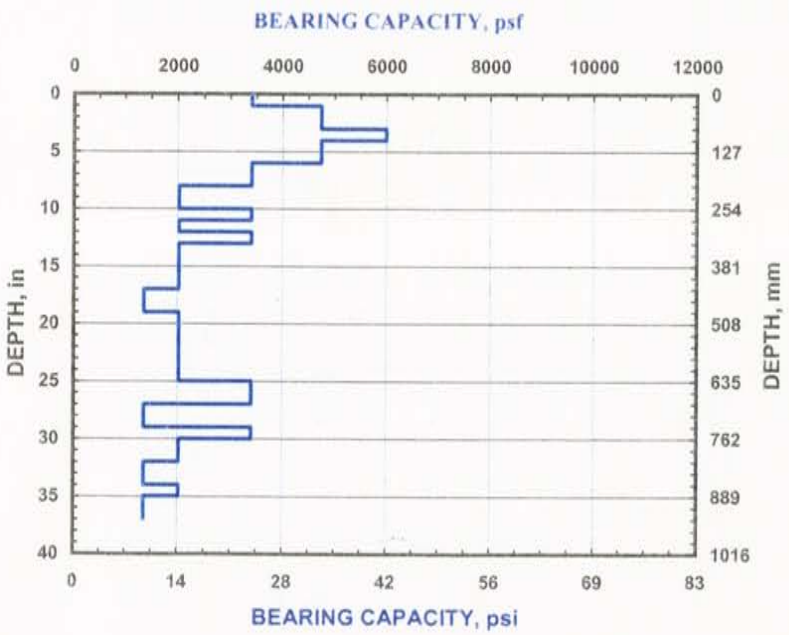
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
3	51	1	2.0
3	76	1	3.0
4	102	1	4.0
3	127	1	5.0
3	152	1	6.0
2	178	1	7.0
2	203	1	8.0
1	229	1	9.0
1	254	1	10.0
2	279	1	11.0
1	305	1	12.0
2	330	1	13.0
1	356	1	14.0
1	381	1	15.0
1	406	1	16.0
1	432	1	17.0
1	483	1	19.0
1	508	1	20.0
1	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	610	1	24.0
1	635	1	25.0
2	660	1	26.0
2	686	1	27.0
1	737	1	29.0
2	762	1	30.0
1	787	1	31.0
1	813	1	32.0
1	864	1	34.0
1	889	1	35.0
1	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-11

Project: *Saddleback Windfarm*
Location: White Salmon, WA

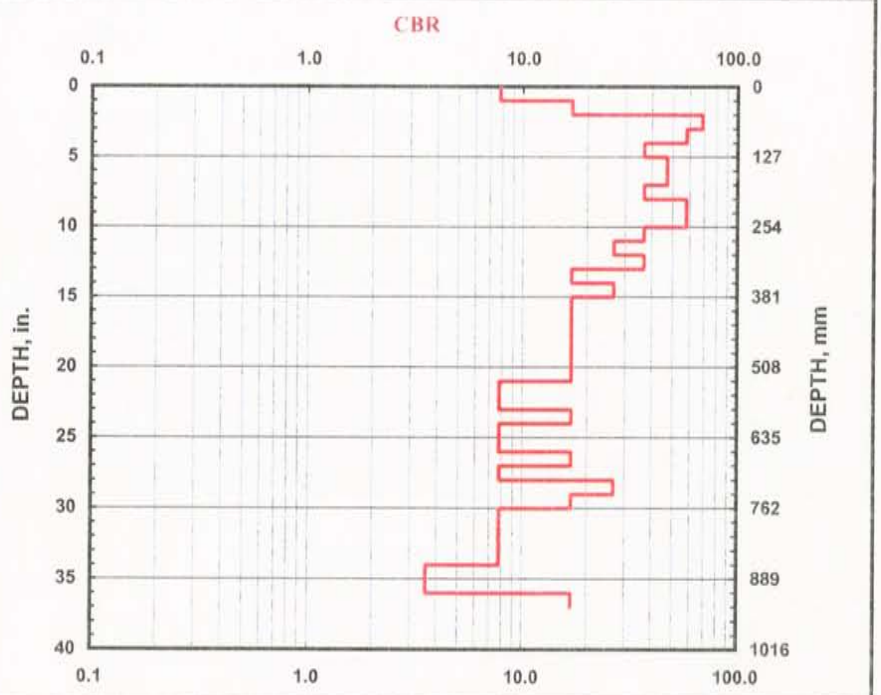
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

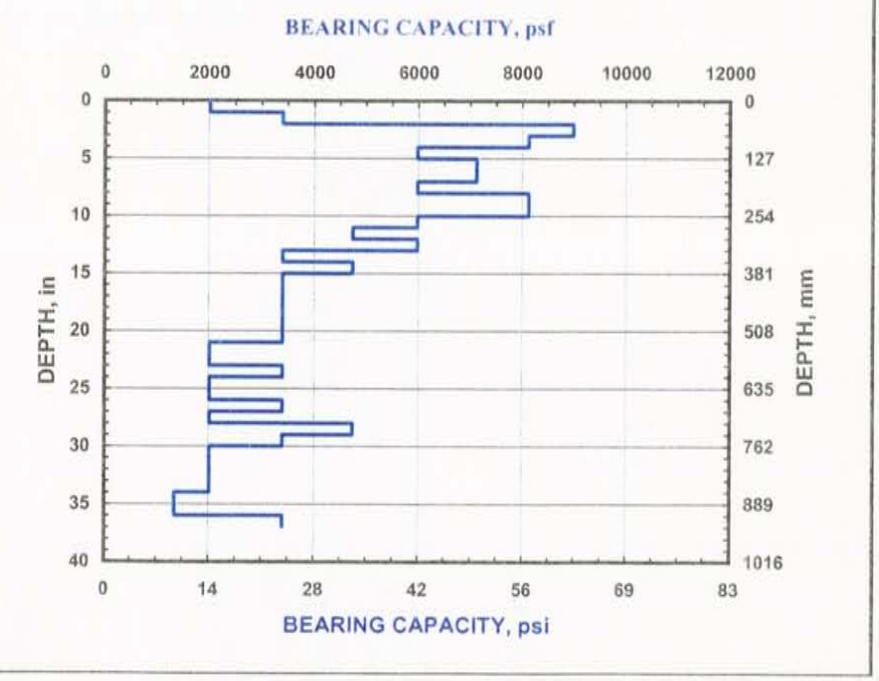
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
1	25	1	1.0
2	51	1	2.0
7	76	1	3.0
6	102	1	4.0
4	127	1	5.0
5	152	1	6.0
5	178	1	7.0
4	203	1	8.0
6	229	1	9.0
6	254	1	10.0
4	279	1	11.0
3	305	1	12.0
4	330	1	13.0
2	356	1	14.0
3	381	1	15.0
2	406	1	16.0
2	432	1	17.0
2	457	1	18.0
2	483	1	19.0
2	508	1	20.0
2	533	1	21.0
1	559	1	22.0
1	584	1	23.0
2	610	1	24.0
1	635	1	25.0
1	660	1	26.0
2	686	1	27.0
1	711	1	28.0
3	737	1	29.0
2	762	1	30.0
1	787	1	31.0
1	813	1	32.0
1	838	1	33.0
1	864	1	34.0
1	914	1	36.0
2	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-12

Project: *Saddleback Windfarm*
Location: White Salmon, WA

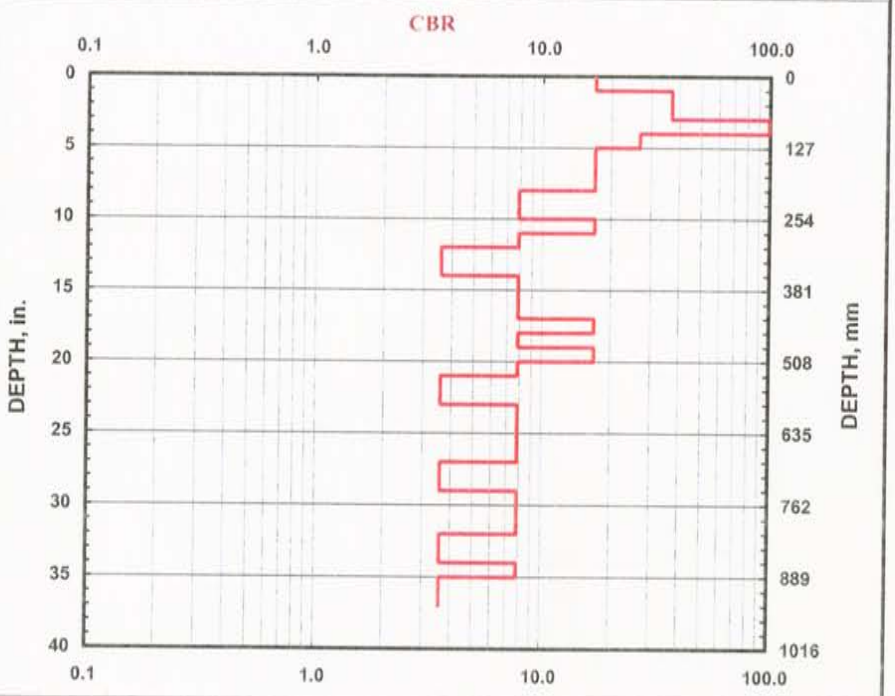
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

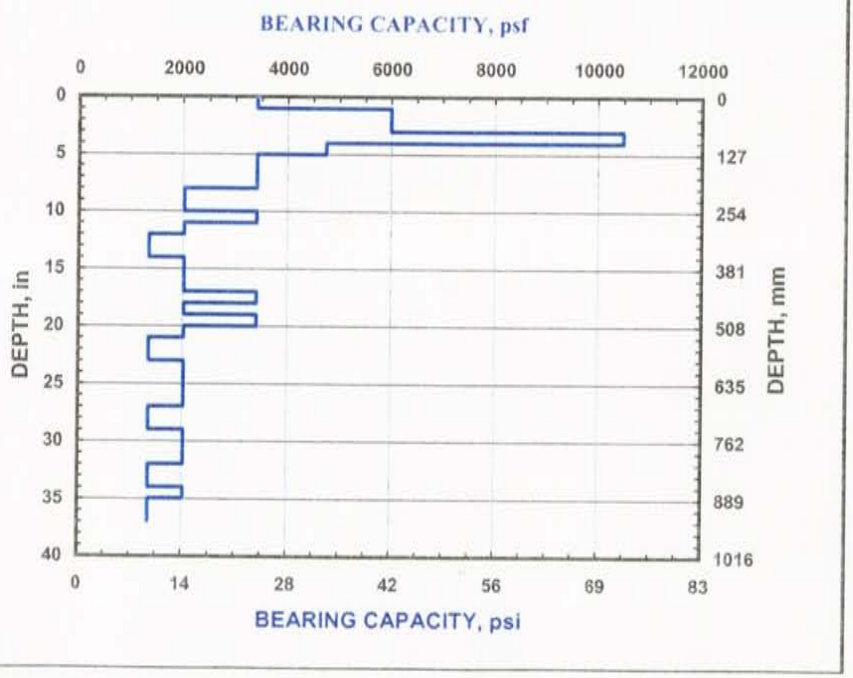
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
4	51	1	2.0
4	76	1	3.0
15	102	1	4.0
3	127	1	5.0
2	152	1	6.0
2	178	1	7.0
2	203	1	8.0
1	229	1	9.0
1	254	1	10.0
2	279	1	11.0
1	305	1	12.0
1	356	1	14.0
1	381	1	15.0
1	406	1	16.0
1	432	1	17.0
2	457	1	18.0
1	483	1	19.0
2	508	1	20.0
1	533	1	21.0
1	584	1	23.0
1	610	1	24.0
1	635	1	25.0
1	660	1	26.0
1	686	1	27.0
1	737	1	29.0
1	762	1	30.0
1	787	1	31.0
1	813	1	32.0
1	864	1	34.0
1	889	1	35.0
1	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-13

Project: *Saddleback Windfarm*
Location: White Salmon, WA

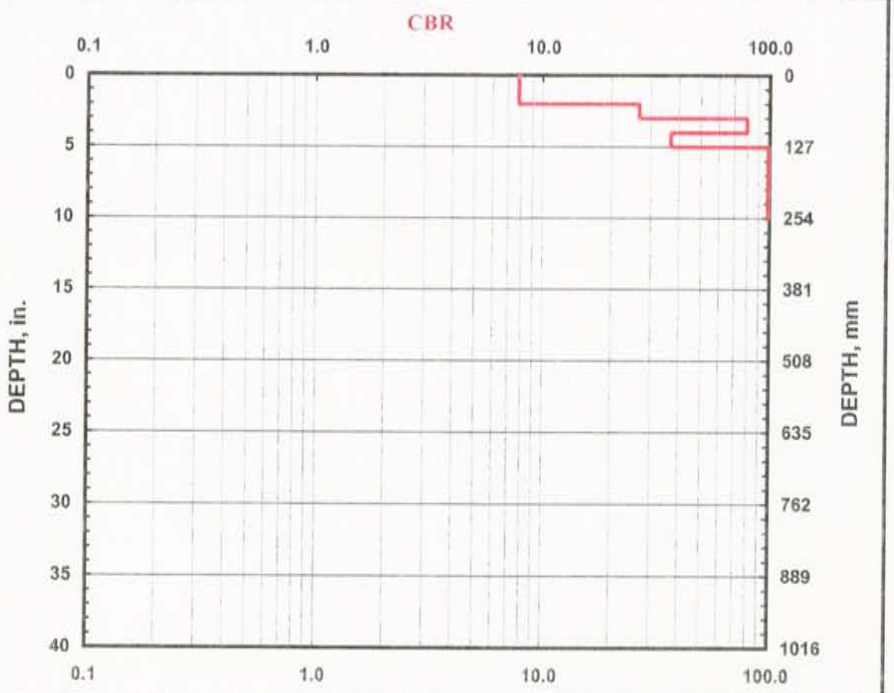
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

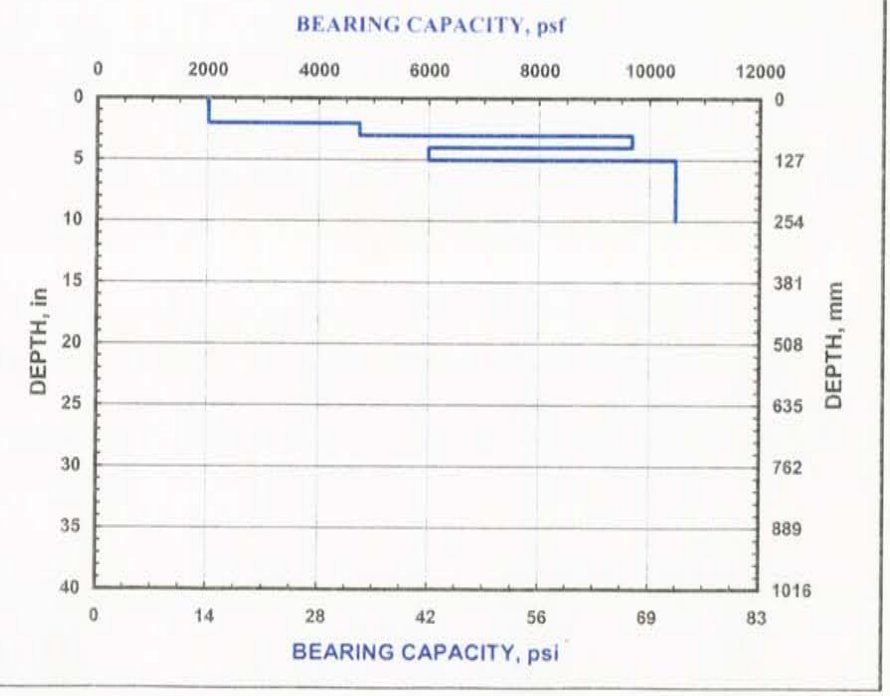
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
1	25	1	1.0
1	51	1	2.0
3	76	1	3.0
8	102	1	4.0
4	127	1	5.0
17	152	1	6.0
14	178	1	7.0
20	203	1	8.0
15	229	1	9.0
16	254	1	10.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-14

Project: *Saddleback Windfarm*
Location: White Salmon, WA

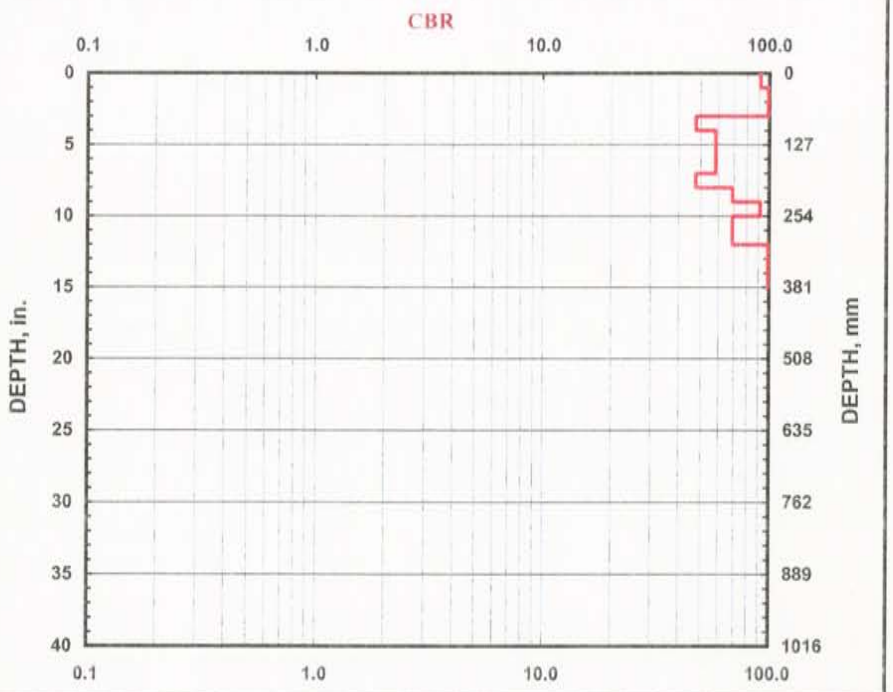
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

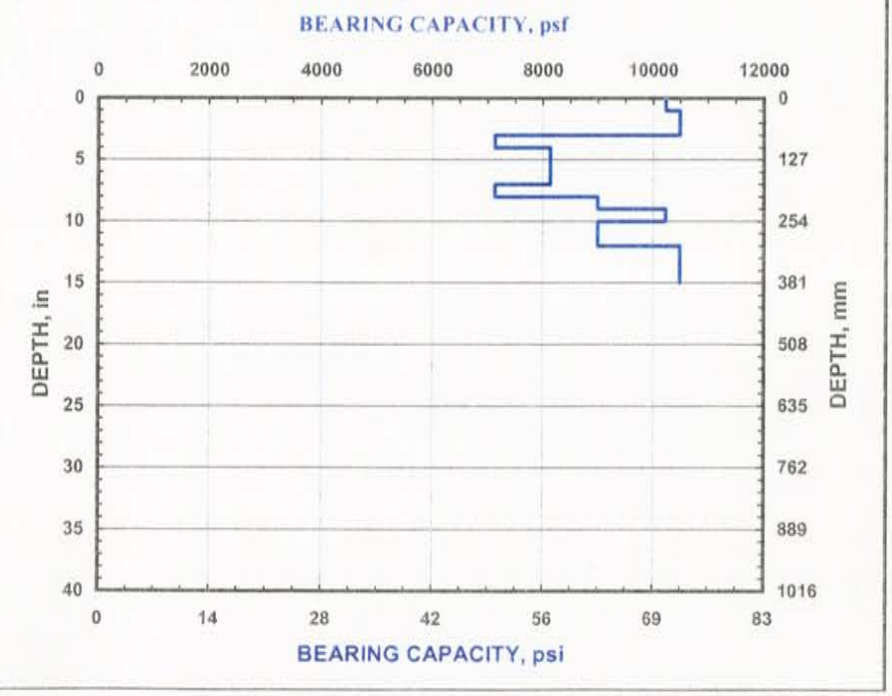
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
9	25	1	1.0
23	51	1	2.0
11	76	1	3.0
5	102	1	4.0
6	127	1	5.0
6	152	1	6.0
6	178	1	7.0
5	203	1	8.0
7	229	1	9.0
9	254	1	10.0
7	279	1	11.0
7	305	1	12.0
10	330	1	13.0
28	356	1	14.0
50	381	1	15.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-15

Project: *Saddleback Windfarm*
Location: White Salmon, WA

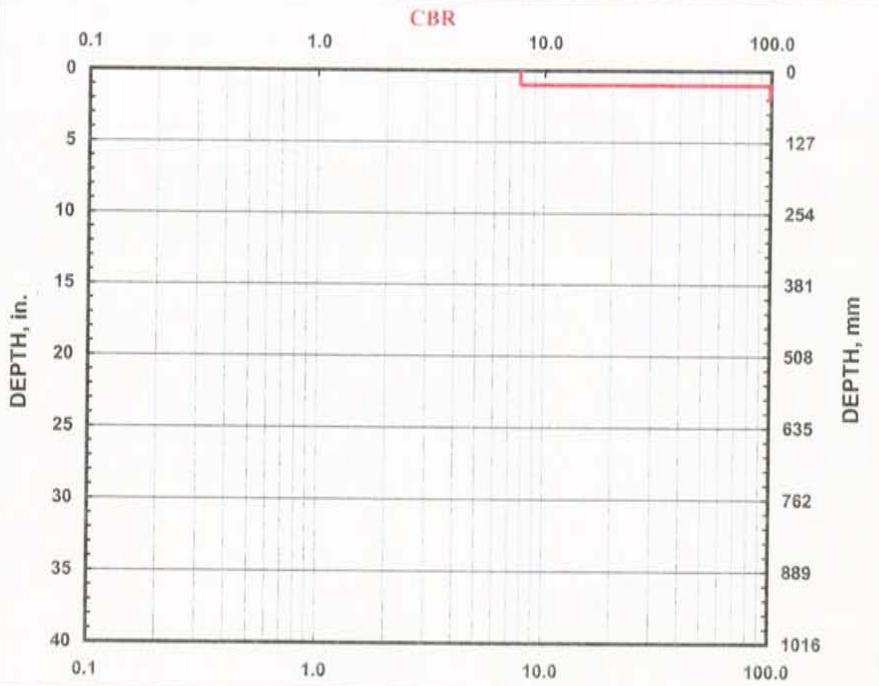
Date: 9/24/2007
Project No.: 33758687
Start: 0 feet bgs

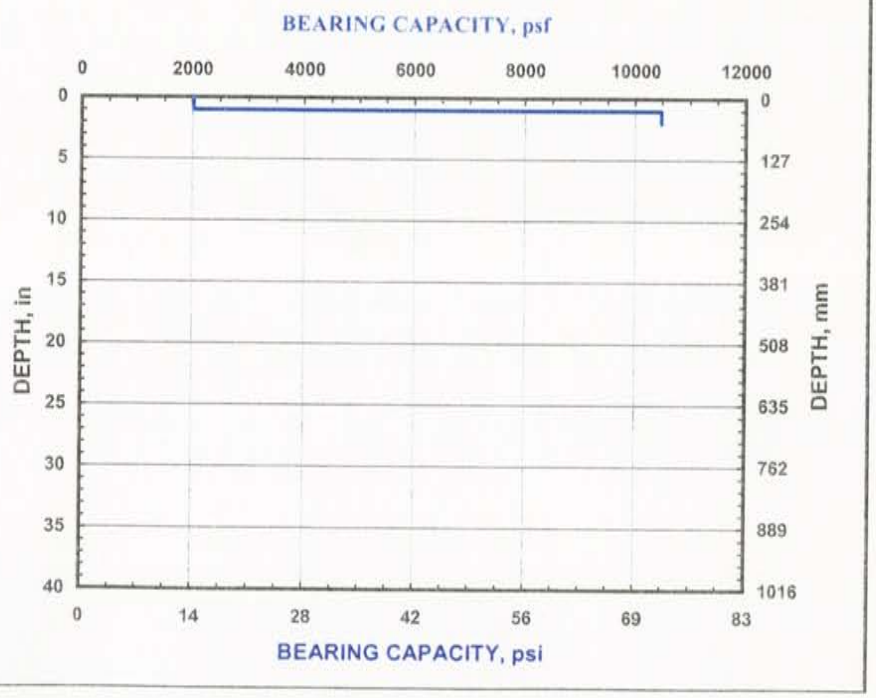
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
1	25	1	1.0
50	51	1	2.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-16

Project: *Saddleback Windfarm*
Location: White Salmon, WA

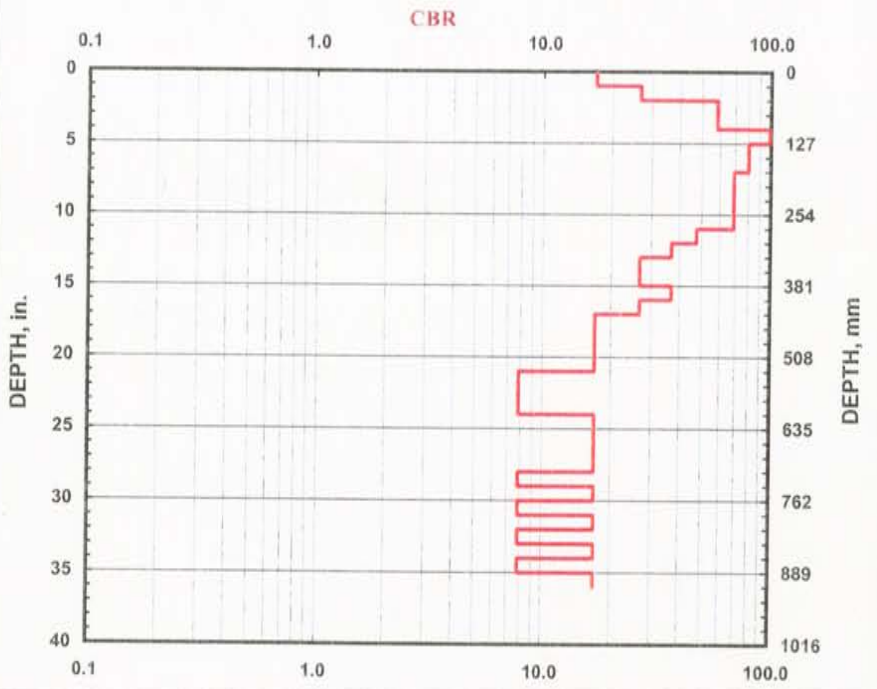
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

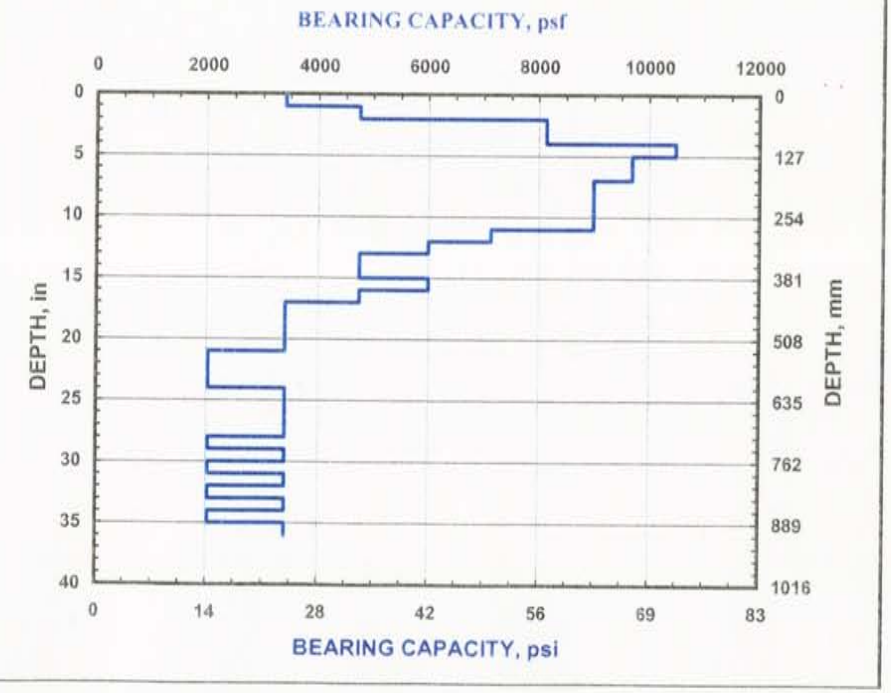
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
3	51	1	2.0
6	76	1	3.0
6	102	1	4.0
10	127	1	5.0
8	152	1	6.0
8	178	1	7.0
7	203	1	8.0
7	229	1	9.0
7	254	1	10.0
7	279	1	11.0
5	305	1	12.0
4	330	1	13.0
3	356	1	14.0
3	381	1	15.0
4	406	1	16.0
3	432	1	17.0
2	457	1	18.0
2	483	1	19.0
2	508	1	20.0
2	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	610	1	24.0
2	635	1	25.0
2	660	1	26.0
2	686	1	27.0
2	711	1	28.0
1	737	1	29.0
2	762	1	30.0
1	787	1	31.0
2	813	1	32.0
1	838	1	33.0
2	864	1	34.0
1	889	1	35.0
2	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-17

Project: *Saddleback Windfarm*
Location: White Salmon, WA

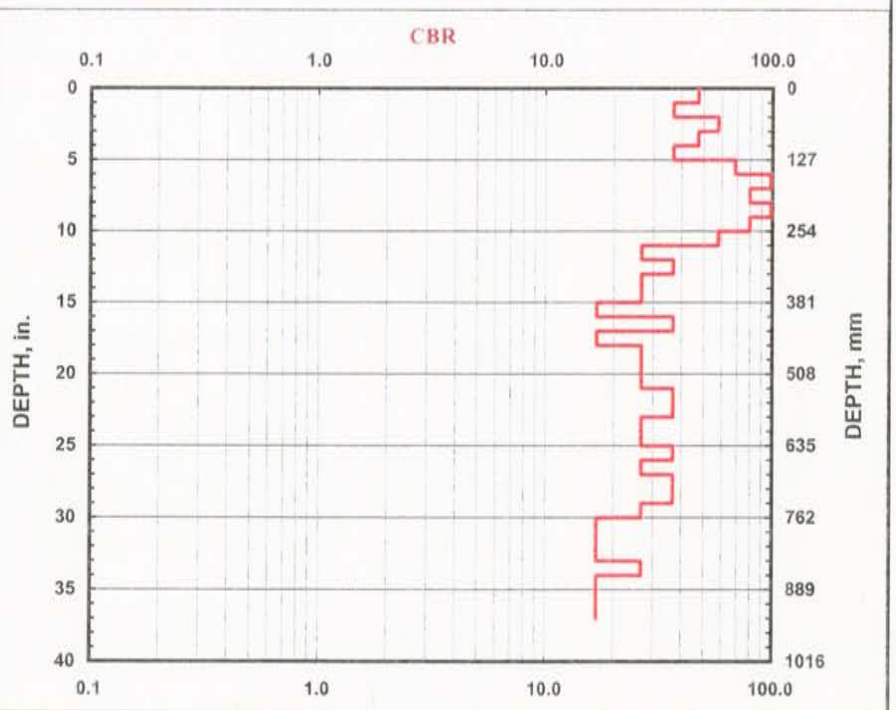
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

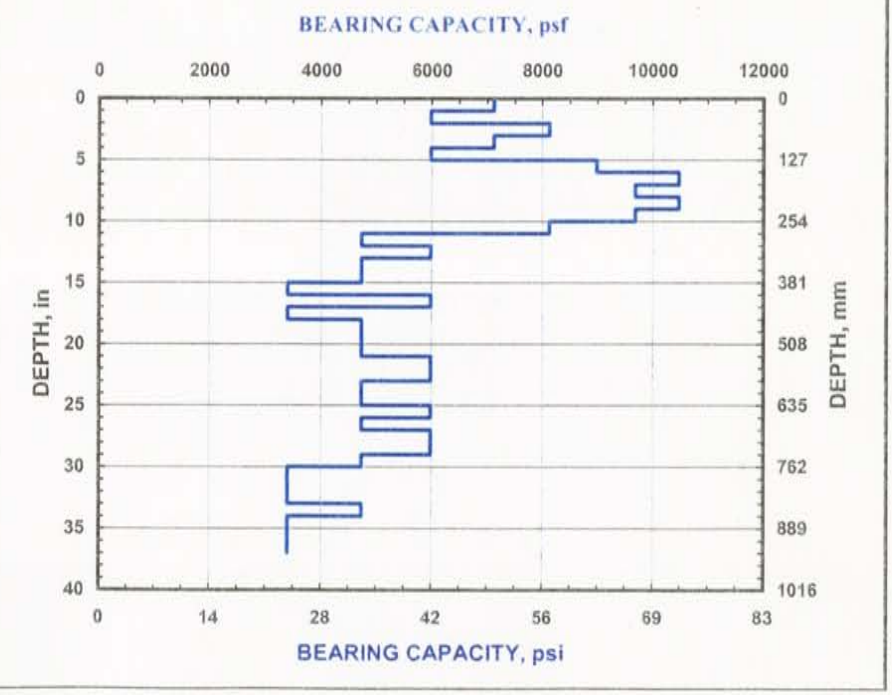
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
5	25	1	1.0
4	51	1	2.0
6	76	1	3.0
5	102	1	4.0
4	127	1	5.0
7	152	1	6.0
10	178	1	7.0
8	203	1	8.0
20	229	1	9.0
8	254	1	10.0
6	279	1	11.0
3	305	1	12.0
4	330	1	13.0
3	356	1	14.0
3	381	1	15.0
2	406	1	16.0
4	432	1	17.0
2	457	1	18.0
3	483	1	19.0
3	508	1	20.0
3	533	1	21.0
4	559	1	22.0
4	584	1	23.0
3	610	1	24.0
3	635	1	25.0
4	660	1	26.0
3	686	1	27.0
4	711	1	28.0
4	737	1	29.0
3	762	1	30.0
2	787	1	31.0
2	813	1	32.0
2	838	1	33.0
3	864	1	34.0
2	889	1	35.0
2	914	1	36.0
2	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-18

Project: *Saddleback Windfarm*
Location: White Salmon, WA

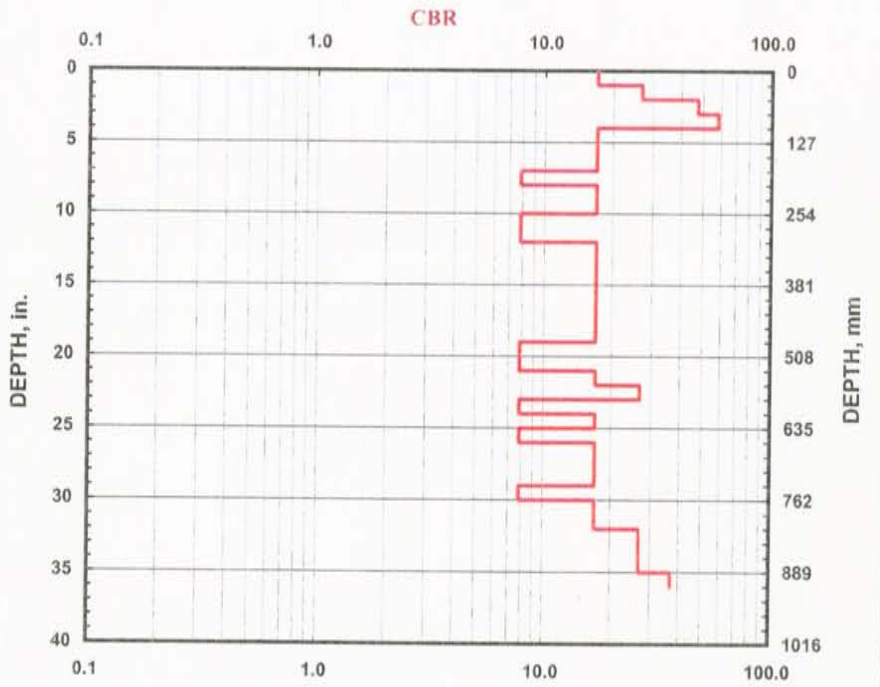
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

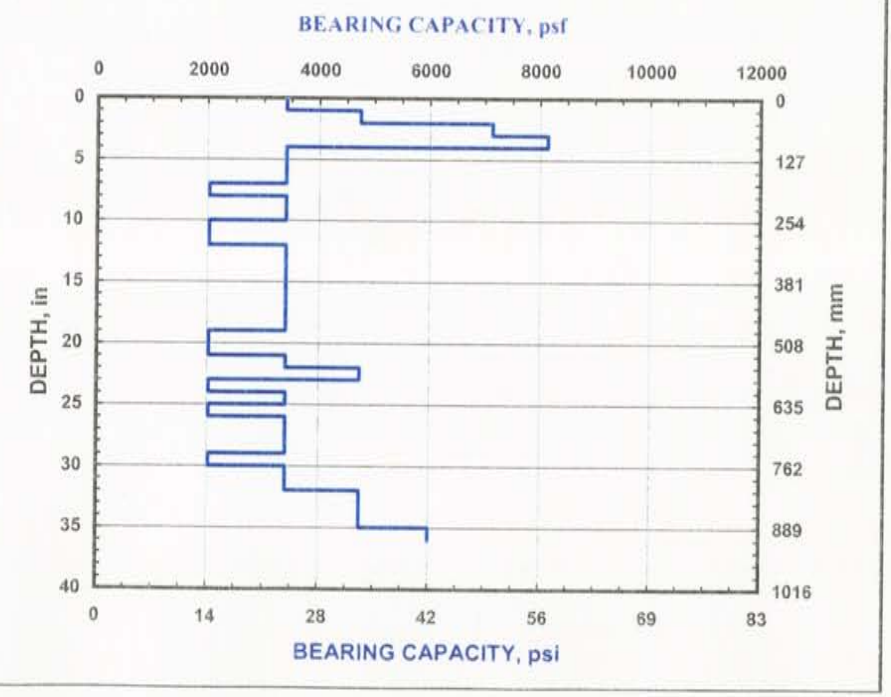
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
3	51	1	2.0
5	76	1	3.0
6	102	1	4.0
2	127	1	5.0
2	152	1	6.0
2	178	1	7.0
1	203	1	8.0
2	229	1	9.0
2	254	1	10.0
1	279	1	11.0
1	305	1	12.0
2	330	1	13.0
2	356	1	14.0
2	381	1	15.0
2	406	1	16.0
2	432	1	17.0
2	457	1	18.0
2	483	1	19.0
1	508	1	20.0
1	533	1	21.0
2	559	1	22.0
3	584	1	23.0
1	610	1	24.0
2	635	1	25.0
1	660	1	26.0
2	686	1	27.0
2	711	1	28.0
2	737	1	29.0
1	762	1	30.0
2	787	1	31.0
2	813	1	32.0
3	838	1	33.0
3	864	1	34.0
3	889	1	35.0
4	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-19

Project: *Saddleback Windfarm*
Location: White Salmon, WA

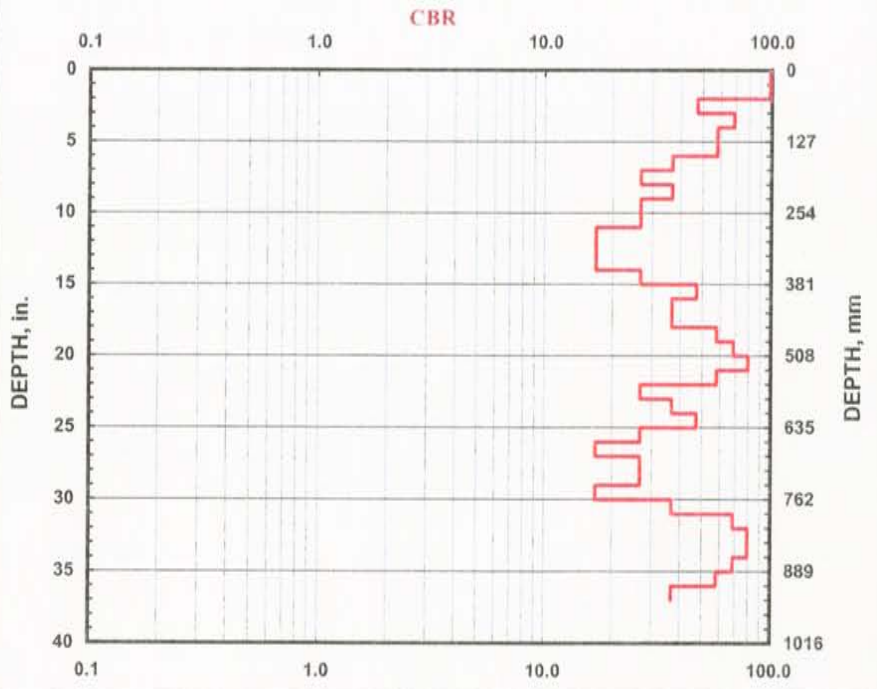
Date: 7/3/2007
Project No.: 33758687
Start: 0 feet bgs

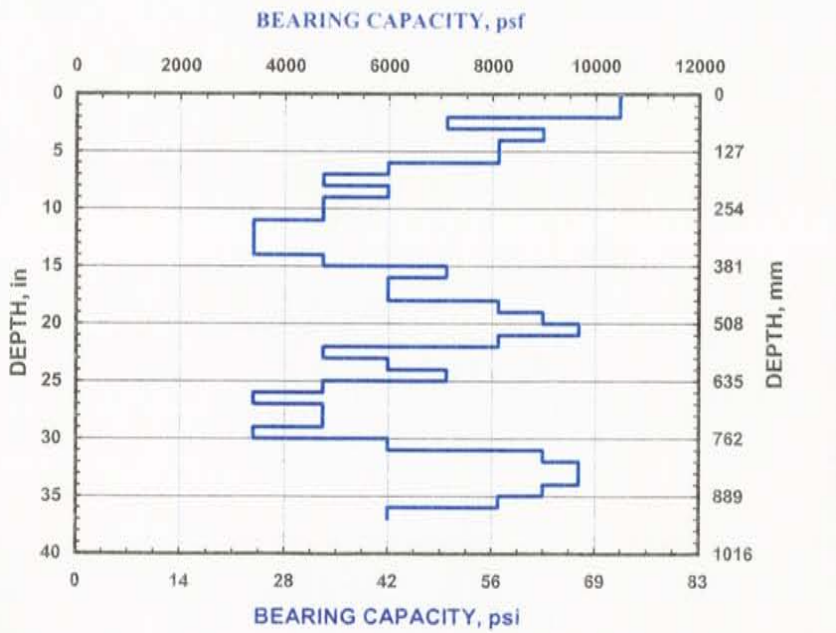
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
12	25	1	1.0
10	51	1	2.0
5	76	1	3.0
7	102	1	4.0
6	127	1	5.0
6	152	1	6.0
4	178	1	7.0
3	203	1	8.0
4	229	1	9.0
3	254	1	10.0
3	279	1	11.0
2	305	1	12.0
2	330	1	13.0
2	356	1	14.0
3	381	1	15.0
5	406	1	16.0
4	432	1	17.0
4	457	1	18.0
6	483	1	19.0
7	508	1	20.0
8	533	1	21.0
6	559	1	22.0
3	584	1	23.0
4	610	1	24.0
5	635	1	25.0
3	660	1	26.0
2	686	1	27.0
3	711	1	28.0
3	737	1	29.0
2	762	1	30.0
4	787	1	31.0
7	813	1	32.0
8	838	1	33.0
8	864	1	34.0
7	889	1	35.0
6	914	1	36.0
4	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-20

Project: *Saddleback Windfarm*
Location: White Salmon, WA

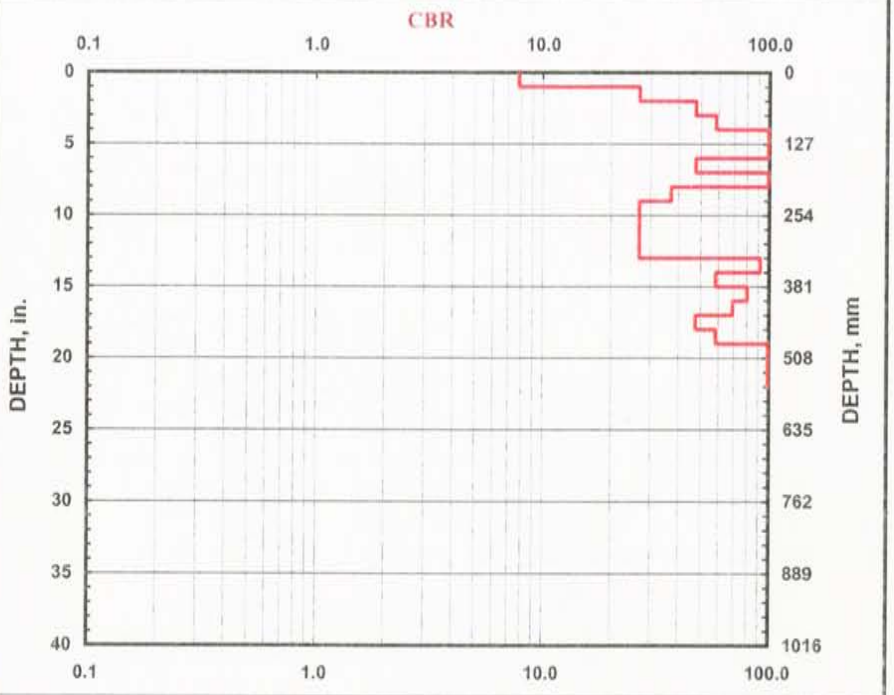
Date: 7/3/2007
Project No.: 33758687
Start: 0 feet bgs

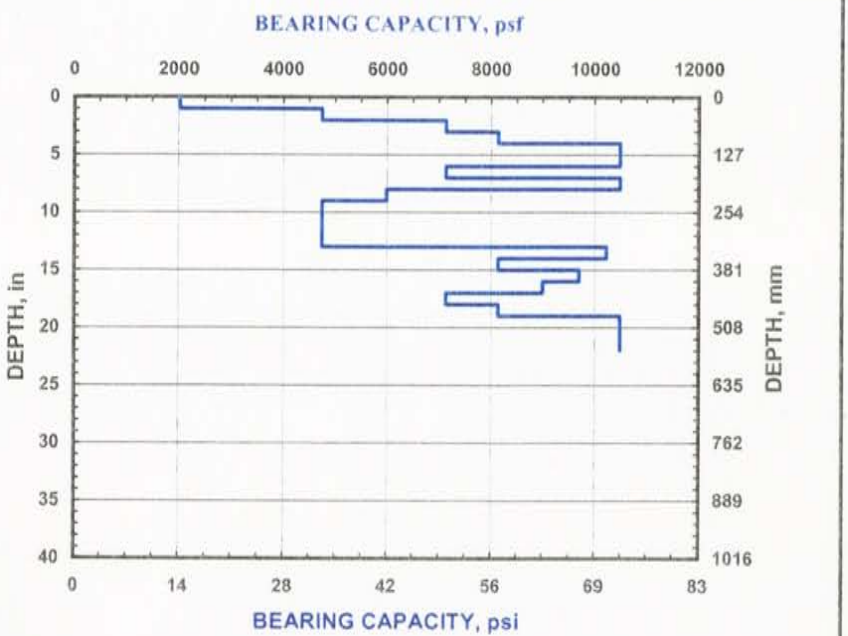
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
1	25	1	1.0
3	51	1	2.0
5	76	1	3.0
6	102	1	4.0
15	127	1	5.0
13	152	1	6.0
5	178	1	7.0
10	203	1	8.0
4	229	1	9.0
3	254	1	10.0
3	279	1	11.0
3	305	1	12.0
3	330	1	13.0
9	356	1	14.0
6	381	1	15.0
8	406	1	16.0
7	432	1	17.0
5	457	1	18.0
6	483	1	19.0
10	508	1	20.0
20	533	1	21.0
50	559	1	22.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-21

Project: *Saddleback Windfarm*
Location: White Salmon, WA

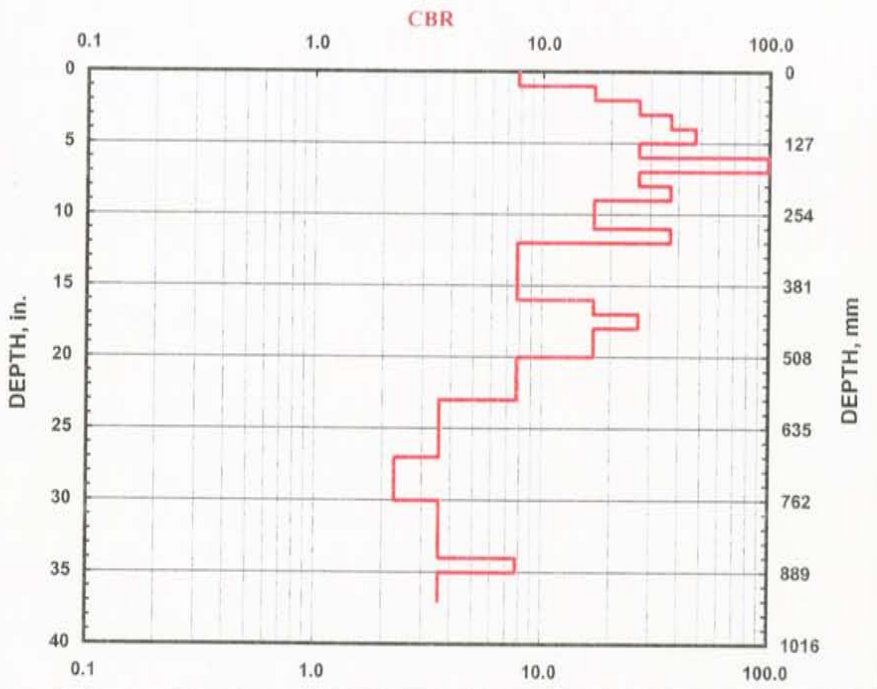
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

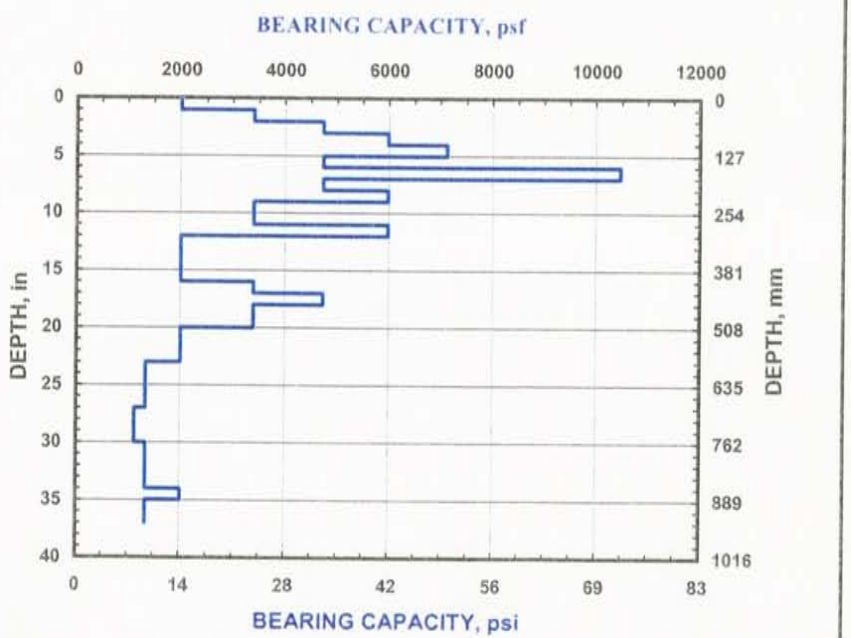
Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
1	25	1	1.0
2	51	1	2.0
3	76	1	3.0
4	102	1	4.0
5	127	1	5.0
3	152	1	6.0
11	178	1	7.0
3	203	1	8.0
4	229	1	9.0
2	254	1	10.0
2	279	1	11.0
4	305	1	12.0
1	330	1	13.0
1	356	1	14.0
1	381	1	15.0
1	406	1	16.0
2	432	1	17.0
3	457	1	18.0
2	483	1	19.0
2	508	1	20.0
1	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	635	1	25.0
1	686	1	27.0
1	762	1	30.0
1	813	1	32.0
1	864	1	34.0
1	889	1	35.0
1	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-22

Project: *Saddleback Windfarm*
Location: White Salmon, WA

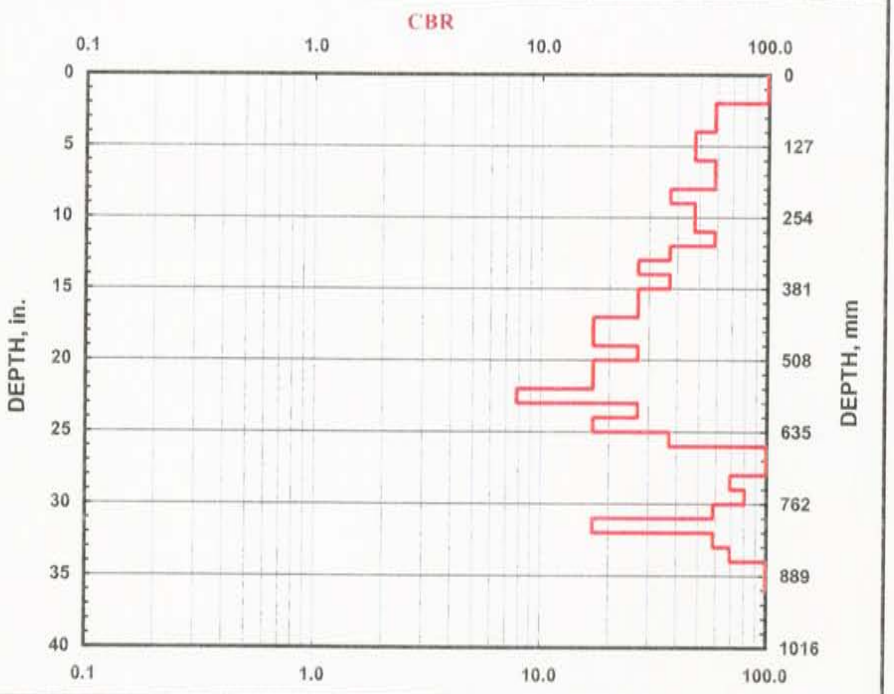
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

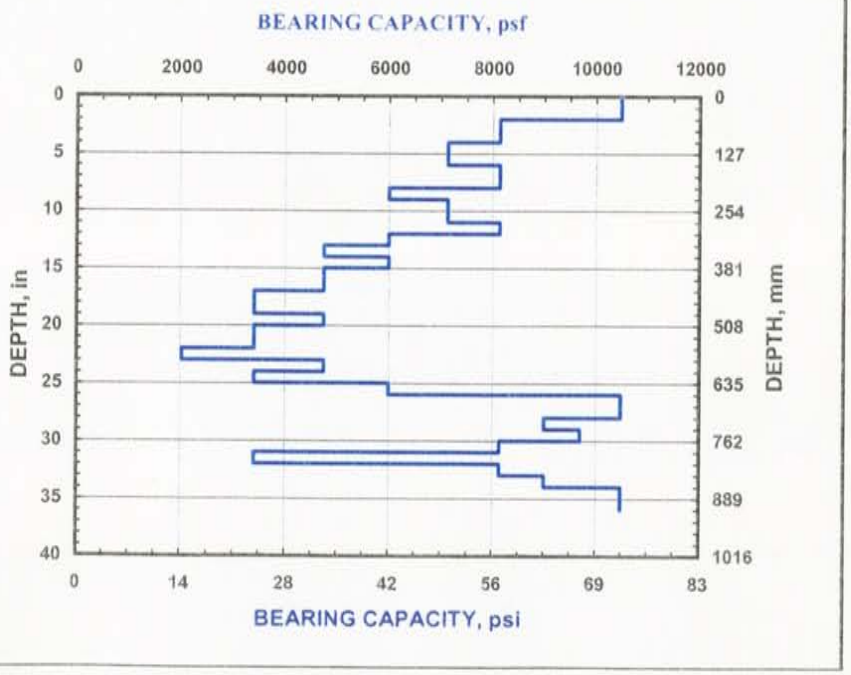
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
15	25	1	1.0
10	51	1	2.0
6	76	1	3.0
6	102	1	4.0
5	127	1	5.0
5	152	1	6.0
6	178	1	7.0
6	203	1	8.0
4	229	1	9.0
5	254	1	10.0
5	279	1	11.0
6	305	1	12.0
4	330	1	13.0
3	356	1	14.0
4	381	1	15.0
3	406	1	16.0
3	432	1	17.0
2	457	1	18.0
2	483	1	19.0
3	508	1	20.0
2	533	1	21.0
2	559	1	22.0
1	584	1	23.0
3	610	1	24.0
2	635	1	25.0
4	660	1	26.0
12	686	1	27.0
12	711	1	28.0
7	737	1	29.0
8	762	1	30.0
6	787	1	31.0
2	813	1	32.0
6	838	1	33.0
7	864	1	34.0
15	889	1	35.0
15	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-23

Project: *Saddleback Windfarm*
Location: White Salmon, WA

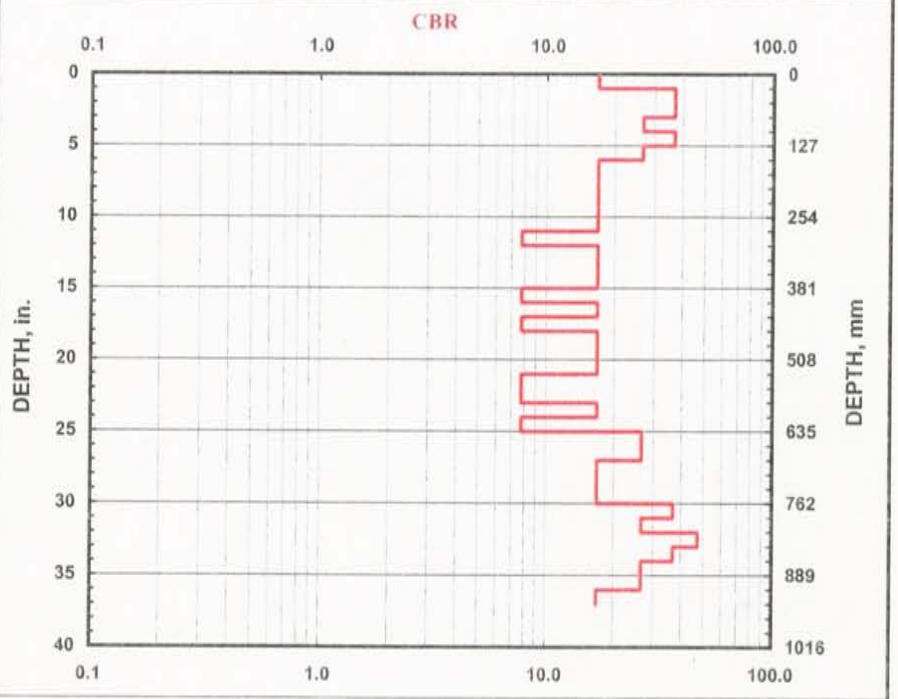
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

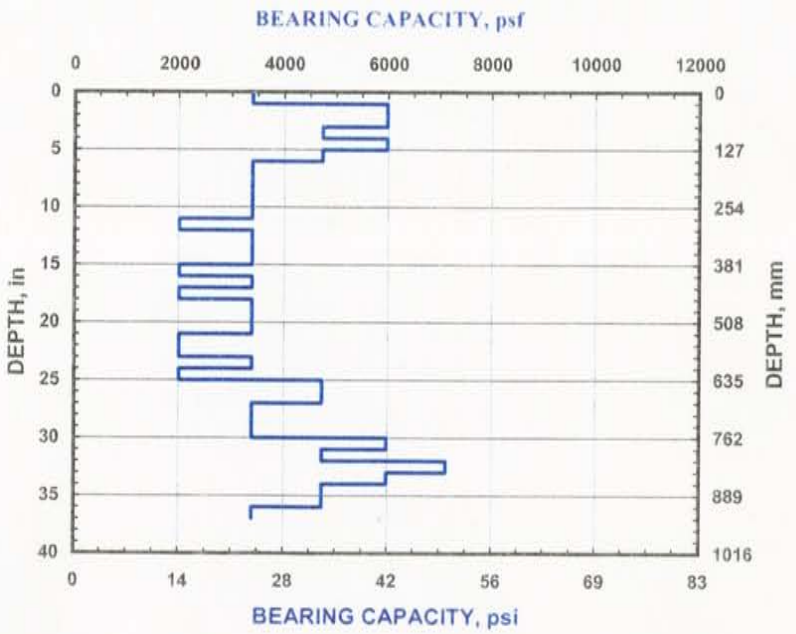
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
4	51	1	2.0
4	76	1	3.0
3	102	1	4.0
4	127	1	5.0
3	152	1	6.0
2	178	1	7.0
2	203	1	8.0
2	229	1	9.0
2	254	1	10.0
2	279	1	11.0
1	305	1	12.0
2	330	1	13.0
2	356	1	14.0
2	381	1	15.0
1	406	1	16.0
2	432	1	17.0
1	457	1	18.0
2	483	1	19.0
2	508	1	20.0
2	533	1	21.0
1	559	1	22.0
1	584	1	23.0
2	610	1	24.0
1	635	1	25.0
3	660	1	26.0
3	686	1	27.0
2	711	1	28.0
2	737	1	29.0
2	762	1	30.0
4	787	1	31.0
3	813	1	32.0
5	838	1	33.0
4	864	1	34.0
3	889	1	35.0
3	914	1	36.0
2	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-24

Project: *Saddleback Windfarm*
Location: White Salmon, WA

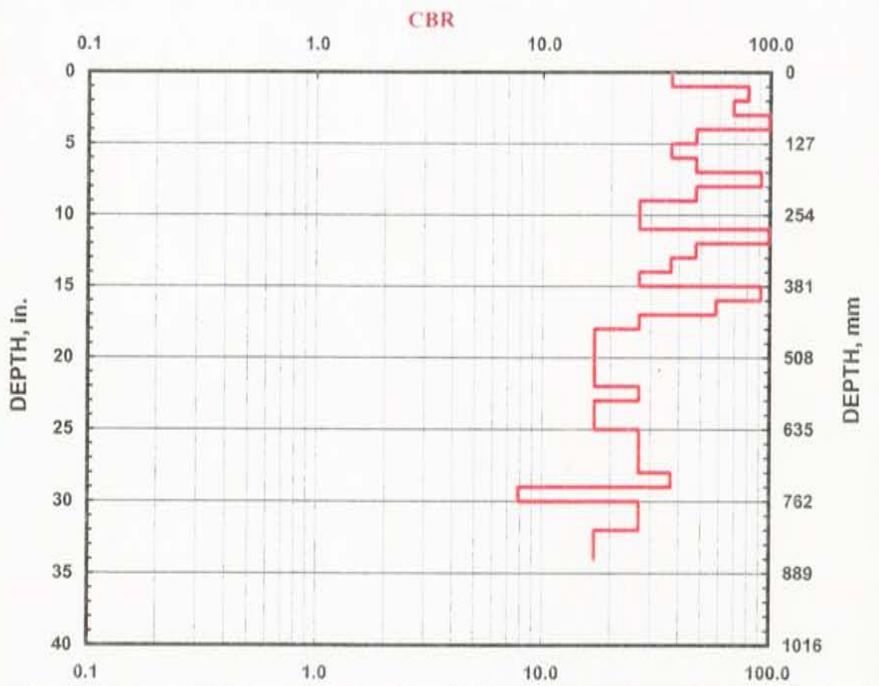
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

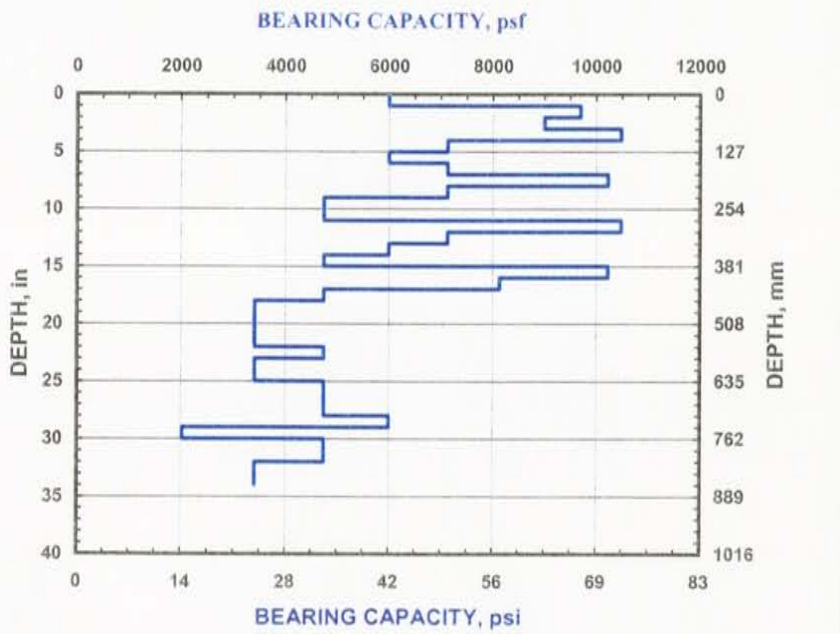
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
4	25	1	1.0
8	51	1	2.0
7	76	1	3.0
10	102	1	4.0
5	127	1	5.0
4	152	1	6.0
5	178	1	7.0
9	203	1	8.0
5	229	1	9.0
3	254	1	10.0
3	279	1	11.0
10	305	1	12.0
5	330	1	13.0
4	356	1	14.0
3	381	1	15.0
9	406	1	16.0
6	432	1	17.0
3	457	1	18.0
2	483	1	19.0
2	508	1	20.0
2	533	1	21.0
2	559	1	22.0
3	584	1	23.0
2	610	1	24.0
2	635	1	25.0
3	660	1	26.0
3	686	1	27.0
3	711	1	28.0
4	737	1	29.0
1	762	1	30.0
3	787	1	31.0
3	813	1	32.0
2	838	1	33.0
2	864	1	34.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-25

Project: *Saddleback Windfarm*
Location: White Salmon, WA

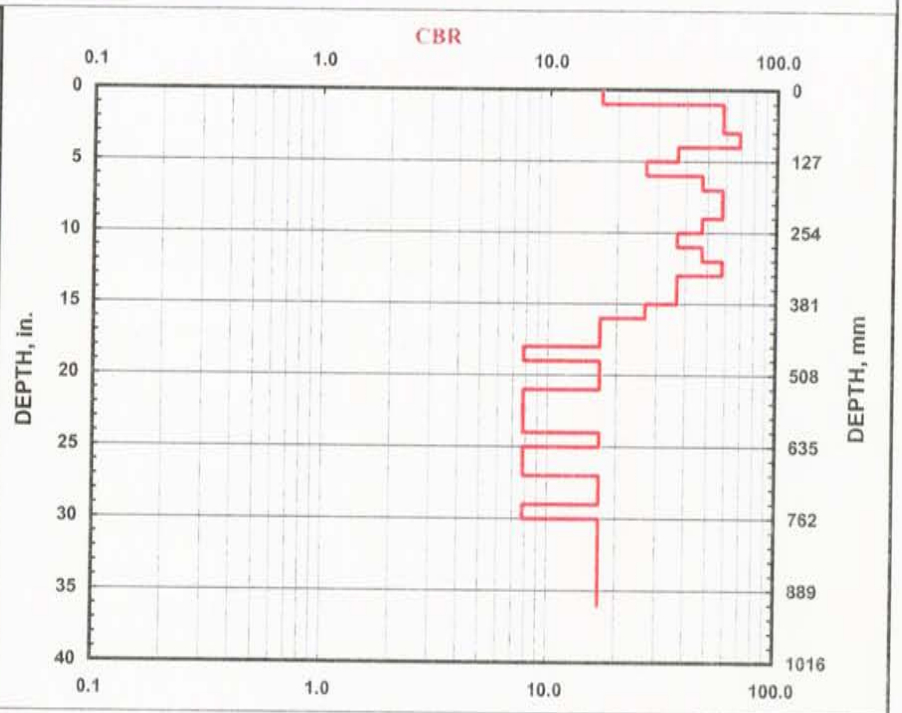
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

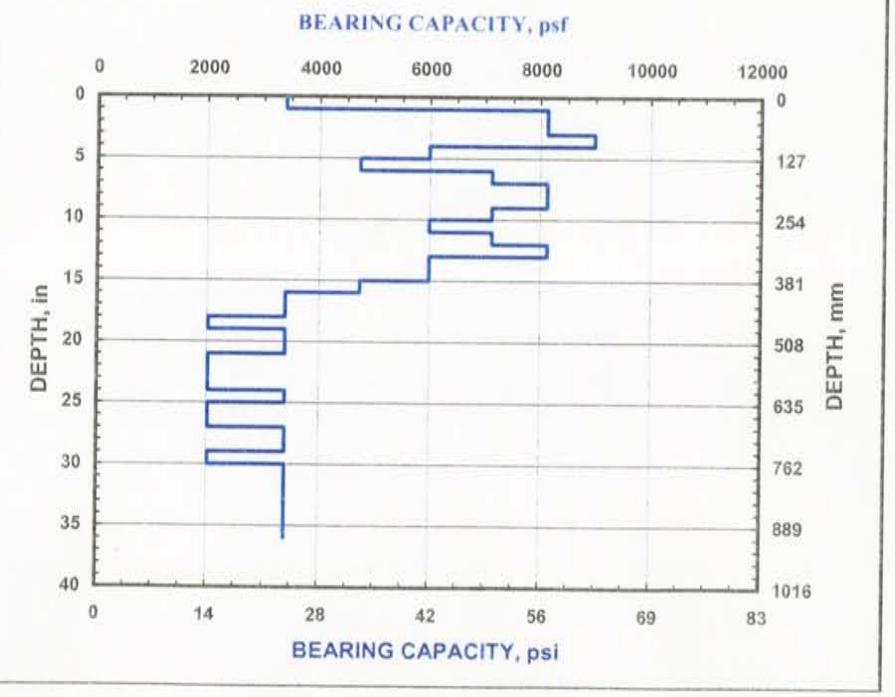
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
2	25	1	1.0
6	51	1	2.0
6	76	1	3.0
7	102	1	4.0
4	127	1	5.0
3	152	1	6.0
5	178	1	7.0
6	203	1	8.0
6	229	1	9.0
5	254	1	10.0
4	279	1	11.0
5	305	1	12.0
6	330	1	13.0
4	356	1	14.0
4	381	1	15.0
3	406	1	16.0
2	432	1	17.0
2	457	1	18.0
1	483	1	19.0
2	508	1	20.0
2	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	610	1	24.0
2	635	1	25.0
1	660	1	26.0
1	686	1	27.0
2	711	1	28.0
2	737	1	29.0
1	762	1	30.0
2	787	1	31.0
2	813	1	32.0
2	838	1	33.0
2	864	1	34.0
2	889	1	35.0
2	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-26

Project: *Saddleback Windfarm*
Location: White Salmon, WA

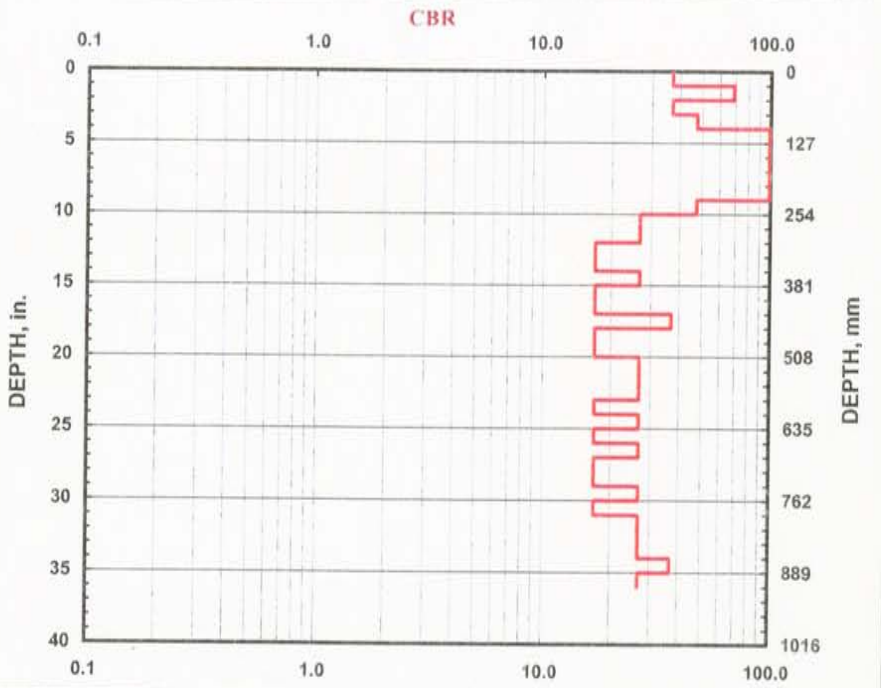
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

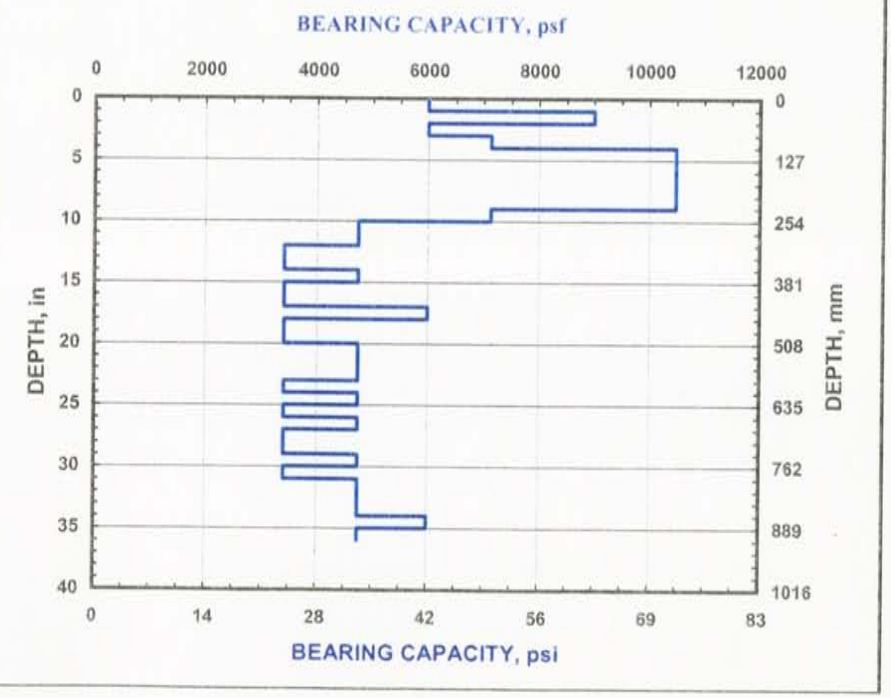
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
4	25	1	1.0
7	51	1	2.0
4	76	1	3.0
5	102	1	4.0
21	127	1	5.0
18	152	1	6.0
21	178	1	7.0
19	203	1	8.0
12	229	1	9.0
5	254	1	10.0
3	279	1	11.0
3	305	1	12.0
2	330	1	13.0
2	356	1	14.0
3	381	1	15.0
2	406	1	16.0
2	432	1	17.0
4	457	1	18.0
2	483	1	19.0
2	508	1	20.0
3	533	1	21.0
3	559	1	22.0
3	584	1	23.0
2	610	1	24.0
3	635	1	25.0
2	660	1	26.0
3	686	1	27.0
2	711	1	28.0
2	737	1	29.0
3	762	1	30.0
2	787	1	31.0
3	813	1	32.0
3	838	1	33.0
3	864	1	34.0
4	889	1	35.0
3	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-27

Project: *Saddleback Windfarm*
Location: White Salmon, WA

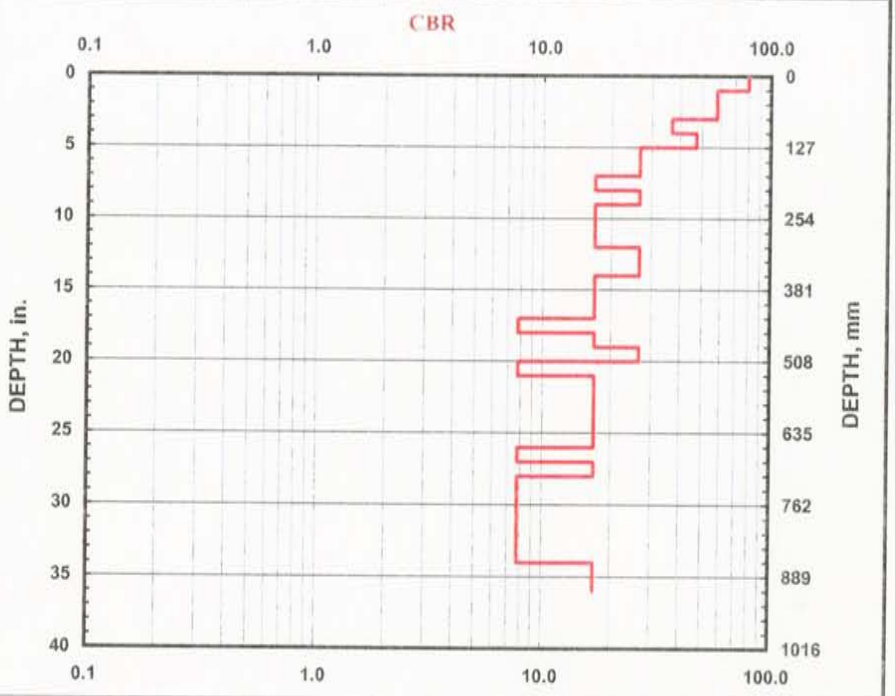
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

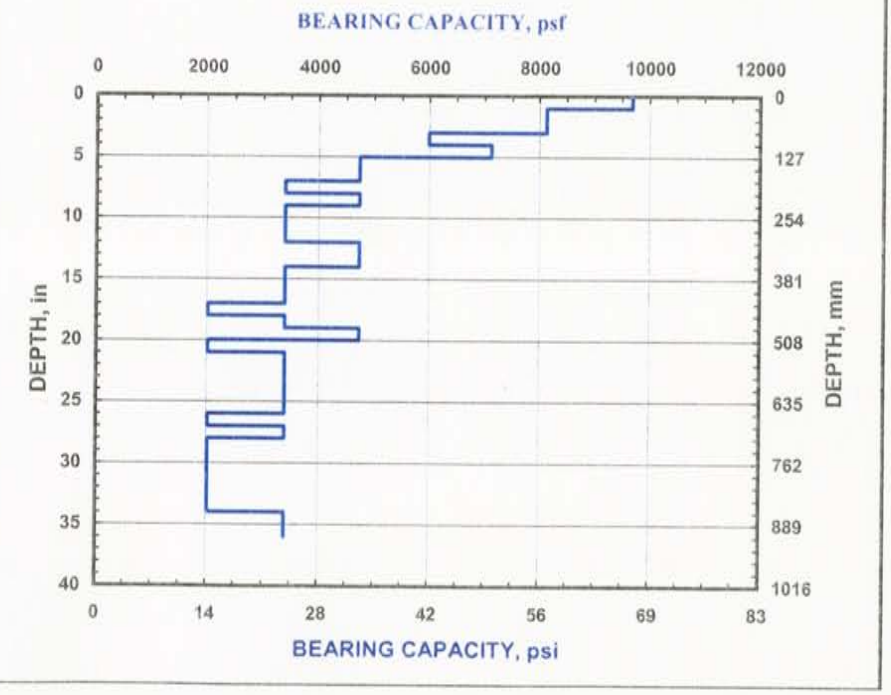
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
8	25	1	1.0
6	51	1	2.0
6	76	1	3.0
4	102	1	4.0
5	127	1	5.0
3	152	1	6.0
3	178	1	7.0
2	203	1	8.0
3	229	1	9.0
2	254	1	10.0
2	279	1	11.0
2	305	1	12.0
3	330	1	13.0
3	356	1	14.0
2	381	1	15.0
2	406	1	16.0
2	432	1	17.0
1	457	1	18.0
2	483	1	19.0
3	508	1	20.0
1	533	1	21.0
2	559	1	22.0
2	584	1	23.0
2	610	1	24.0
2	635	1	25.0
2	660	1	26.0
1	686	1	27.0
2	711	1	28.0
1	737	1	29.0
1	762	1	30.0
1	787	1	31.0
1	813	1	32.0
1	838	1	33.0
1	864	1	34.0
2	889	1	35.0
2	914	1	36.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-28

Project: *Saddleback Windfarm*
Location: White Salmon, WA

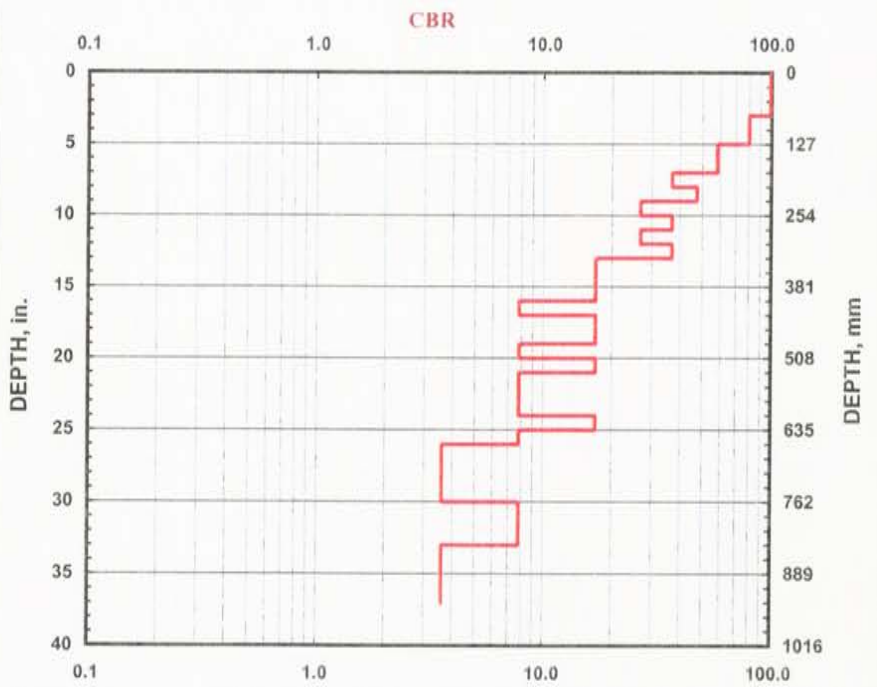
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

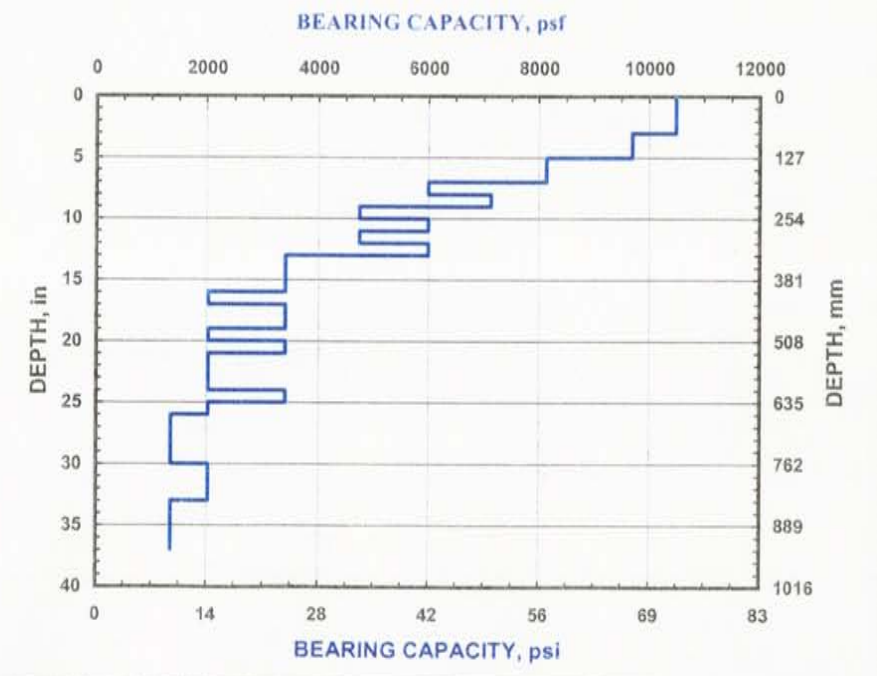
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
12	25	1	1.0
14	51	1	2.0
15	76	1	3.0
8	102	1	4.0
8	127	1	5.0
6	152	1	6.0
6	178	1	7.0
4	203	1	8.0
5	229	1	9.0
3	254	1	10.0
4	279	1	11.0
3	305	1	12.0
4	330	1	13.0
2	356	1	14.0
2	381	1	15.0
2	406	1	16.0
1	432	1	17.0
2	457	1	18.0
2	483	1	19.0
1	508	1	20.0
2	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	610	1	24.0
2	635	1	25.0
1	660	1	26.0
1	711	1	28.0
1	762	1	30.0
1	787	1	31.0
1	813	1	32.0
1	838	1	33.0
1	889	1	35.0
1	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-29

Project: *Saddleback Windfarm*
Location: White Salmon, WA

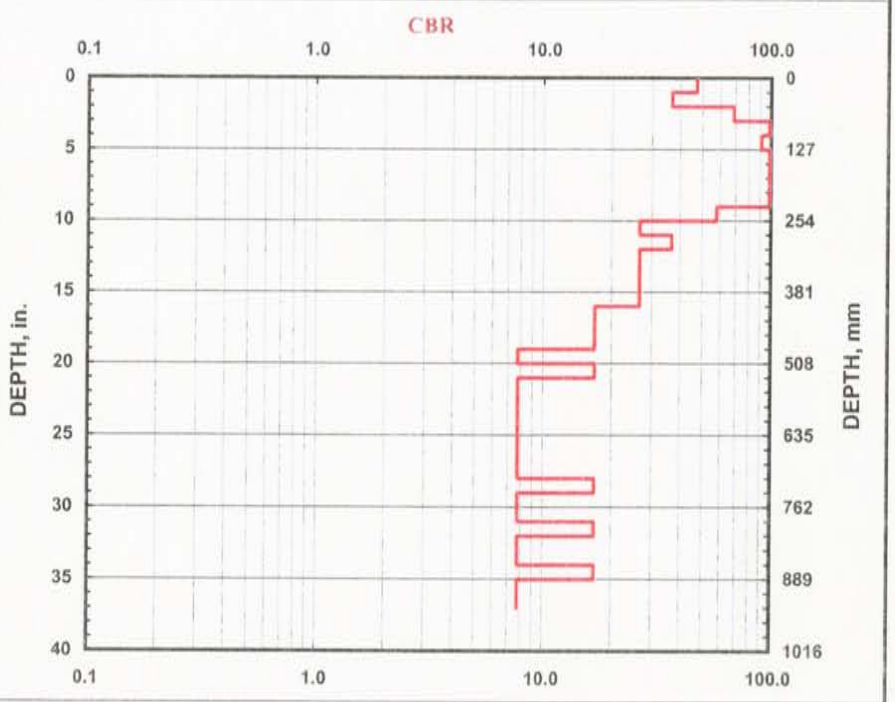
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

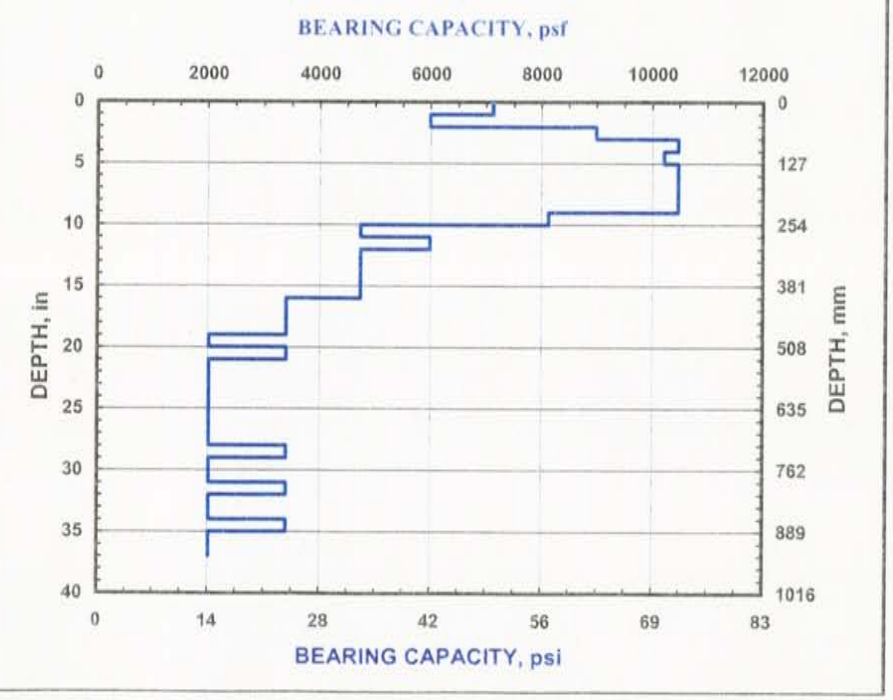
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
5	25	1	1.0
4	51	1	2.0
7	76	1	3.0
11	102	1	4.0
9	127	1	5.0
10	152	1	6.0
14	178	1	7.0
13	203	1	8.0
19	229	1	9.0
6	254	1	10.0
3	279	1	11.0
4	305	1	12.0
3	330	1	13.0
3	356	1	14.0
3	381	1	15.0
3	406	1	16.0
2	432	1	17.0
2	457	1	18.0
2	483	1	19.0
1	508	1	20.0
2	533	1	21.0
1	559	1	22.0
1	584	1	23.0
1	610	1	24.0
1	635	1	25.0
1	660	1	26.0
1	686	1	27.0
1	711	1	28.0
2	737	1	29.0
1	762	1	30.0
1	787	1	31.0
2	813	1	32.0
1	838	1	33.0
1	864	1	34.0
2	889	1	35.0
1	914	1	36.0
1	940	1	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





DCP TEST DATA

DCP-30

Project: *Saddleback Windfarm*
Location: White Salmon, WA

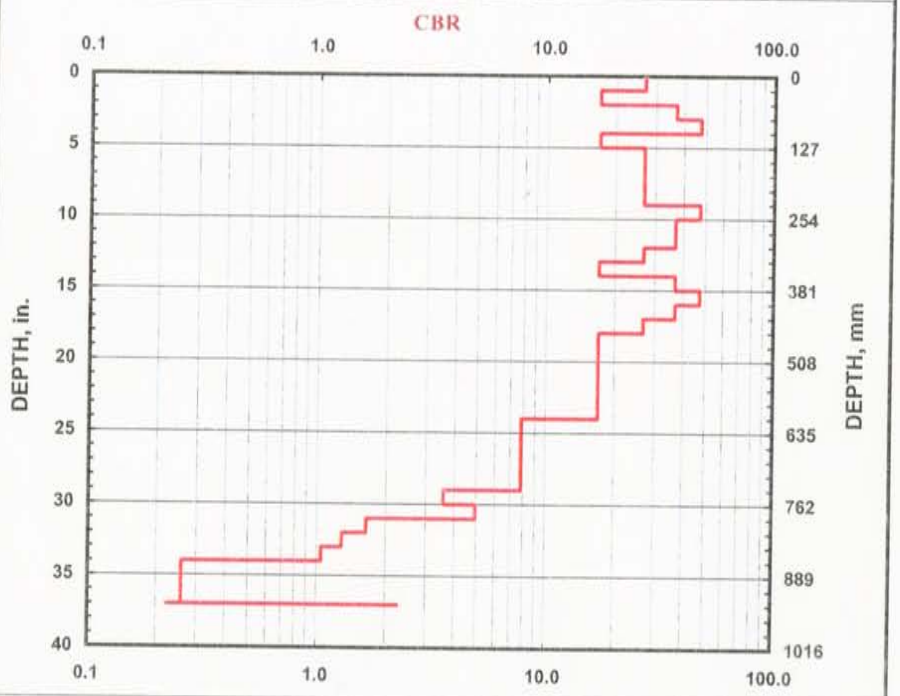
Date: 9/25/2007
Project No.: 33758687
Start: 0 feet bgs

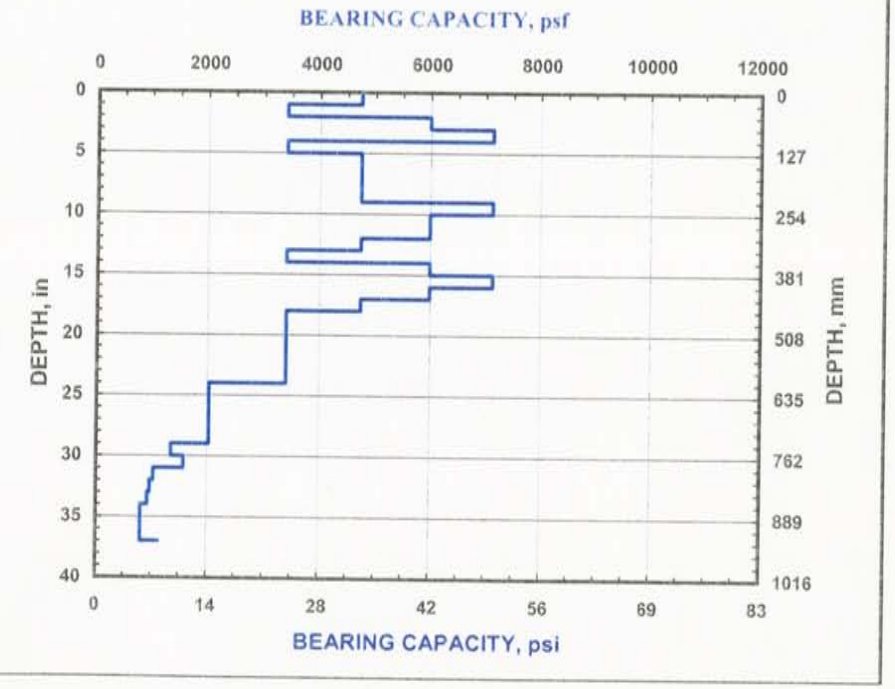
Hammer
- ○ 10.1 lbs.
- ◉ 17.6 lbs.
- ○ Both hammers used

Soil Type
- ○ CH
- ○ CL
- ◉ All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer	Scale Reading (in)
			0.0
3	25	1	1.0
2	51	1	2.0
4	76	1	3.0
5	102	1	4.0
2	127	1	5.0
3	152	1	6.0
3	178	1	7.0
3	203	1	8.0
3	229	1	9.0
5	254	1	10.0
4	279	1	11.0
4	305	1	12.0
3	330	1	13.0
2	356	1	14.0
4	381	1	15.0
5	406	1	16.0
4	432	1	17.0
3	457	1	18.0
2	483	1	19.0
2	508	1	20.0
2	533	1	21.0
2	559	1	22.0
2	584	1	23.0
2	610	1	24.0
1	635	1	25.0
1	660	1	26.0
1	686	1	27.0
1	711	1	28.0
1	737	2	29.0
1	762	3	30.0
2	787	4	31.0
1	813	5	32.0
1	838	6	33.0
1	864	7	34.0
1	940	8	37.0

Bearing Capacity based on correlations of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)





APPENDIX D
LANDSLIDE HAZARDS

LANDSLIDE HAZARDS REPORT

Pursuant to Skamania County Code, Title 21A, Chapter 21A.06 - Landslide Hazard Areas, URS has conducted a preliminary landslide hazard evaluation of the proposed Saddleback Wind Energy (SWE) project wind turbine site. The project location is shown on Figure C-1.

Landslide Hazard Report Methodology

A URS Licensed Engineering Geologist conducted a site specific landslide hazard investigation. The investigation consisted of:

- Review of Sections of the County Code that address Geologically Hazardous Areas;
- Review of existing available topographic, geologic and soils literature and maps;
- Analysis of project-specific stereo aerial photographs;
- Review of project test pit logs and soil samples;
- A one day site reconnaissance.

According to the County Code, the primary criteria for landslide hazard designations are: presence of pre-existing, known mappable landslides; slope angle; and/or composition of the near-surface soils or rock.

URS has created a color-coded map of the study area using an existing USGS 10 meter digital terrain model (DTM) to segregate slopes into three categories: slopes less than 20%; slopes between 20% and 30%; and slopes greater than 30%. We then superimposed the United States Department of Agriculture, National Resources Conservation Services (NRCS) soil survey map onto the slope map to provide soil type information. The resulting Landslide Hazard Map is presented herein as Figure C-1.

Landslide Hazard Area Delineation

Skamania County recognizes three classes of landslide hazard areas (LHAs). Class I (Severe) LHAs are considered to present a severe landslide hazard and are distinguished as areas of known mappable landslide deposits which have been designated landslide hazard areas by the local legislative body. Class II (High) LHAs are areas with slopes between twenty and thirty percent that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with

slopes greater than thirty percent. Class III (Moderate) LHAs are areas with slopes between twenty percent and thirty percent not included in Class II.

URS reviewed available geologic and soils literature to develop a landslide hazard classification for the proposed SWE project. An existing published regional geologic map (partially recreated in Figure 3 of the main text of this report) indicates a large landslide in the northeast corner of the study area underlying Tower Line 'C'. Review of stereo photographs of the area where the landslide deposits are mapped, coupled with a site reconnaissance, indicate that there is little geomorphic evidence for landslide activity such as obvious scarps, hummocky or benched terrain, lobate toe areas, or redirected watercourses. No deep subsurface investigations have been carried out at the site to date, but future explorations in support of design for the turbine tower foundations will provide subsurface information that will provide information regarding the presence, or lack of, landslide deposits in the area. Based on our preliminary investigation, there does not appear to be any area of the site that meets Skamania County's criteria for a (Class I) LHA.

Class II LHAs are shown in red on Figure C-1. The Class II LHAs at the site are predominantly associated with the steep slopes to the west of proposed Tower Lines 'A' and 'B'. There are also steep slopes to the east of the 7 southernmost 'A' Line towers, and on both sides of Tower Line 'C'.

Although none of the proposed turbines are located within Class II LHAs, several of the towers along the western side of the project site (Tower Lines 'A' and 'B') are located along ridgelines with descending slopes that are locally greater than 35 degrees (70%). The heads of some of the drainages along these slopes are arcuate indicating possible mass-wasting activity such as landslides, debris flows, and / or earthflows.

Based on aerial photo and field observations, the primary mass wasting process below the ridgelines appears to be debris flows and soil creep. No evidence for deep-seated, block failure type landslides was observed. Local surficial creep of near-surface soils is indicated by the presence of pistol-butted trees on some of the slopes, primarily on the descending slope west of the northern portion of Tower Line 'A'. Other slopes have mature conifer stands that indicated little or no soil creep. Further subsurface investigation in support of final tower foundation design will help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock mass underlying the ridgelines.

It appears that the primary concern for towers located adjacent to the Class II LHAs is the

potential for headward erosion of the steep drainages by debris or earth flow processes. Erosion rates of these drainages are unknown, but no obvious recent mass wasting features were observed in the aerial photos or during the site reconnaissance.

Class III LHAs have been delineated adjacent to proposed wind turbines along the southern 'A' Line, and the 'C' Line. Class I LHAs are not anticipated to have any impact on the proposed facilities due to the robust nature of the proposed foundation designs.

Conclusions and Recommendations

URS has conducted a Landslide Hazard Evaluation for the proposed SWE wind farm project in Southeast Skamania County. The evaluation has identified several areas where the proposed wind turbine generators are located adjacent to slopes that meet Skamania County's criteria for Class II and Class III Landslide Hazard Areas. The primary hazard to the proposed towers appears to be the potential for exposure to headward erosion of steep drainages on the slopes below some of the tower locations. Exposure of the towers to headward erosion of the steep slope drainages can be minimized by providing maximum possible setbacks from the tops of the steep slopes and / or by siting the turbines along portions of the ridgelines that are above intervening spur ridges. The most critical area of exposure to Class II LHAs is the narrow ridge at the southern portion of the 'A' Line.

It is URS's opinion that the proposed SWE facilities can be constructed and operated without danger to human life or the surrounding environment due to landslide hazards.

Map Unit Symbol	Soils Description
23	Chemawa loam, 15 to 30 percent slopes
21	Chemawa loam, 2 to 8 percent slopes
24	Chemawa loam, 30 to 50 percent slopes
22	Chemawa loam, 8 to 15 percent slopes
67	McElroy gravelly loam, 15 to 30 percent slopes
68	McElroy gravelly loam, 30 to 65 percent slopes
66	McElroy gravelly loam, 5 to 15 percent slopes
136	Timberhead gravelly loam, 30 to 65 percent slopes
135	Timberhead gravelly loam, 5 to 30 percent slopes
145	Underwood loam, 15 to 30 percent slopes
144	Underwood loam, 2 to 15 percent slopes
146	Underwood loam, 30 to 50 percent slopes
148	Undusk gravelly loam, 30 to 65 percent slopes
147	Undusk gravelly loam, 5 to 30 percent slopes

Class II Areas
Class III Areas
Soil Areas
Access Roads
Towers
N E S W
0 1,000 2,000 3,000 Feet

GeoDataScape
URS

Figure C1
Landslide Hazard Classifications
Saddleback Wind Project

SDS Lumber

ENERGY FACILITY SITE EVALUATION COUNCIL
August 2011

Whistling Ridge Energy Project

Final Environmental Impact Statement

Appendices C-F

August 2011



Washington State Environmental Policy Act Lead Agency:
State of Washington, Energy Facility Site Evaluation Council

Appendix C

Wildlife Reports

C-1

Vegetation Technical Report: Saddleback Wind Project EIS, Skamania County, Washington

CH2M HILL

Figures 1, 2, and 3 are missing from Appendix C-1 as the full report was not provided to URS

Vegetation Technical Report
Saddleback Wind Project EIS
Skamania County, Washington

Criteria and Methodology

The vegetation study area includes the area of a proposed substation, turbine strings, and their associated access roads, and existing secondary roads proposed for improvement. Vegetation was surveyed in a 300-ft corridor centered on proposed turbine strings and their associated access roads, in 50-foot corridors adjacent to existing roads proposed for improvement in conjunctions with this project, and in 25 additional acres in three locations proposed for staging areas and location of a substation (Figure 1).

Numerous vegetation classification systems are available for characterizing the plant communities across a landscape. The classification system used for this analysis was USDA Forest Service classification system (Brown 1985). It was selected for: (1) ability to address the variety of vegetation conditions in the study area; and (2) ability to interpret their function as wildlife habitat.

The aerial photographs are DNR orthophotos taken in January 2002 and were scaled to 1:600, and a. maximum 3-foot resolution.

The available color photo coverage was overlain with the project base map, and vegetation types within the study area were digitally mapped using scanned color aerial photographs and ER Mapper 6.3 software by Earth Resources. Photographic signatures were calibrated using field observations. Final maps of the approximate vegetation type boundaries were adjusted using field survey observations, field notes, field maps, and oblique photos. Areas

The USDI Fish and Wildlife Service (USFWS), and the Washington Natural Heritage Information System (WNHIS) were consulted for information on the existence of special status plant species and important habitats that would support special status species in the project vicinity.

Special status plant species are native species that have been accorded special legal or management protection because of concern for their continued existence. There are several categories of protection, depending on the magnitude of threat to continued existence, and existing knowledge of population levels. Any plant species that is in danger of extinction throughout all or a significant portion of its range is defined as "endangered." A "threatened" species is a species that is likely to become endangered in the foreseeable future. Species of concern are candidates for listing as endangered or threatened.

Insert Figure 1 Study Area

A search of the WNHIS database for records of listed or proposed threatened or endangered plant species was conducted. Records of special status species documented within two miles of the proposed project area were obtained. Also, species records for a large area surrounding the project vicinity were obtained to indicate potentially occurring species that may not been recorded because of a lack of detailed surveys for these species.

Affected Environment

Vegetation Communities

The project area is located in the Southern Washington Cascades Province (Franklin and Dyrness 1988). This area is characterized by generally accordant ridge crests separated by steep, deeply dissected valleys. The project falls within the *Abies grandis* and *Pseudotsuga menziesii* major vegetation zones (Franklin and Dyrness 1988). Climate is wet and cool, receiving a significant portion of its precipitation in the form of snow which accumulates in winter snowpacks as deep as 1 to 3 meters.

The project area is located specifically on Underwood Mountain northwest of White Salmon, Washington. Major drainages in the area include the White Salmon and the Little White Salmon River basins to the east and west of the site respectively. Both basins drain to the Columbia River south of the site, which drains to the Pacific Ocean.

Historically, the project area was dominated by coniferous species—grand fir (*Abies grandis*), and Douglas-fir (*Pseudotsuga menziesii*). Historical species dominance was dependent on elevation, aspect, underlying soil, and previous disturbance history (Franklin and Dyrness 1988). Mixed conifer and deciduous forest stands usually followed disturbances, but occasionally deciduous-dominated stands developed, depending on the disturbance type and physical environment. Typical deciduous species were alder (*Alnus rubra, A. sinuata*), Pacific dogwood (*Cornus nutallii*), and big-leaf maple (*Acer macrophyllum*).

The predominant land use in the surrounding area between Underwood Mountain and the Little White Salmon River is commercial forest production. Some land east of the Little White Salmon is zoned for 2-, 5-, and 10-acre residential use, but the land is currently in commercial timber production and is owned by SDS Lumber Company and Broughton Lumber Company, and the Washington Department of Natural Resources. The rural communities of Mill A and Willard are both located west of the Little White Salmon River. Mill A, the closer of the two communities, is approximately 1.5 miles from the nearest turbine site. Willard is approximately 2.25 miles north of the nearest turbine site in the A string.

Current vegetation conditions are heavily influenced by forest management activities over the last century. Land in the project area is privately owned, managed industrial forest. While forest management has not reduced tree species diversity, it has resulted in a shift in species dominance to the commercially valuable Douglas-fir and in changes to stand structure and complexity, patch size, and species distribution. Average stand age probably declined from relatively short stand rotation ages. Few large, old conifer trees occur in the project area and there are no known late-successional or "old-growth" stands within or adjacent to the project area, though small groups of big trees occur.

Common understory plants include sword fern (*Polystichum munitum*), vanilla leaf (*Achlys triphylla*), false Solomon's seal (*Smilacena racemosa*), western starflower (*Trientalis latifolia*), Columbia windflower (*Anemone deltoidea*), snowberry (*Symphoricarpos albus*), vine maple (*Acer circinatum*), Oregongrape (*Berberis nervosa*), red-flowering currant (*Ribes sanguineum*), and red elderberry (*Sambucus racemosa*). A list of all plant species observed within the project area is found in Table 1.

The vegetation communities within the project area are common within the region and maintained through forest management, and to a lesser extent natural disturbance. Because of private ownership, rugged landscape, and the value of high-volume timber producing land, these vegetation communities are expected to persist within the region during the foreseeable future

Five vegetation communities and wildlife habitats were identified within the project area:

- Grass-forb Stand (recent clearcuts)
- Brushfield/Shrub Stand
- Conifer-Hardwood Forest
- Conifer Forest
- Riparian - Deciduous

The approximate acreage of each habitat type within the study area by turbine string, road, and other proposed impact areas is shown in Table 2. The locations of the communities are shown in the vegetation community maps (Figure 2). These acreage figures and maps are based on June 2003 conditions. The locations and areas of plant communities will change over time through natural succession, forest development, and forest management.

GRASS-FORB STAND

Grass-forb Stands are found in the project vicinity in recently clearcut areas. Grass-forb is the stand condition in the USDA Forest Service classification system defined as areas where shrubs comprise less than 40 percent crown cover and are less than 5 feet tall (Brown, 1985). This stand type occurs when a disturbance such as timber harvest, fires, or wind has killed or removed most or all of the larger trees, or when brush fields are cleared for planting. These units may range from mainly devoid of vegetation to dominance by herbaceous species (grasses and forbs). Tree regeneration in these units is generally less than 5 feet tall and 40 percent crown cover.

In Grass-forb stands within the project vicinity vegetation is minimal and consists predominantly of weedy herbaceous species, including bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and dandelion (*Taraxacum officinale*). These areas generally consist of ubiquitous coarse woody material (CWM), occasional slash piles, and large areas of bare ground. Within the project's proposed impact area there are approximately 22.3 acres of grass-forb vegetation community.

Insert Table 1 p1

Insert Table 1 p2

Insert Table 1 p3

Insert Table 1 p4

TABLE 2 Vegetation Communities byTurbine String, Staging and Substation Areas, and Roads Proposed for Improvement
Saddleback Wind Project

VEGETATION COMMUNITIES	TURBINE STRINGS													
	A		B		C		D		E		F		G	
	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent
Grass-forb							9.7	0.17						
Brushfield/Shrub			3.9	0.12			5.2	0.09						
Conifer-Hardwood Forest	30.8	1.00	29.9	0.88	14	1.00	23.7	0.41			8.2	1.00		
Conifer Forest							18.8	0.33	17.5	1.00			15.1	1.00
Riparian Deciduous														
Subtotal	**30.8**	1.00	**33.8**	1.00	**14**	1.00	**57.4**	1.00	**17.5**	1.00	**8.2**	1.00	**15.1**	1.00

VEGETATION COMMUNITIES	STAGING AND SUBSTATION AREAS													
	Substation		Staging Area 1		Staging Area 2		Staging Area 3		Staging Area 4		Staging Area 5		Staging Area 6	
	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent
Grass-forb														
Brushfield/Shrub	15	1.00												
Conifer-Hardwood Forest			5	1.00			2	1.00	2	1.00				
Conifer Forest					5	1.00					2	1.00	2	1.00
Riparian Deciduous														
Subtotal	**15**	1.00	**5**	1.00	**5**	1.00	**2**	1.00	**2**	1.00	**2**	1.00	**2**	1.00

VEGETATION COMMUNITIES	EXISTING ROADS PROPOSED FOR IMPROVEMENT													
	1		2		3		4							
	Acreage	Percent	Acreage	Percent	Acreage	Percent	Acreage	Percent						
Grass-forb		0.00	6.9	0.18										
Brushfield/Shrub	26.3	0.49												
Conifer-Hardwood Forest	27.1	0.51	5.5	0.15	6.7	1.00	8	1.00						
Conifer Forest			25.4	0.67										
Riparian Deciduous														
Subtotal	**53.4**	1.00	**37.8**	1.00	**6.7**	1.00	**8**	1.00						

Insert Figure 2 Vegetation Community Map

BRUSHFIELD/SHRUB STAND

Brushfields are defined as the shrub stand condition in the USDA Forest Service classification system (Brown 1985). They develop on land following clearcut tree harvesting or other disturbances that remove vegetation. In keeping with Washington Forest Practices Rules, Chapter 222 WAC, all harvest units are planted within 3 years after harvest or a period of from 1 to 10 years as determined by the department in the case of a natural regeneration plan and must maintain minimum stocking levels of 150 vigorous, well-distributed undamaged seedlings per acre of commercial tree species.

Thus the majority of brushfields are actually young plantations (typically Douglas-fir, although many landowners are now planting mixed species) that have not yet reached the closed canopy stage or shaded out the shrub species. The type may have large amounts of bare soil, and often has slash and other logging debris on the ground. Vegetation (other than planted conifers) often consists of remnants from the forest understory and early successional annuals. There are vine maple, Sitka alder, beaked hazelnut (*Corylus cornuta*), serviceberry (*Amelanchier alnifolia*), Himalayan blackberry (*Rubus discolor*), bracken fern (*Pteridium aquilinum*), sword fern, oceanspray (*Holodiscus discolor*), fireweed (*Epilobium angustifolium*), wooly yarrow (*Achillea millefollium*), pearly everlasting (*Anaphalis margaritacea*) and grasses as ground cover.

Vegetation control has occurred in conjunction with forest management and includes herbicide application, mechanical control, or both. These areas are visually and functionally different from areas where control has not occurred. Despite control efforts, or where they have not occurred, dense shrub thickets frequently occur, dominated by the native vine maple. Within the thickets are small alders and Douglas-fir that occasionally grow taller than the vine maple. These areas also may have patches of alder saplings, salmonberry (*Rubus spectabilis*), vine maple, red elderberry, oceanspray, lupine (*Lupinus* sp.), Oregon oxalis, and grass. Small diameter coarse woody material (CWM) is common. Within the project's proposed impact area there are approximately 45.8 acres of brushfield/shrub vegetation community.

CONIFER-HARDWOOD FOREST

Conifer-Hardwood Forest is found in the project vicinity in the closed sapling-pole stand condition, under the USDA Forest Service vegetation classification system (Brown 1985). The forest canopy in these stands is dominated by a mix of bigleaf maple and Douglas-fir, with some red alder. Canopy height typically ranges from 40 to 60 feet. Canopy closure is between 60 and 80 percent. Maple forms about 30 percent of the canopy cover with Douglas-fir forming most of the rest of the canopy. Stands may have distinct tree canopy layers with deciduous overtopping emerging conifer or remnant conifer over the deciduous component. Stands with shrub layers that merge with the canopy layers are found in the project vicinity. The shrub layer varies from open to dense and contains vine maple, salmonberry, thimbleberry (*Rubus parviflora*), red elderberry, beaked hazelnut, and Pacific dogwood (*Cornus nutallii*). The herbaceous layer contains sword fern, trailing blackberry, oxalis, grasses, and moss. Within the project's proposed impact area there are approximately 147.9 acres of conifer-hardwood vegetation community.

CWM is dependent on stand age, but is typically low to moderate. Deciduous snags out-number conifer snags, although depending on stand origin, short well decayed conifer snags may be present.

CONIFER FOREST

Coniferous Forest is found in the project area in closed sapling-pole-sawtimber stands and large sawtimber stands. Within the project area and most of the region, Coniferous Forests are dominated by Grand fir and Douglas-fir. The closed sapling-pole-sawtimber is a continuum of tree diameter sizes with saplings being relatively small, poles being in the 8-12 inch range, and sawtimber ranging from 12 to 23 inches. Important to these stand types is the closed canopy and relative short live crowns found in the pole and sawtimber stages. The closed canopy results in the exclusion of most shrub species and many herbs.

CWM in this stage is typically low and consists of remnants from previous stands. Snags are typically rare, although small diameter snags become more frequent in the pole and sawtimber stages as shading and resource competition kills subdominants.

Large sawtimber is considered to be at least 21 inches in DBH. Within-stand differentiation has begun and dominants are beginning to overtop and out-compete other tree species. Competition for space results in more light reaching the forest floor and shrub and herbaceous communities typically become more diverse. CWM and snags are generally rare, although the number of snags and amount of CWM may be variable amount stands, dependent on past harvest practices, stand management, and actual stand age.

These forests are used for commercial forestry, and are generally regenerated after harvest, although some may be the result of natural disturbance combined with commercial planting. They are subject to timber management activities including harvest, replanting, and stand improvement activities. These forests are widespread in the project vicinity. Within the project's proposed impact area there are approximately 85.8 acres of conifer vegetation community.

RIPARIAN DECIDUOUS FOREST

Natural and anthropogenic disturbances frequently result in domination by deciduous species in near-stream areas. Within the project area this type occurs in the area identified on the USGS topographic map as "Cedar Swamp." Historically this area was dominated by very large, old cedar, which have been logged. The area is now dominated by willow and cottonwood (*Populus balsamifera*) with scattered occurrences of young cedar.

The Cedar Swamp area consists of approximately 24 acres is located adjacent to the proposed impact area for Turbine String F.

Special Status Plants

Field Reconnaissance Surveys

Reconnaissance and inventory surveys were conducted for sensitive species on two occasions. The survey chronology is presented in Table 3.

TABLE 3
Field Survey Chronology for Sensitive Species
Saddleback Wind Project

Date	Primary Purpose
May 28-30, 2003	General habitat survey and survey for spring-blooming rare plant species
July 28-29	Survey for summer blooming rare plant species

The project study area for potential habitats included the following areas:

- 300-foot corridors centered on all proposed turbine strings and their associated access roads,
- 50-foot corridors on either side of existing all roads proposed for improvement in conjunction with the project,
- an approximately 5-acre plot for proposed substation construction, and
- one 15-acre and two five-acre areas identified as proposed construction staging areas.

Study area boundaries are shown in Figure 1. Field surveys were performed by CH2M HILL botanists and ecologists familiar with rare plant species of the region. Surveys were conducted on May 28-30 and July 28-29, 2003 during optimum time for identification of target species. Total survey area was approximately 302 acres. Potential habitats supporting rare species within the project study area were surveyed on foot at an intensity level sufficient to confirm the presence or absence of targeted rare plant species identifiable at the time of the surveys. The surveyors kept a list of all vascular plants encountered. Observations of plant associations, land use patterns, and unusual habitats were recorded.

Investigation Results

Sensitive Plant Species.

Pre-field Review. The search of the WNHIS database disclosed four rare plant populations documented as currently occurring within 2 miles of the project vicinity (Figure 3):

- branching montia (*Montia diffusa*),
- Suksdorf's desert parsley (*Lomatium suksdorfii*),
- Siskyou false hellebore (*Veratrum insolitum*), and
- golden chinquapin (*Chrysolepsis chrysophylla*).

Three rare plant populations are documented as historically occurring in the project vicinity:

- bolandra (*Bolandra oregana*),
- white-top aster (*Aster curtis*), and
- branching montia.

Insert Figure 3

One plant community identified as a *Known High-Quality or Rare Plant Community and Wetland Ecosystem of Washington* (WNHIS 2003) is documented as occurring within 2 miles of the project site. It is an Oregon white oak/Idaho fescue (*Quercus garryana/Festuca idahoensis*) vegetation community and is located along the drainage of the White Salmon River, approximately ½ mile north of its confluence with the Columbia River.

In addition to the six plants species discussed above, twenty-three additional plant species were added to the survey list, based on the WNHIS list of rare plant species known to occur in Skamania County. Twenty-two of these species were documented by WNHP as occurring within 2 miles of the project site prior to 1977. Rare plant data collected prior to 1977 were vaguely mapped (a five-mile-diameter circle was used to map general location). Rare plant records collected since 1977 are more accurately mapped and have been included in this report. No rare plant species have been documented on the project site since 1977.

The list of potential rare plant species for the project area, identified through prefield review, is presented in Table 4.

Field Reconnaissance Surveys. Field reconnaissance surveys failed to locate any rare plant species or plant communities within the proposed project area.

Environmental Consequences

No Build Alternative

The types and distribution of vegetation would be similar to the existing conditions because land use patterns would be about the same. The age and structure of vegetation in commercial timberland would change over time in a shifting mosaic. It is reasonable to assume that relatively small percentages of existing vegetation types would be affected by roadway maintenance and operations activities, and required modifications to maintain functionality of the roadway.

Build Alternative

See discussion of environmental consequences for the Build Alternative under the Wildlife section of this technical memorandum.

Mitigation Concepts

See discussion of mitigation concepts for the Build Alternative in the Wildlife section below.

Insert Table 4 p1

Insert Table 4 p2

References

Brown, E.R. Technical editor. 1985. *Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington.* U.S. Forest Service USFWS), Pacific Northwest Region.

Washington Forest Practices Act.

Franklin, Jerry F., and C.T. Dyrness. 1988. *Natural Vegetation of Oregon and Washington.* Oregon State University Press.

Niehaus, Theodore F. 1976. *A Field Guide to Pacific States Wildflowers: Washington, Oregon, and Adjacent Areas.* Houghton Mifflin Company, Boston, MA.

Whitney, Stephen R. 1983. *A Field Guide to the Cascades and Olympics.* The Mountaineers, 306 2nd Avenue West, Seattle, WA 98119.

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003
Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Aceraceae				
	Acer circinatum	vine maple	X	
	Acer macrophyllum	big leaf maple	X	
Apiaceae				
	Daucus carota	Queen Anne's lace		X
	Oenanthe sarmentosa	Pacific water -parsley	X	
	Osmorhiza chilensis	mountain sweet-cicely	X	
	Sanicula crassicaulis	Pacific sanicle	X	
Apocynaceae				
	Apocynum androsaemifolium	spreading dogbane	X	
Araliaceae				
	Oplopanax horridus	Devil's club	X	
Aristolochiaceae				
	Asarum caudatum	wild ginger		
Asteraceae				
	Achillea millefolium	wooly yarrow	X	
	Adenocaulon bicolor	pathfinder		
	Anaphalis margaritacea	pearly-everlasting	X	
	Antennaria luzuloides	woodrush pussytoes	X	
	Centaurea cyanus	bachelor's button		X
	Centaurea diffusa	diffuse knapweed		X
	Chrysanthemum leucanthemum	ox-eye daisy		X
	Cichorium intybus	chicory		X
	Cirsium arvense	Canada thistle		X
	Cirsium vulgare	bull thistle		X
	Gnaphalium palustre	marsh cudweed	X	
	Hieracium albiflorum	white-flowered hawkweed	X	
	Hieracium scouleri	wooly-weed	X	
	Lactuca serriola	prickly lettuce		X
	Taraxacum officinale	dandelion		X
	Tragopogon dubius	yellow salsify		X
Berberidaceae				
	Achlys triphylla	vanilla leaf	X	
	Berberis nervosa	Cascade Oregongrape	X	
	Vancouveria hexandra	white insideout flower	X	
Betulaceae				
	Alnus sinuata	Sitka alder	X	
	Corylus cornuta	beaked hazelnut	X	
Boraginaceae				
	Cryptantha flaccida	common cryptantha	X	
Brassicaceae				
	Erysimum occidentale	pale wallflower	X	
Campanulaceae				
	Campanula scouleri	Scouler's bluebell	X	

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003
Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Caprifoliaceae				
	Linnaea borealis	twin flower	X	
	Lonicera hispidula	hairy honeysuckle	X	
	Lonicera sp.	honesuckle	X	
	Sambucus racemosa	red elderberry	X	
	Symphoricarpos albus	snowberry	X	
Caryophyllaceae				
	Stellaria jamesiana	sticky chickweed		
Cornaceae				
	Cornus nutallii	Pacific dogwood	X	
Cupressaceae				
	Thuja plicata	western red cedar	X	
Cyperaceae				
	Eleocharis palustris	creeping spikerush	X	
Dryopteridaceae				
	Athyrium filix-femina	lady fern	X	
Equisitaceae				
	Equisetum arvense	field horsetail	X	
Ericaceae				
	Arctostaphylos patula	green-leaf manzanita	X	
	Chimaphylla menziesii	little pipsissewa	X	
	Chimaphylla umbellata	common pipsissewa	X	
	Pyrola picta	white vein pyrola	X	
	Vaccinium sp.	huckleberry	X	
Fabaceae				
	Cytisus scoparius	Scotch broom		X
	Lathyrus latifolius	everlasting peavine		X
	Lathyrus polyphyllus	leafy peavine	X	
	Lotus purshiana	spanish-clover	X	
	Lupinus caudatus	Kellog spurred lupine	X	
	Lupinus polyphyllus	large-leaf lupine	X	
	Lupinus sp.	lupine	X	
	Trifolium dubium	least hop clover		X
	Trifolium sp.	clover		
	Vicia sp.	vetch		
Grossulariaceae				
	Ribes sanguineum	red-flowering currant	X	
Hydrophyllaceae				
	Nemophila parviflora	small-flowered nemophila	X	
	Phacelia hastata	silver-leaf phacelia	X	
Hypericaceae				
	Hypericum perforatum	common St. John's-wort		X
Juncaceae				
	Juncus effusus	common rush	X	
	Luzula parviflora	small-flowered wood rush	X	

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003 Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Lamiaceae				
	Stachys cooleyae	Cooley's hedge-nettle	X	
Liliaceae				
	Clintonia uniflora	bead lily	X	
	Disporum hookeri	Hooker's fairy-bell	X	
	Lilium columbianum	Columbia lily	X	
	Smilacina racemosa	western false Solomon's seal	X	
	Smilacina stellata	star-flowered false Solomon's	X	
	Trillium ovatum	western trillium	X	
Onagraceae				
	Epilobium angustifolium	fireweed		X
	Epilobium sp.	epilobium		
	Oenothera strigosa	common evening-primrose	X	
Orchidaceae				
	Calypso bulbosa	fairy-slipper	X	
	Corallorhiza maculata	spotted coral-root	X	
	Corallorhiza mertensiana	Merten's coral-root	X	
	Corallorhiza striata	striped coral-root	X	
Pinaceae				
	Abies grandis	grand fir	X	
	Pseudotsuga menziesii	Douglas-fir	X	
	Tsuga heterophylla	western hemlock	X	
Plantaginaceae				
	Plantago lanceolata	English plantain	X	
	Plantago major	common plantain	X	
Poaceae				
	Bromus tectorum	cheat grass		X
Polemoniaceae				
	Microsteris gracilis	midget phlox	X	
Polygonaceae				
	Rumex acetosella	sheep sorrel		X
	Rumex occidentalis	western dock	X	
Polypodiaceae				
	Adiantum pedatum	maidenhair fern	X	
	Polystichum munitum	sword fern	X	
	Pteridium aquilinum	bracken fern	X	
Portulacaceae				
	Claytonia perfoliata	miner's lettuce	X	
	Claytonia siberica	Siberian spring beauty	X	
Primulaceae				
	Trientalis latifiolia	western starflower	X	
Ranunculaceae				
	Actaea rubra	baneberry	X	
	Anemone deltoidea	Columbia wind flower	X	

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003
Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Rhamnaceae				
	Ceanothus integerrimus	deerbrush	X	
	Ceanothus sanguineus	redstem ceanothus	X	
	Ceanothus velutinus	tobacco-brush	X	
Rosaceae				
	Aruncus sylvester	goatsbeard	X	
	Fragaria virginiana	wild strawberry	X	
	Holodiscus discolor	oceanspray	X	
	Prunus emarginata	bitter cherry	X	
	Prunus virginiana	common chokecherry	X	
	Rosa gymnocarpa	baldhip rose	X	
	Rosa woodsii	Wood's rose	X	
	Rubus leucodermis	blackcap	X	
	Rubus parviflora	thimbleberry	X	
	Rubus ursinus	blackberry	X	
Rubiacea				
	Galium aparine	cleavers	X	
Salicaceae				
	Populus balsamifera	black cottonwood	X	
	Salix lasiandra	Pacific willow	X	
	Salix scouleriana	Scouler's willow	X	
	Salix sitchensis	Sitka willow	X	
Saxifragaceae				
	Mitella diversifolia	varied-leaved mitrewort	X	
	Tellima grandiflora	fringecup	X	
	Tiarella trifoliata	foamflower	X	
Scrophulariaceae				
	Linaria dalmatica	dalmatian toadflax		X
	Penstemon sp.	penstemon	X	
	Penstemon subserratus	fine-toothed penstemon	X	
	Verbascum thapsus	wooly mullein	X	
	Veronica scutellata	marsh speedwell	X	
Valerianaceae				
	Plectritis macrocera	white plectritis	X	
Violaceae				
	Viola glabella	stream violet	X	

TABLE 4 Special Status Plant Species Potentially Occurring Within the Project Area Saddleback Wind Project

Family	Scientific Name	Common Name	WA State Status	Federal Status
Asteraceae				
	Balsamorhiza deltoidea	Puget balsamroot	Review	
	Erigeron howellii	Howell's daisy	Threatened	SC
	Erigeron oreganus	Gorge daisy	Threatened	SC
	Microseris borealis	northern microseris	Sensitive	
Boraginaceae				
	Hackelia diffusa var. diffusa	Diffuse stickseed	Sensitive	
Brassicaceae				
	Rorippa columbiae	persistentsepal	Threatened	SC
Campanulaceae				
	Githopsis specularioides	common blue-cup		
Caryophyllaceae				
	Silene douglasii var. monantha	Douglas' silene	Review	
Cyperaceae				
	Carex macrochaeta	large-awn sedge	Sensitive	
Fagaceae				
	Chrysolepsis chrysophylla	golden chinquapin	Sensitive	
Fumiariaceae				
	Corydalis aquae-gelidae	Clackamas corydalis	Threatened	SC
Iridaceae				
	Sisyrinchium sarmentosum	Pale blue-eyed grass	Threatened	SC
Juncaceae				
	Juncus howellii	Howell's rush	Review	
Lentibulariaceae				
	Utricularia intermedia	Flat-leaved bladderwort	Sensitive	
Lycopodiaceae				
	Lycopodiella inundata	bog clubmoss	Sensitive	
Ophioglossaceae				
	Botrychium lunaria	moonwort	Sensitive	
	Botrychium minganense	Victorian's grape-fern	Review	
	Botrychium pinnatum	St. John's moonwort	Sensitive	
Orchidaceae				
	Cypripedium fasciculatum	Clustered lady's slipper	Threatened	SC
	Plantathera sparsifolia	canyon bog-orchid	Sensitive	
	Spiranthes porrifolia	Western ladies-tresses	Sensitive	
Polemoniaceae				
	Polemonium carneum	great polemonium	Threatened	
Portulacaceae				
	Montia diffusa	Branching montia	Sensitive	

TABLE 4 Special Status Plant Species Potentially Occurring Within the Project Area Saddleback Wind Project

Family	Scientific Name	Common Name	WA State Status	Federal Status
Ranunculaceae				
	Cimicifuga elata	Tall bugbane	Threatened	
Saxifragaceae				
	Bolandra oregana	Bolandra	Sensitive	
	Parnassia fimbriata var.	fringed	Sensitive	
	Sullivantia oregana	Oregon sullivantia	Threatened	SC
Scrophulariaceae				
	Collinsia sparsiflora var.	Few-flowered collinsia		
	Penstemon barrettiae	Barrett's beardtongue	Threatened	SC

C-2

Wetland Delineation Report: Saddleback Wind Project, Skamania County, Washington.

CH2M HILL (Peggy O’Neill). 2007

Wetland Delineation Report
Saddleback Wind Energy Project
Skamania County, Washington

PREPARED FOR: Dana Peck/Horizon Wind Energy LLC

PREPARED BY: Joel Shaich /CH2M HILL/PDX

REVIEWED BY: Peggy O'Neill/CH2M HILL/PDX

COPIES: Mike Pappalardo/CH2M HILL/CVO

DATE: January 9, 2007

Summary

CH2M HILL conducted a delineation of potentially jurisdictional wetlands and waters of the State/U.S. and a determination of potential county-required buffer widths adjacent to wetlands and waters within the proposed project areas for the Saddleback Wind Energy Project. The investigation was conducted in the vicinity of Underwood Mountain, approximately 7 miles northwest of the City of White Salmon, in an unincorporated area of Skamania County, Washington (Figure 1). The project area is situated adjacent to, but entirely outside of, the Columbia Gorge National Scenic Area.

Study area boundaries are shown in Figure 2. The project study area for potential wetlands and waters included:

- 300-foot corridors centered on all proposed turbine strings and their associated access roads;
- 50-foot corridors on either side of all existing roads proposed for improvement in conjunction with the project; and
- an approximately 15-acre plot for proposed substation construction, and two 5-acre and five 2-acre areas identified as proposed construction staging areas.

No jurisdictional wetlands or waters of the State/U.S. were observed in the study area. Five sites were identified as potential "drainageways having short periods of spring or storm runoff" that would be subject to county buffer requirements. The five drainageways appear to meet criteria as Type V streams subject to a 25 foot buffer requirement.

This delineation represents the best professional judgment and conclusions of CH2M HILL. It is considered a preliminary jurisdictional determination; final authority for jurisdictional determinations for regulatory permitting rests with the U.S. Army Corps of Engineers and Skamania County Department of Planning and Community Development.

Results

Office Review

USGS Topographic Map

The USGS topographic map shows an intermittent pond identified as "Cedar Swamp" mapped within the general project area but outside of the study areas/proposed project facilities. Three unnamed perennial streams (Cedar Swamp tributaries) are mapped as crossing an existing road that is proposed to be widened to 20 feet. A proposed underground collector line will also follow the road. An unnamed perennial stream is mapped beginning at the western edge of the proposed 15 acre staging area (Figure 2).

National Wetland Inventory (NWI) Map

The National Wetland Inventory map shows one wetland in the general project area (Figure 3). The wetland is classified as a *palustrine unconsolidated bottom, semipermanently flooded, diked/impounded* (PUBFh) wetland and corresponds with the "Cedar Swamp" mapped on the USGS topographic map. It is outside the study areas.

Washington Department of Natural Resources (DNR) Forest Practices Stream Mapping

The Washington Department of Natural Resources Forest Practices Stream Mapping shows ten stream segments that are located within project study areas (Figure 3). These included the streams on the USGS map as well as additional streams. The streams at sites B-1, B-2 and B-3 are unnamed drainages that flow toward the Little White Salmon River. The other streams are unnamed tributaries of Little Buck Creek.

Skamania County Area Soil Survey

A review of the *Soil Survey of Skamania County Area, Washington* (Haagen, 1990) shows six soil series and 13 types or phases mapped within the project area (Figure 4). None are listed as hydric according the *Hydric Soils List for the Skamania County Area, Washington* (NRCS, 2001) and none are listed as containing inclusions of hydric soils.

Field Investigation

Wetlands

No wetlands were observed within the study areas. All of the potential stream crossing sites examined for the delineation were dominated by upland species. No wetland hydrology indicators were observed on the surface. Due to the lack of wetland vegetation or hydrology indicators on the surface no sample pits were dug.

Waters of the State/U.S.

Ten sites with potential stream crossings of proposed project facilities were documented in the field delineation and determination of potential buffer widths (Table 1; Figure 3). Site photos are in the Appendix. None of the crossings appear to have waters of the U.S./State present. They did not contain channels or other characteristics of waters.

TABLE 1
Site Summary

Site ID	Site Characteristics	Water of the State/U.S.	Skamania County Critical Area	Buffer Width (feet)
B-1	plateau; west edge is steep forested slope with broad swale; upland vegetation; no channel, scour or other indicators of a drainageway	NO	NO	0
B-2	gully in forest; upland vegetation; no channel, culvert, scour or other indicators of a drainageway	NO	NO	0
B-3	gully in forest and clearcut; upland vegetation; no channel, culvert, scour or other indicators of a drainageway	NO	NO	0
D-2	very subtle broad forested swale; upland vegetation; no channel, culvert, scour or other indicators of a drainageway	NO	NO	0
D-3	narrow forested gully; upland vegetation; 12" culvert under road; no channel; isolated areas of scour upstream of road; 12" wide scour path extends downstream of road approximately 100', then ends	NO	Class V stream	25
D-4	broad, shallow forested gully; upland vegetation; 12" culvert under road; no channel or scour	NO	Class V stream	25
D-5	very subtle broad forested swale; upland vegetation; no channel, culvert, scour or other indicators of a drainageway	NO	NO	0
D-6	broad, shallow forested gully; upland vegetation; 12" culvert under road; no channel or scour	NO	Class V stream	25
F-1	broad gully in recent clearcut; upland vegetation; 12" culvert under road; no channel; isolated areas of scour	NO	Class V stream	25
F-2	gentle slope in recent clearcut; upland vegetation; water from snow melt flowing across the ground; no culvert, channel or scour	NO	Class V stream	25



LEGEND

- City
- Freeway
- Highway
- County Boundary
- Columbia River

N

0 10 20
Miles

Figure 1

Vicinity Map

Wetland Delineation
Saddleback Wind Project

CH2MHILL

File Path: \\rosa\proj\HorizonWindEnergy\351595SaddleBack\GIS\MapDocuments\WetlandDelineationReport\Figure1_VicinityMap.mxd, Date: December 29, 2006 9:03:12 AM

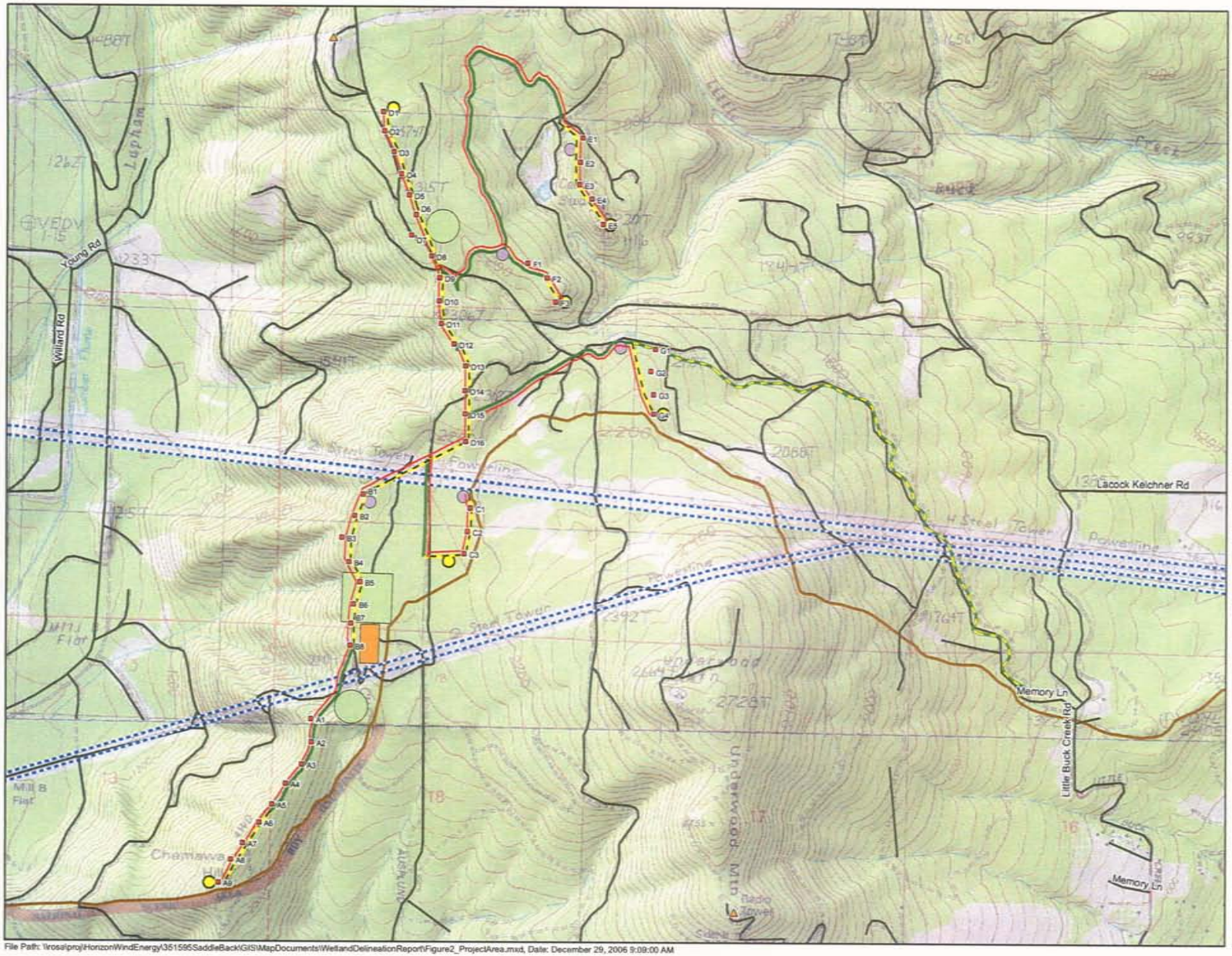


Figure 2

Project Area

Wetland Delineation
Saddleback Wind Project

LEGEND

Proposed Permanent Facilities

- Proposed Turbine
- Proposed Access Road - 20'
- Existing Road - Widened to 15'
- Existing Road - Widened to 20'
- Proposed Underground 34.5kV Collector Line
- Proposed Substation & O&M Facility

Proposed Temporary Facilities

- Temporary Turnaround Area
- Temporary Staging Area - 5 and 15 Acres
- Temporary Staging Area - 2 Acres

Existing Features

- Existing Microwave Tower
- Existing Transmission Line
- Existing Road
- National Scenic Area Boundary

N

0 1,500 3,000
Feet

CH2MHILL

File Path: \\rosa\proj\HorizonWindEnergy\351595SaddleBack\GIS\MapDocuments\WetlandDelineationReport\Figure2_ProjectArea.mxd, Date: December 29, 2006 9:09:00 AM

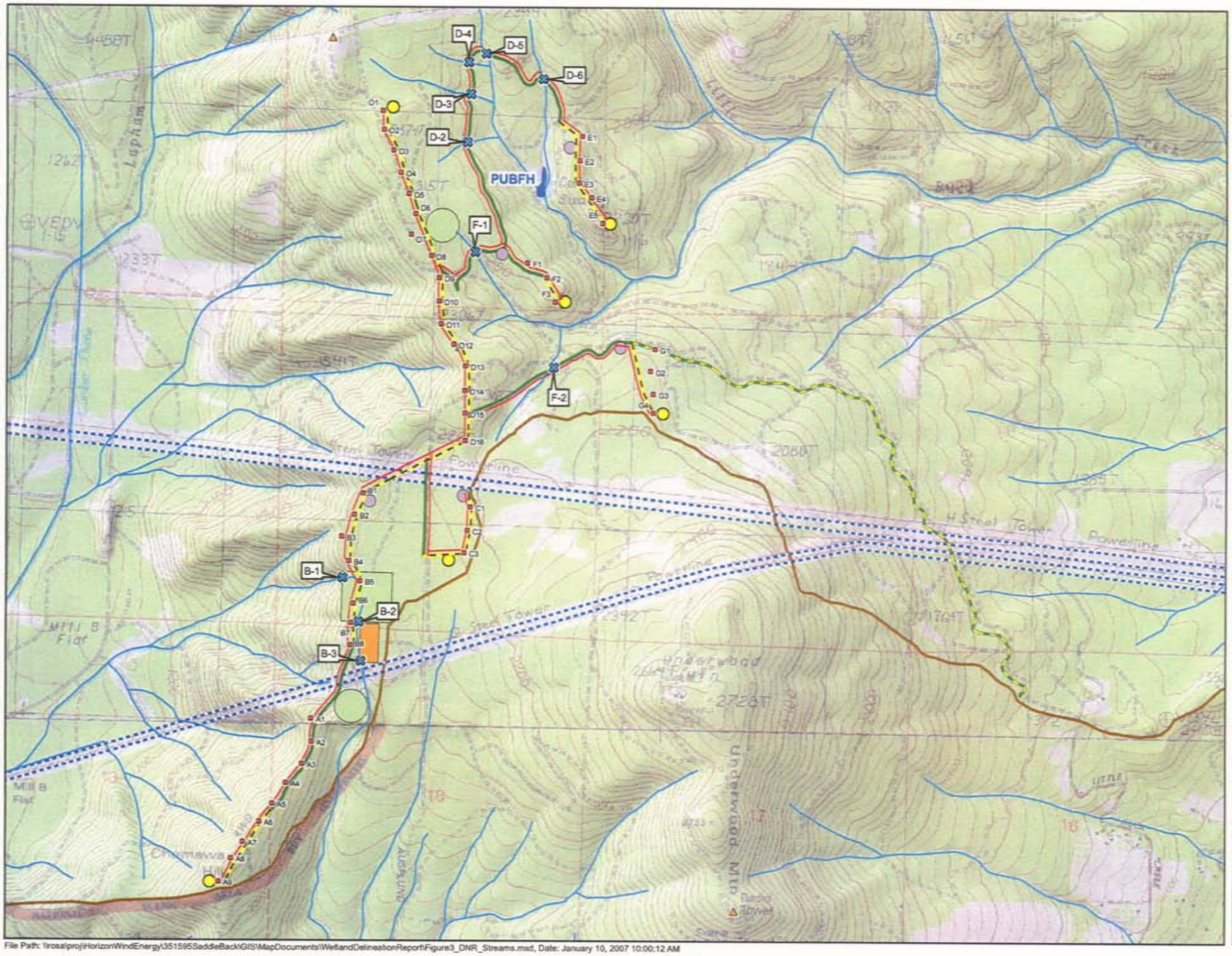


Figure 3

DNR Streams

Wetland Delineation
Saddleback Wind Project

LEGEND

- NWI Wetlands
- Stream Crossing
- Streams (from WA DNR)

Proposed Permanent Facilities

- Proposed Turbine
- Proposed Access Road - 20'
- Existing Road - Widened to 15'
- Existing Road - Widened to 20'
- Proposed Underground 34.5kV Collector Line
- Proposed Substation & O&M Facility

Proposed Temporary Facilities

- Temporary Turnaround Area
- Temporary Staging Area - 5 and 15 Acres
- Temporary Staging Area - 2 Acres

Existing Features

- Existing Microwave Tower
- Existing Transmission Line
- National Scenic Area Boundary

N

0 1,500 3,000
Feet

CH2MHILL

File Path: \\rosa\proj\HorizonWindEnergy\351595SaddleBack\GIS\MapDocuments\WetlandDelineationReport\Figure3_DNR_Streams.mxd, Date: January 10, 2007 10:00:12 AM

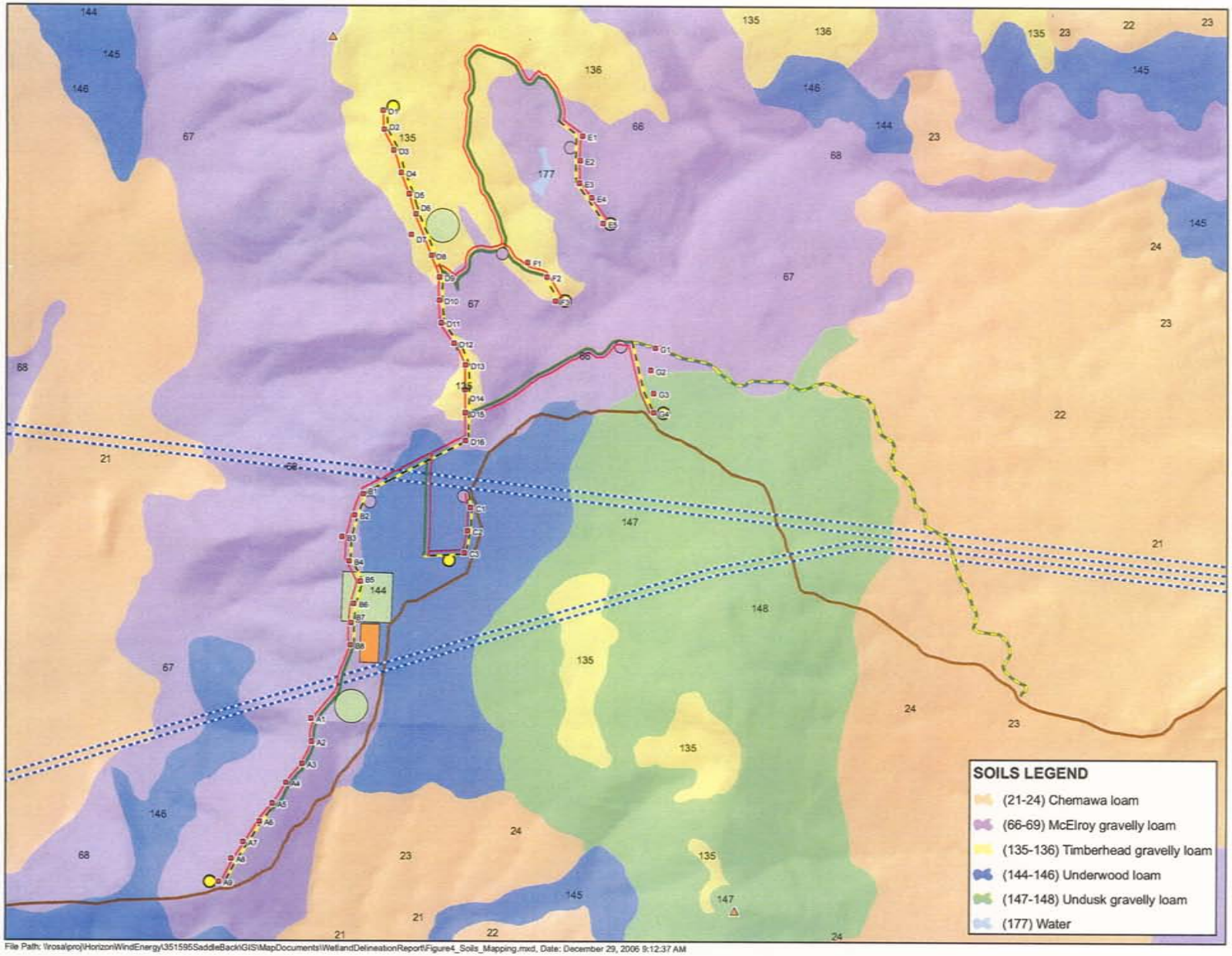


Figure 4

Soils Mapping

Wetland Delineation
Saddleback Wind Project

LEGEND

Proposed Permanent Facilities

- Proposed Turbine
- Proposed Access Road - 20'
- Existing Road - Widened to 15'
- Existing Road - Widened to 20'
- Proposed Underground 34.5kV Collector Line
- Proposed Substation & O&M Facility

Proposed Temporary Facilities

- Temporary Turnaround Area
- Temporary Staging Area - 5 and 15 Acres
- Temporary Staging Area - 2 Acres

Existing Features

- Existing Microwave Tower
- Existing Transmission Line
- National Scenic Area Boundary

N

0 1,500 3,000
Feet

CH2MHILL

File Path: \\rosa\proj\HorizonWindEnergy\351595SaddleBack\GIS\MapDocuments\WetlandDelineationReport\Figure4_Soils_Mapping.mxd, Date: December 29, 2006 9:12:37 AM

APPENDIX
SITE PHOTOS



Photo B1-01 . Looking west down slope from edge of plateau at location of upper end of USGS and DNR-mapped stream. 10/26/06.



Photo B1-02. Looking west downslope approximately 100 feet below plateau edge. 10/26/06.



Photo B1-03. Looking east at location of proposed temporary staging area on plateau. 10/26/06.



Photo B2-01. Looking north up slope at location of upper end of DNR mapped stream in proposed temporary staging area. No channel or other evidence of wetlands or waters was observed during this site visit or on an October 26, 2006 site visit. 01/08/07.



Photo B2-02. Looking south at subtle swale in location of DNR-mapped stream in proposed temporary staging area. Swale becomes a larger gully down slope. 01/08/07.



Photo B3-01. Looking west where transmission line access road crosses gully at location of DNR mapped stream. Proposed Substation & O&M Facility location is just north (right) of the road. 01/08/07.

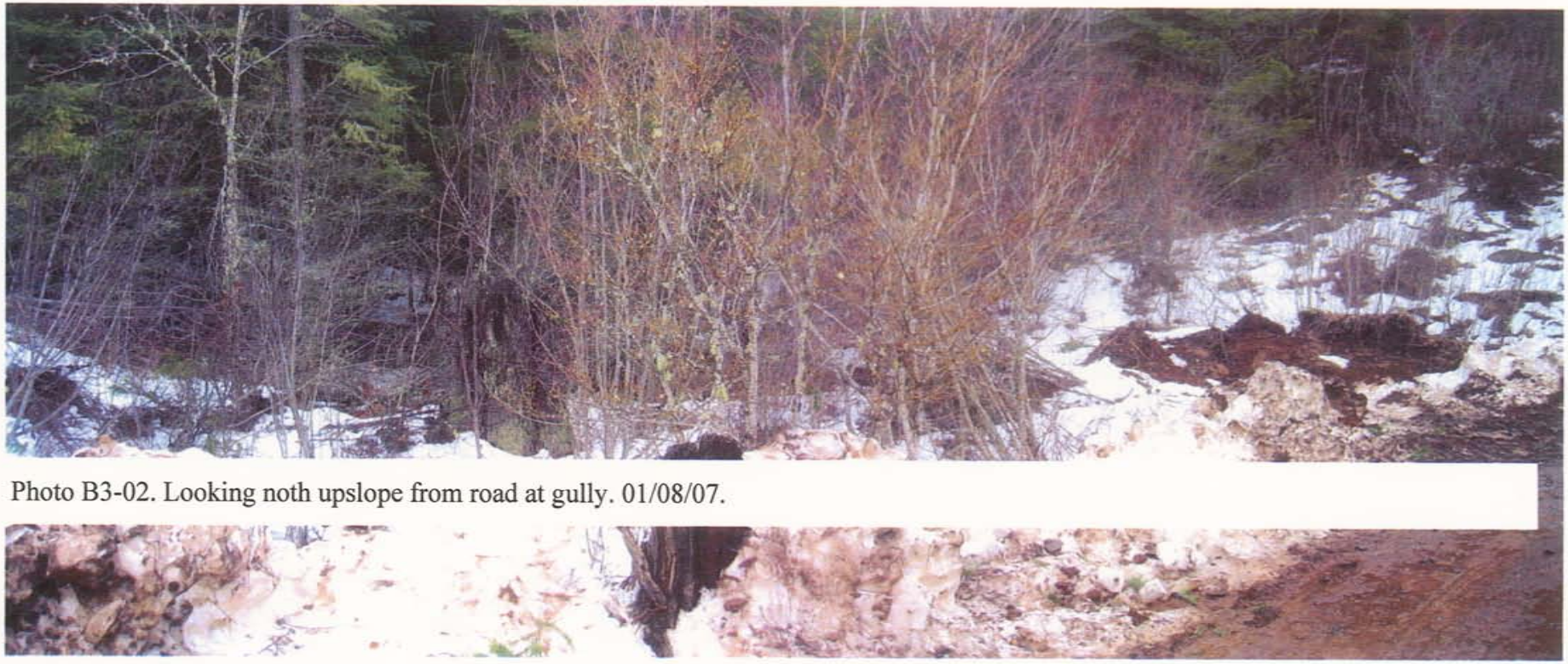


Photo B3-02. Looking noth upslope from road at gully. 01/08/07.



Photo B3-03. Looking south downslope from transmission line access road at gully. 01/08/07.



Photo D2-01. Looking south at location of DNR-mapped stream. 10/26/06.

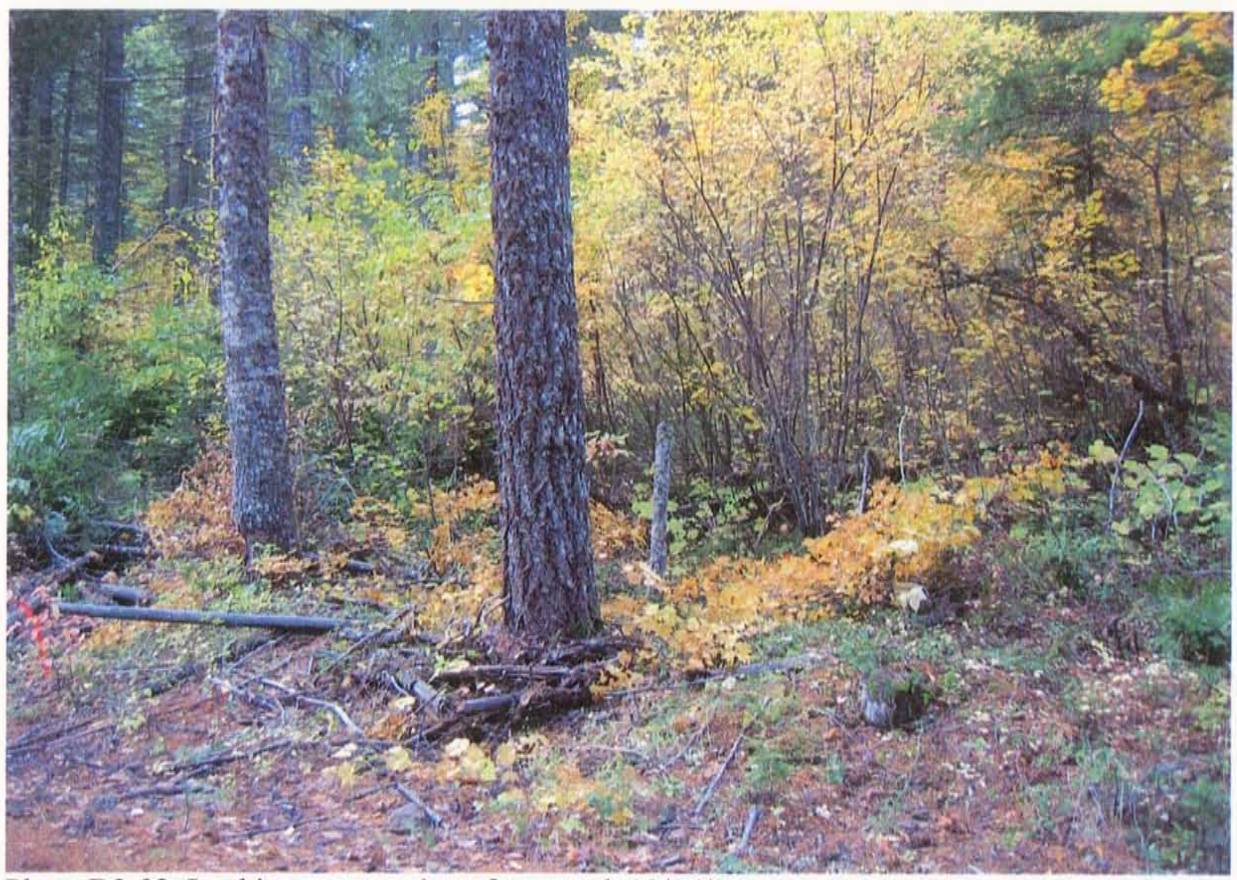


Photo D2-02. Looking west upslope from road. 10/26/06.



Photo D2-03. Looking west upslope from approximately 25 feet below road. 10/26/06.

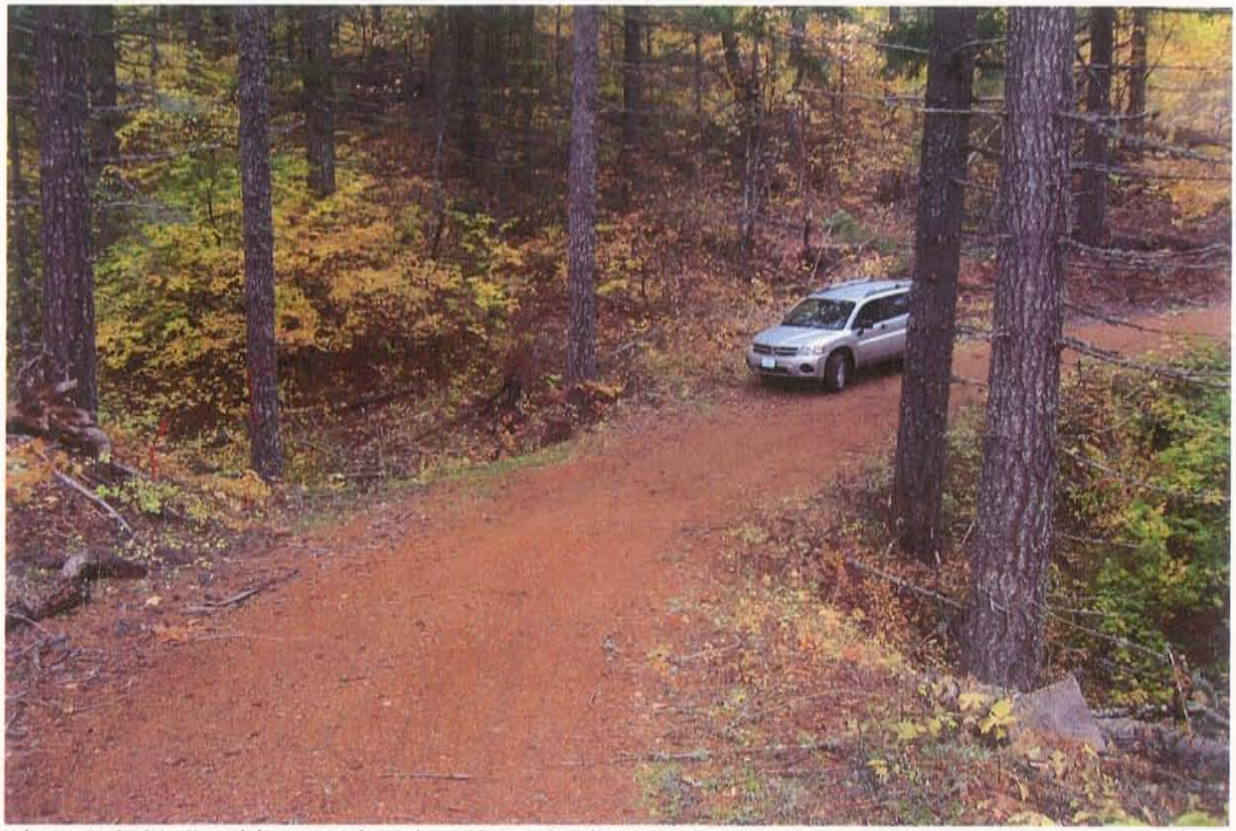


Photo D3-01. Looking north at location of USGS and DNR-mapped stream. Drainageway is in front of vehicle. 10/26/06.



Photo D3-02. Looking west upslope approximately 200 feet below road. 10/26/06.

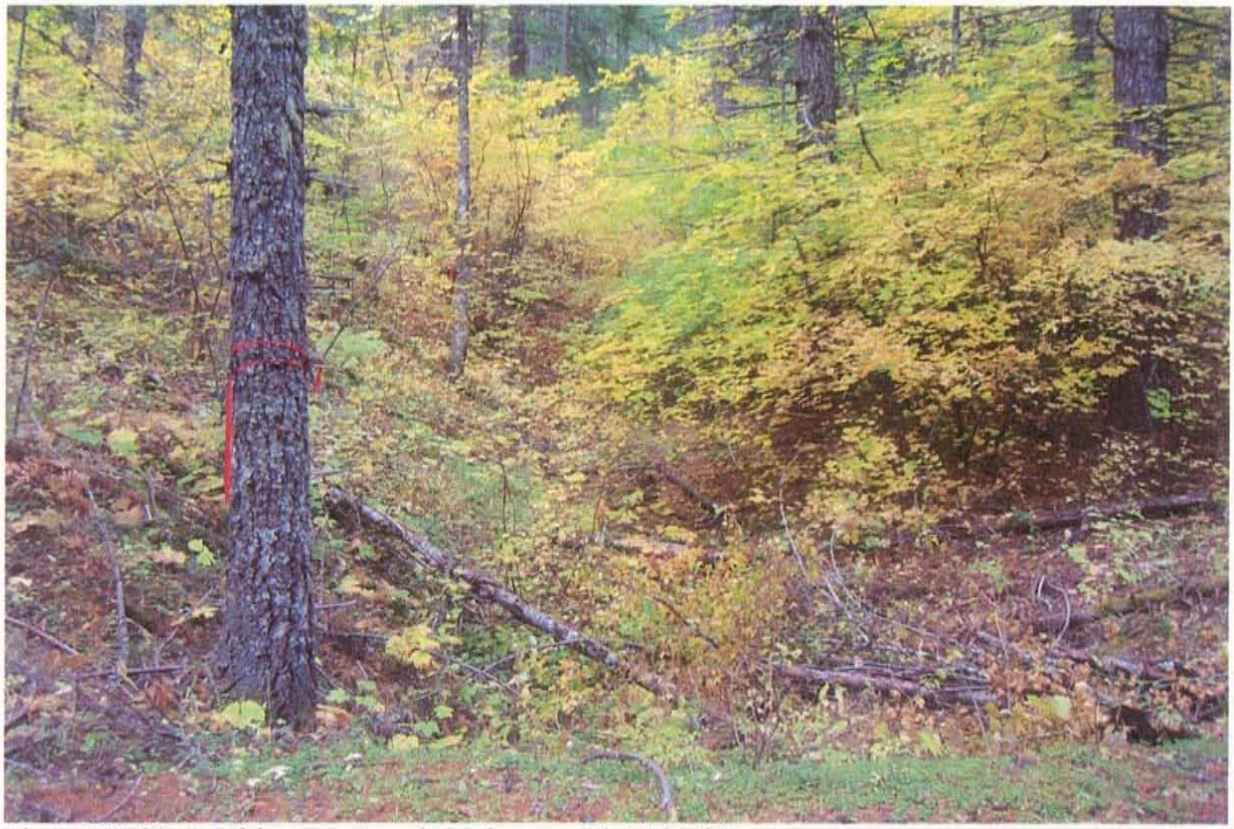


Photo D3-03. Looking west upslope from road. 10/26/06.

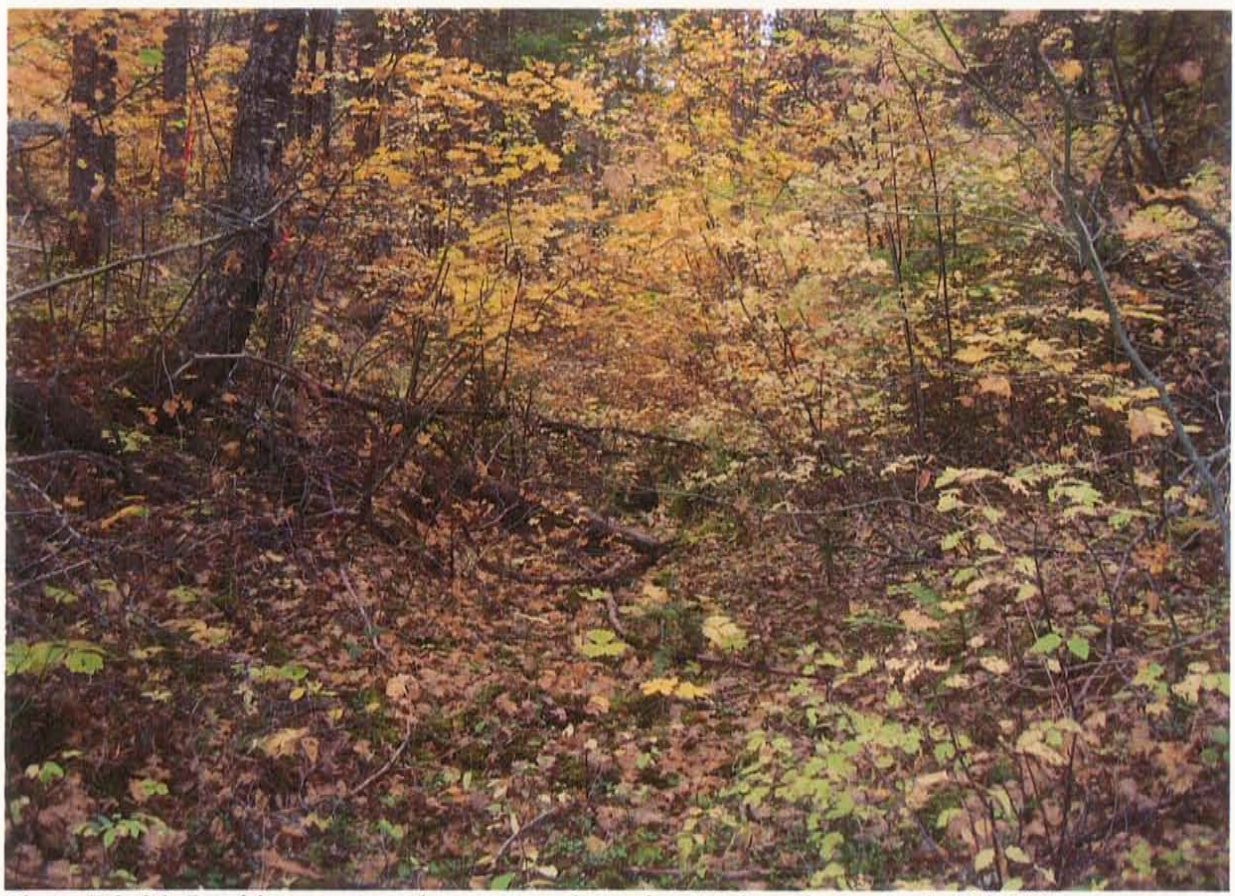


Photo D3-04. Looking west upslope approximately 100 feet above road. 10/26/06.

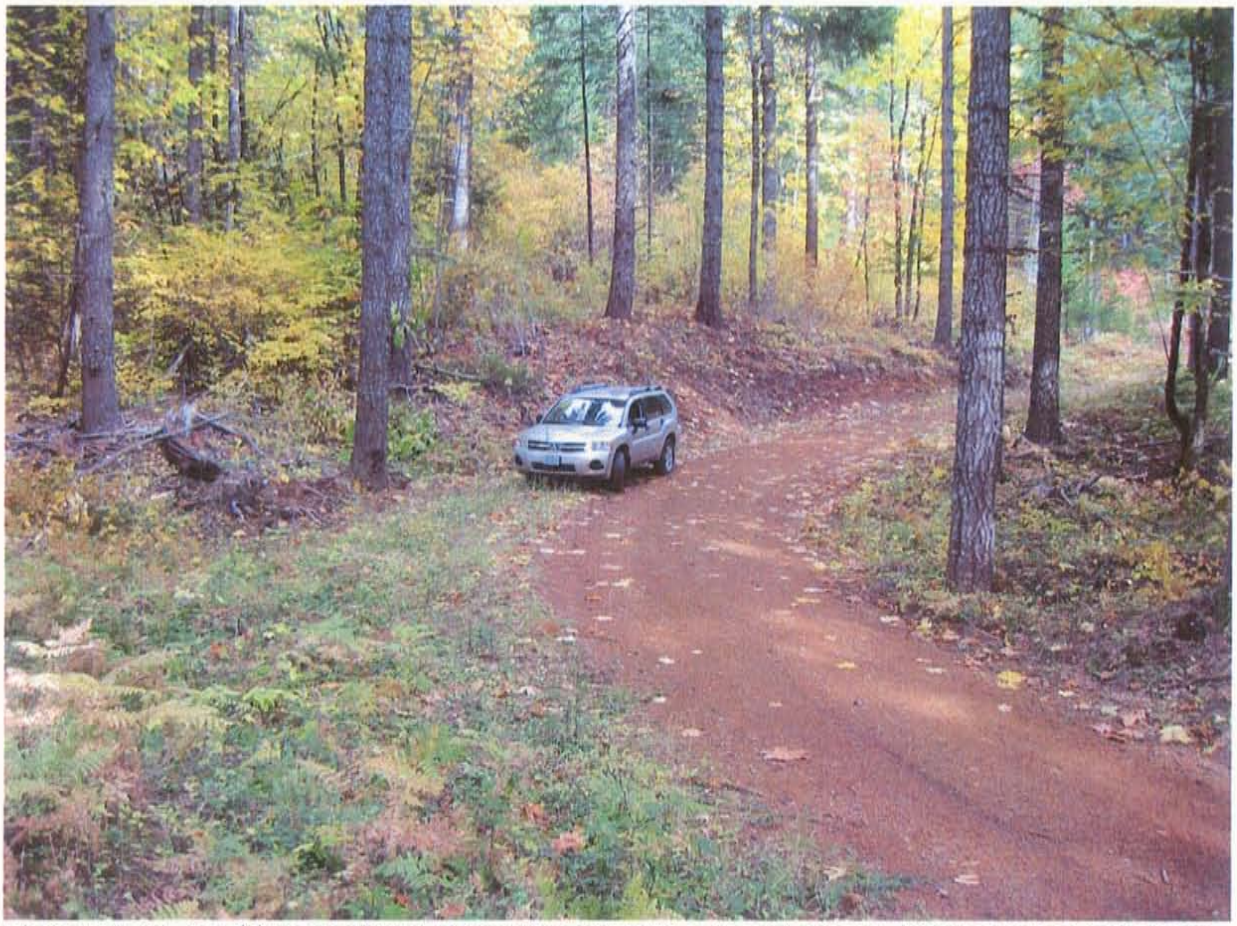


Photo D4-01. Looking northeast at location of DNR-mapped stream. Drainageway is in front of vehicle. 10/26/06.



Photo D4-02. Looking northwest upslope from road. 10/26/06.

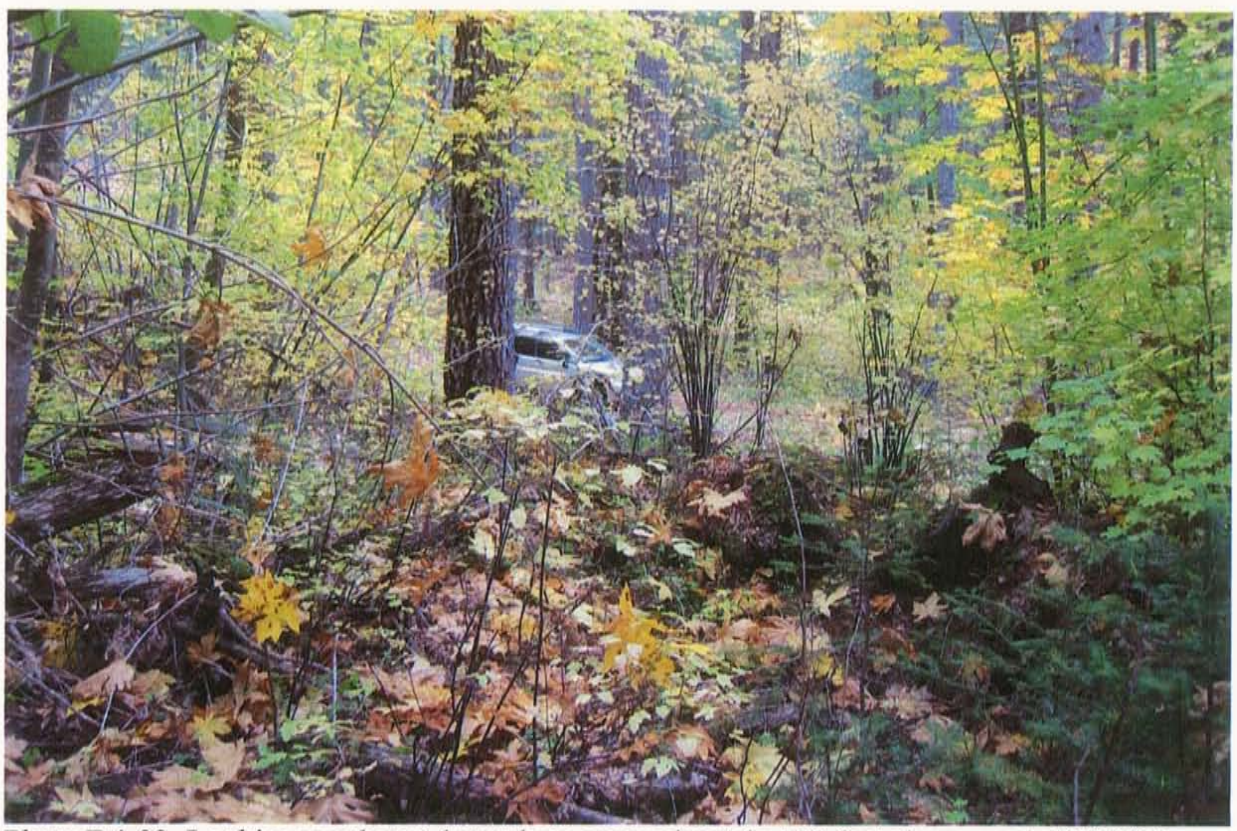


Photo D4-03. Looking southeast downslope approximately 100 feet above road. 10/26/06.

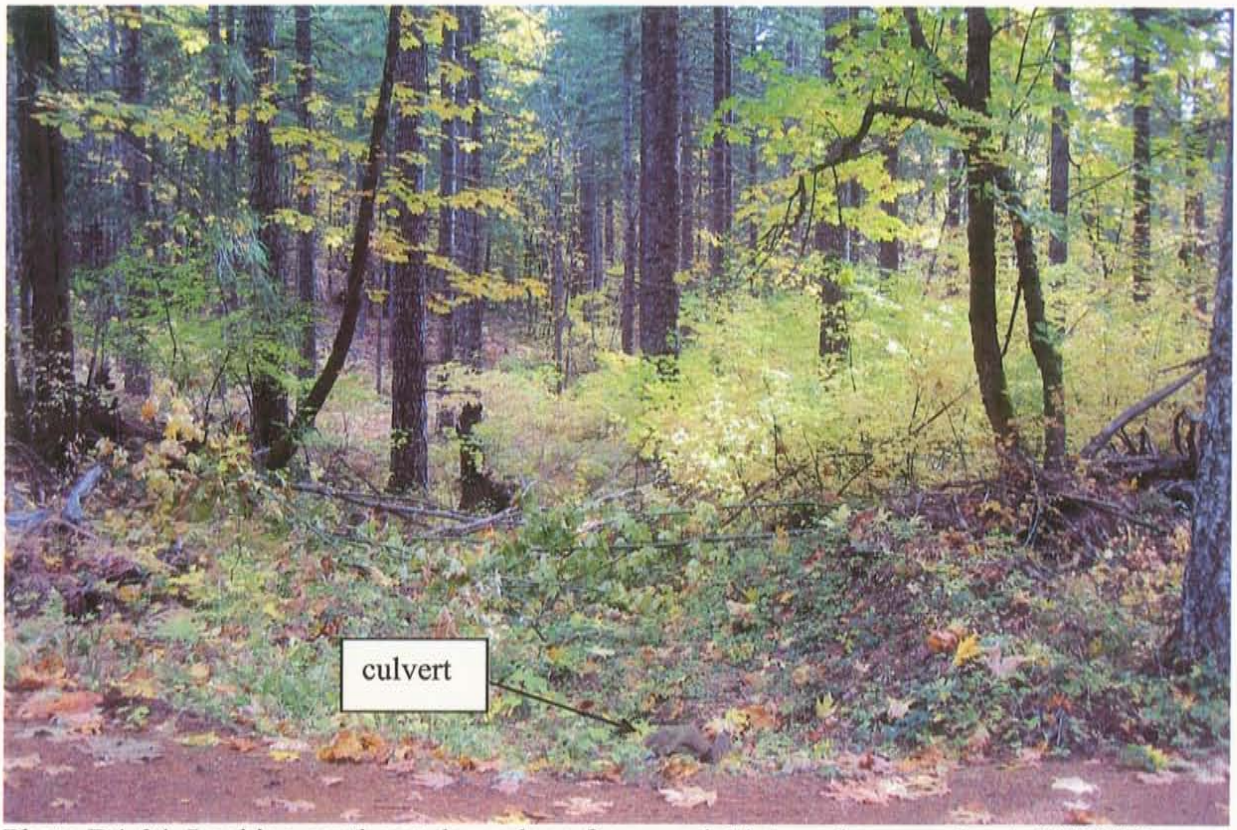


Photo D4-04. Looking southeast downslope from road. Note rock over culvert. 10/26/06.


Photo D4-05. Looking northwest upslope approximately 200 feet below road. 10/26/06.

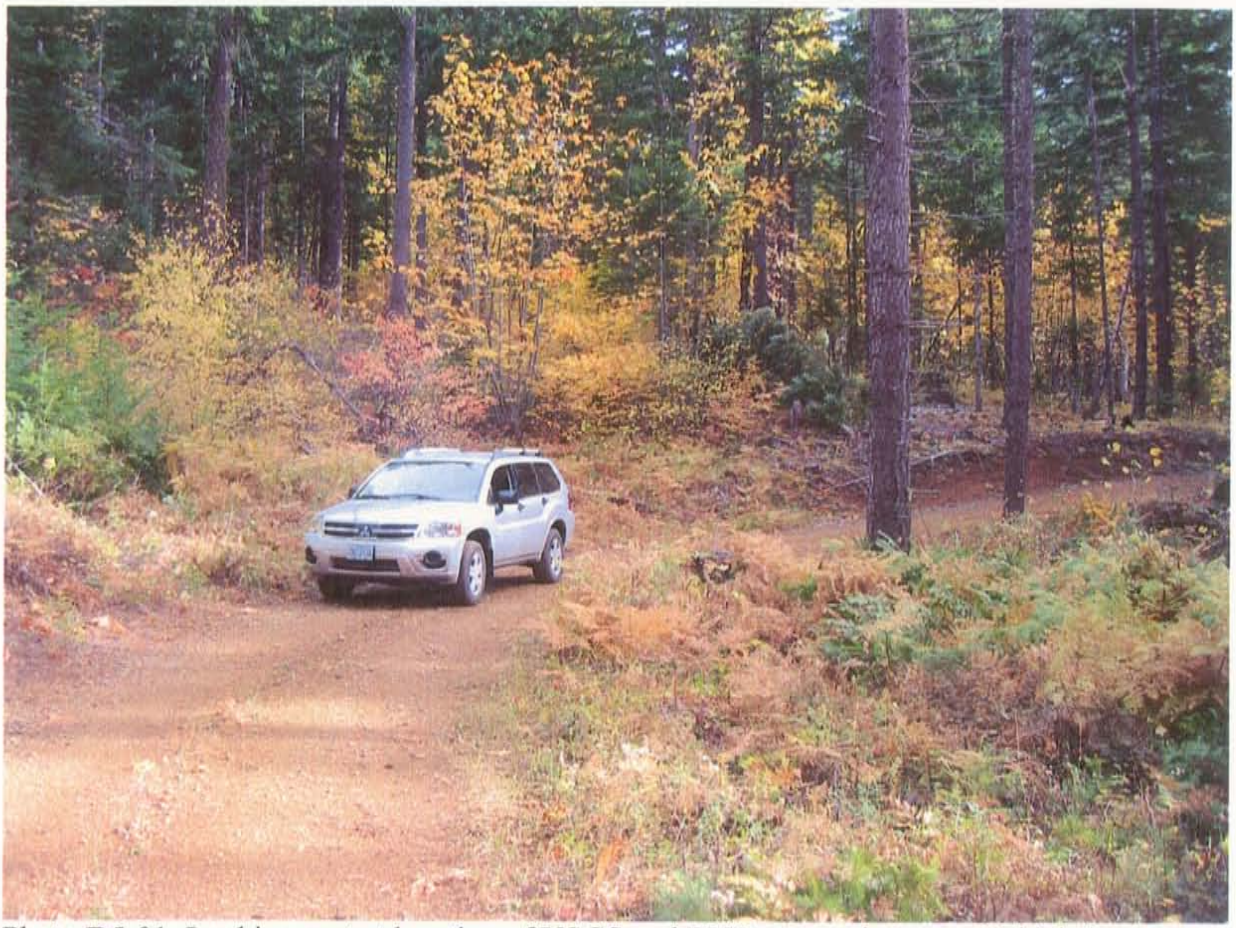


Photo D5-01. Looking east at location of USGS and DNR-mapped stream. Vehicle is at lowest portion of site. 10/26/06.



Photo D5-02. Looking north upslope from road. 10/26/06.



Photo D5-03. Looking north upslope approximately 100 feet above road. 10/26/06.



Photo D5-04. Looking south downslope from road. 10/26/06.



D5-05. Looking north upslope approximately 200 feet below road (note vehicle on road in center of photo). 10/26/06.



Photo D6-01. Looking east at location of USGS and DNR-mapped stream. Drainageway is in front of vehicle. 10/26/06.

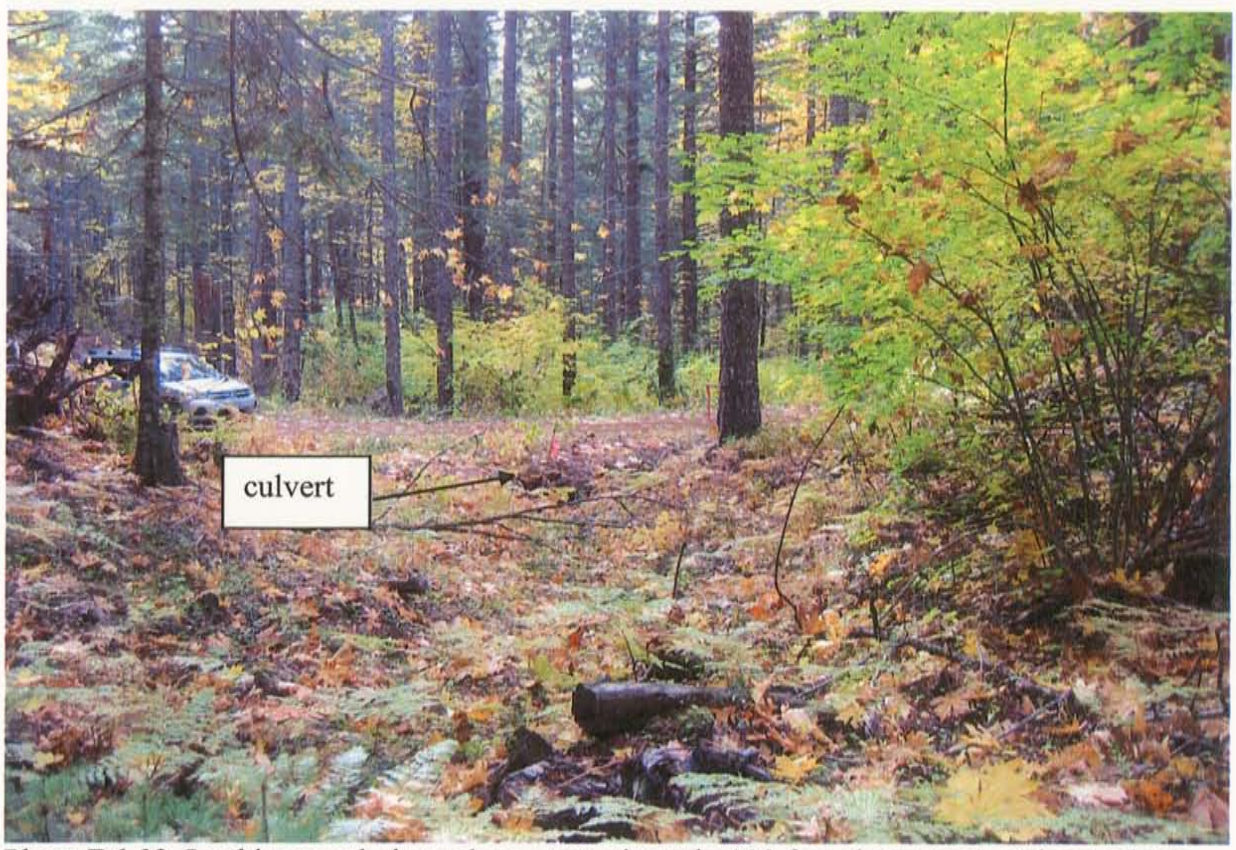


Photo D6-02. Looking south downslope approximately 100 feet above road. Culvert inlet is at pink flag. 10/26/06.

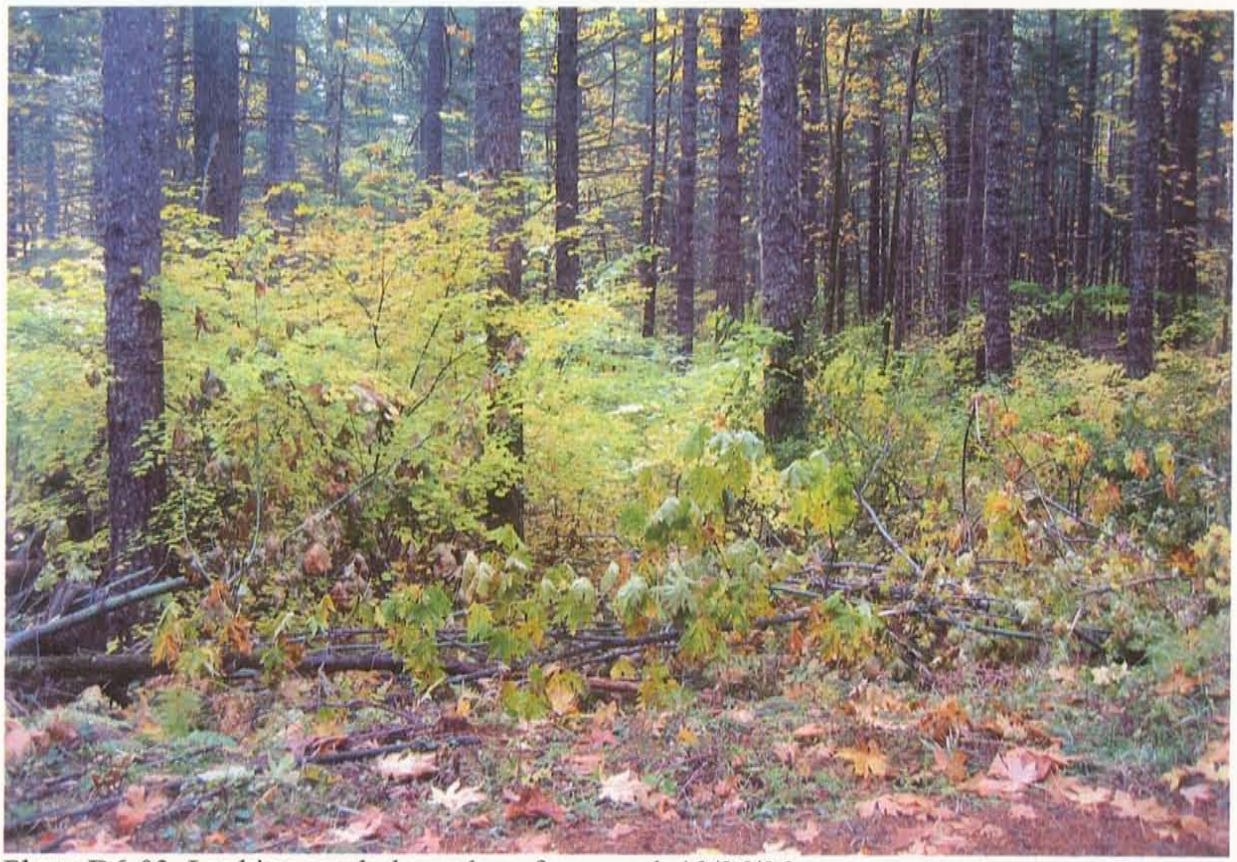


Photo D6-03. Looking south downslope from road. 10/26/06.

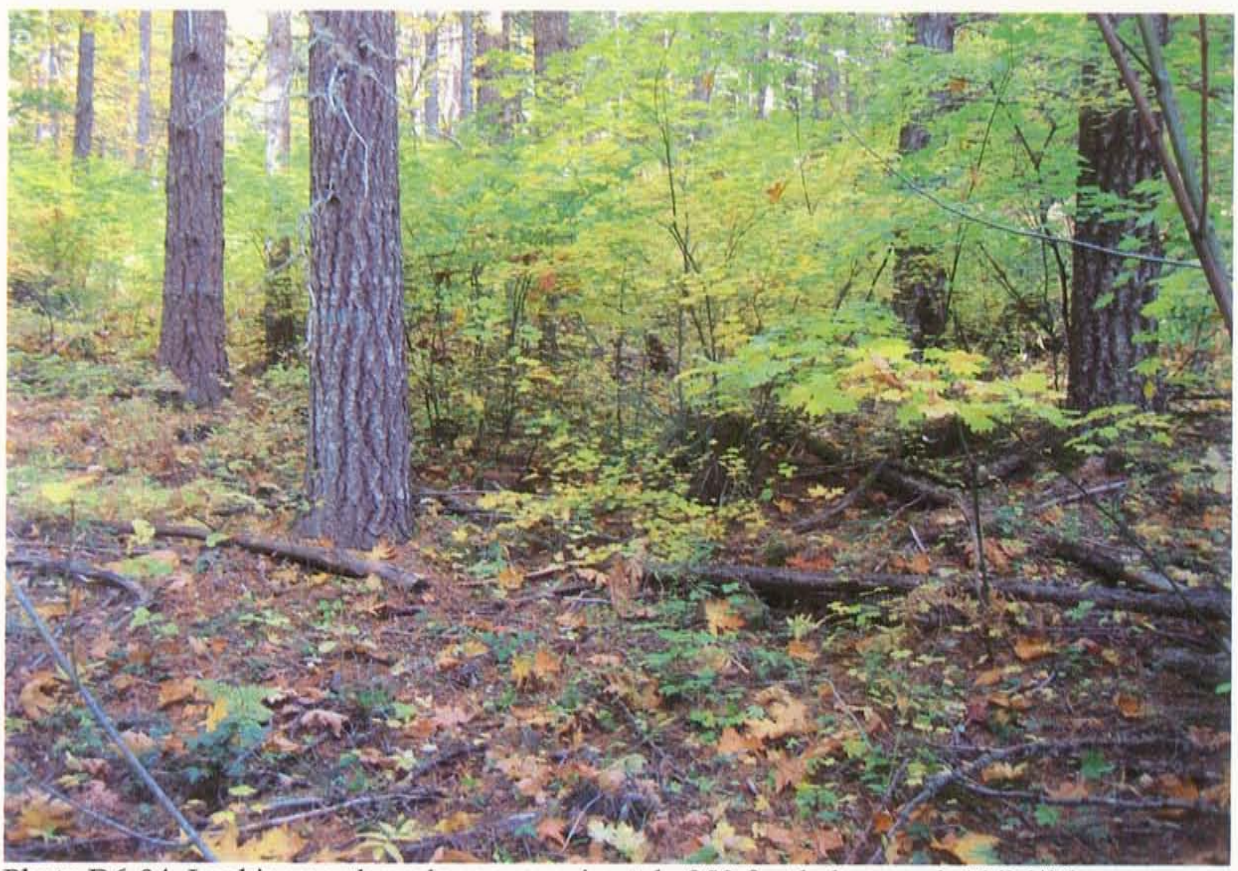


Photo D6-04. Looking north upslope approximately 250 feet below road. 10/26/06.



Photo F1-01. Looking west at location of DNR-mapped stream. Drainageway is behind vehicle. 10/26/06.



Photo F1-02. Looking southeast downslope from road. 10/26/06.



Photo F1-03. Looking northwest upslope approximately 200 feet below road. 10/26/06.



Photo F1-04. Looking northwest upslope from road. 10/26/06.



Photo F1-05. Looking upslope approximately 100 feet above road. 10/26/06.



Photo F2-01. Looking southwest at location of DNR-mapped stream. Dashed line is location of existing dirt road proposed for widening. 01/08/07.



Photo F2-02. Looking northwest along existing dirt road at location of DNR-mapped stream. 01/08/07.



Photo F2-03. Looking south upslope approximately 50 feet above existing dirt road. 01/08/07.



Photo F4-04. Looking north downslope approximately 100 feet below existing dirt road. Surface flow sinks into ground and disappears approximately 100 feet below this point. 01/08/07.

C-3

Rare Plant Survey Report: Saddleback Wind Project, Skamania County, Washington. Prepared for PPM Energy.

CH2M HILL (Peggy O'Neill). 2003

Rare Plant Survey Report
Saddleback Wind Project
Skamania County, Washington

Prepared for

PPM Energy

October 2003

CH2MHILL
Peggy O'Neill

Contents

Contents ..... **i**
1.0 Introduction **1**
1.1 Proposed Project Activites 1
1.2 Study Area 1
2.0 Methods **1**
2.1 Pre-field Review 1
2.2 Field Investigation 1
3.0 Results **1**
3.1 Plant Communities 1
3.1.1 Wetland Vegetation 1
3.1.2 Upland Vegetation. 1
3.2 Rare Plants 3
4.0 References **5**
Appendix A Plant Species Observed **8**
Appendix B Potential Special Status Plant Species **9**
Appendix C Species Descriptions for Potentially Occurring Rare Plants **10**

1.0 Introduction

CH2M HILL biologists conducted surveys for endangered, threatened, and sensitive plant species for the purpose of complying with state and federal permit requirements for the proposed Saddleback Wind project. BPA and Skamania County are the lead federal and state agencies that are responsible for identifying and evaluating the potential adverse environmental impacts of the proposed Project. The investigation was conducted in the vicinity of Underwood Mountain, approximately 7 miles northwest of the City of White Salmon, in an unincorporated area of Skamania County, Washington (Figure 1). The project area is situated adjacent to, but entirely outside of, the Columbia Gorge National Scenic Area.

1.1 Proposed Project Activites

PPM Energy, Inc. (PPM), proposes to build and operate a wind power facility at a site on private commercial forest land and a parcel owned by the Washington Department of Natural Resources (DNR). The planned facility will generate up to 86 megawatts (MW) of electricity and will consist of up to 48, 1.5 to 1.8-MW, wind turbines and associated support infrastructure, consisting of newly constructed and improved roads, transformers, underground 34.5-kilovolt (kV) collector lines, as well as a substation and operations and maintenance (O&M) facility. Collectively, the facility is known as the "proposed Project" or "Project."

The total project will consist of up to 48 wind turbines. Each turbine will be up to approximately 390 feet tall (measured from the ground to the turbine blade tip), and will be mounted on a concrete pad. Spaced about 347 to 462 feet apart, the turbines will be grouped in strings of 3 to 16 turbines and connected by an underground electrical collector system. The applicant has determined the location and the end points of each turbine string; however, the number of turbines within each string, and the spacing between each turbine, may vary depending on which turbine supplier is selected by PPM Energy. All ultimate turbine siting, spacing, and clear areas will be in accordance with industry standards and safety measures discussed later in this document.

The turbines will operate at wind speeds ranging from 9 to 56 miles per hour (mph). The electrical output of each string of turbines will be connected to the Project substation by underground collector cables. The Project substation will be built directly adjacent to BPA's transmission lines, facilitating interconnection with the BPA grid. Access to the Project area will likely require use of about 5 miles of private logging roads and constructing about 3 miles of new gravel roads on private land.

1.2 Study Area

The project area is located in the Southern Washington Cascades Province (Franklin and Dyrness 1988). This area is characterized by generally accordant ridge crests separated by

steep, deeply dissected valleys. The project falls within the *Abies grandis* and *Pseudotsuga menziesii* major vegetation zones (Franklin and Dyrness 1988). Climate is wet and cool, receiving a significant portion of its precipitation in the form of snow which accumulates in winter snowpacks as deep as 1 to 3 meters.

The project area is located on the north and west flanks of Underwood Mountain, northwest of White Salmon, Washington. Major drainages in the area include the White Salmon and the Little White Salmon River basins to the east and west of the site respectively. Both basins drain to the Columbia River south of the site, which drains to the Pacific Ocean.

Historically, the project area was dominated by coniferous species—grand fir (*Abies grandis*), and Douglas-fir (*Pseudotsuga menziesii*). Historical species dominance was dependent on elevation, aspect, underlying soil, and previous disturbance history (Franklin and Dyrness 1988). Mixed conifer and deciduous forest stands usually followed disturbances, but occasionally deciduous-dominated stands developed, depending on the disturbance type and physical environment. Typical deciduous species were alder (*Alnus rubra, A. sinuata*), Pacific dogwood (*Cornus nutallii*), and big-leaf maple (*Acer macrophyllum*).

The predominant land use in the surrounding area between Underwood Mountain and the Little White Salmon River is commercial forest production. Land within the proposed project area is currently in commercial timber production and is owned by SDS Lumber Company, Broughton Lumber Company, and the Washington Department of Natural Resources.

Current vegetation conditions are heavily influenced by forest management activities over the last century. Land in the project area is privately owned, managed industrial forest. While forest management has not reduced tree species diversity, it has resulted in a shift in species dominance to the commercially valuable Douglas-fir and in changes to stand structure and complexity, patch size, and species distribution. Average stand age probably declined from relatively short stand rotation ages. Few large, old conifer trees occur in the project area and there are no known late-successional or "old-growth" stands within or adjacent to the project area, though small groups of big trees occur.

Common understory plants include sword fern (*Polystichum munitum*), vanilla leaf (*Achlys triphylla*), false Solomon's seal (*Smilacena racemosa*), western starflower (*Trientalis latifolia*), Columbia windflower (*Anemone deltoidea*), snowberry (*Symphoricarpos albus*), vine maple (*Acer circinatum*), Oregongrape (*Berberis nervosa*), red-flowering currant (*Ribes sanguineum*), and red elderberry (*Sambucus racemosa*). A list of all plant species observed within the project area is found in Table 1, Appendix A.

The vegetation communities within the project area are common within the region and maintained through forest management, and to a lesser extent natural disturbance. Because of private ownership, rugged landscape, and the value of high-volume timber producing land, these vegetation communities are expected to persist within the region during the foreseeable future.

Insert Figure 1

VICINITY MAP

2.0 Methods

2.1 Pre-field Review

Prior to the field survey, a list of rare plant species potentially occurring within the project area was compiled. In identifying these species a plant was considered a special status species if it met one of the following criteria: federally or state listed or proposed as a rare, threatened, or endangered species (USFWS 1996 a&b); a federal candidate for listing (USFWS 1996 a&b); a Washington Natural Heritage Information System special plant (WNHIS 2003); or listed by the Washington Natural Heritage Program (WNHP) as a rare plant species known to occur in Skamania County (WNHP, March 2003). A species was determined to have some potential for occurring in the study area if it is known to occur in the vicinity or its known geographic range includes the study area, and if it is known to occur in habitats and elevations likely to occur in the study area. Twenty-nine special status species identified from these searches are shown in Table 2, Appendix B.

Further data was collected regarding the habitat requirements, phenology, associated species, and taxonomy of these species. Taxonomic keys, monographs, species guides, and plant lists were collected to provide additional information. Several references were used to gather habitat descriptions for particular species and are noted in the reference section of this report. This information was used to focus the level of survey intensity in areas where site conditions indicated species habitat requirements were present.

2.2 Field Investigation

The purpose of the rare plant surveys was to locate all populations of special status plants within the project area, to precisely record and map their locations using GPS technology, and to determine the size and phenology of each rare plant population, and its microhabitat characteristics. Surveys were floristic in nature and were conducted according to the rare plant survey guidelines provided by the U.S. Bureau of Land Management *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants* (Whiteaker et al. 1998).

Surveys for potential rare plant species within project area were conducted on May 28, 29, 30 and July 28 and 29, 2003. This range of survey dates was selected to encompass all or a portion of the blooming times of all of the special status plants potentially occurring within the project area. The field surveys were performed by CH2M HILL botanists and ecologists familiar with rare plant species of the region. Potential habitats supporting rare species within the project study area were surveyed on foot at an intensity level sufficient to confirm the presence or absence of targeted rare plant species identifiable at the time of the surveys. The surveyors kept a list of all vascular plants encountered. Observations of plant associations, land use patterns, and unusual habitats were recorded.

Study area boundaries are shown in Figure 2. The project study area for potential habitats included:

- 300-foot corridors centered on all proposed turbine strings and their associated access roads,
- 50-foot corridors on either side of all existing roads proposed for improvement in conjunction with the project,
- an approximately 15-acre plot for proposed substation construction, and
- two 5-acre and five 2-acre areas identified as proposed construction staging areas.

Two survey methods were used. An *Intuitive Controlled Survey* was conducted throughout the project site with a *Complete Survey* conducted in areas of high potential habitat. Protocol for these methods is as follows:

Intuitive Controlled Survey

For the entire project area an intuitive controlled survey was used. This method can also include a complete survey in habitats with the highest potential for rare plant species of concern.

The surveyor traversed through the project area to see a representative cross section of all the major habitats and topographic features, looking for the target species while en route between different areas. When the surveyor arrives at an area of high potential (that is defined in the pre-field review or encountered during the field visit), a complete survey for the target species is conducted.

Complete Survey

For areas where the most suitable habitat was located a complete survey was conducted. These surveys are defined as a 100 percent visual exam of the project area.

All plant species encountered in the survey areas were identified to at least genus and to the level necessary to ensure that they were not special status plant species. Plant identification was aided using current taxonomic guides, including *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1996) and *Wetland Plants of Oregon and Washington* (Guard, 1995). A list of all plant taxa encountered was recorded in the field by turbine string, road, or staging/substation area. Collections were made for later determination of species that were not readily identifiable in the field. Final species determinations were made by keying specimens using standard references such as *Flora of the Pacific Northwest* (Hitchcock and Cronquist, 1996). A list of plants encountered within the project area during the rare plant survey is provided in Table 1, Appendix A.

FIGURE 2: STUDY AREA

3.0 Results

3.1 Plant Communities

A total of five vegetation types occur within the areas included in project surveys: one wetland and four upland vegetation types. A description of these vegetation types follows.

3.1.1 Wetland Vegetation

Riparian Deciduous. Natural and anthropogenic disturbances frequently result in domination by deciduous species in near-stream areas. Within the project area this type occurs in the area identified on the USGS topographic map as "Cedar Swamp." Historically this area was dominated by very large, old cedar, which have been logged. The area is now dominated by willow and cottonwood (*Populus balsamifera*) with scattered occurrences of young cedar.

The Cedar Swamp area consists of approximately 24 acres is located adjacent to the proposed impact area for Turbine String F.

3.1.2 Upland Vegetation.

Grass-forb Stand. Grass-forb Stands are found in the project vicinity in recently clearcut areas. Grass-forb is the stand condition in the USDA Forest Service classification system defined as areas where shrubs comprise less than 40 percent crown cover and are less than 5 feet tall (Brown, 1985). This stand type occurs when a disturbance such as timber harvest, fires, or wind has killed or removed most or all of the larger trees, or when brush fields are cleared for planting. These units may range from mainly devoid of vegetation to dominance by herbaceous species (grasses and forbs). Tree regeneration in these units is generally less than 5 feet tall and 40 percent crown cover.

In Grass-forb stands within the project vicinity vegetation is minimal and consists predominantly of weedy herbaceous species, including bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and dandelion (*Taraxacum officinale*). These areas generally consist of ubiquitous coarse woody material (CWM), occasional slash piles, and large areas of bare ground. Within the project's proposed impact area there are approximately 22.3 acres of grass-forb vegetation community.

Brushfield/Shrub Stand. Brushfields are defined as the shrub stand condition in the USDA Forest Service classification system (Brown 1985). They develop on land following clearcut tree harvesting or other disturbances that remove vegetation. In keeping with Washington Forest Practices Rules, Chapter 222 WAC, all harvest units are planted within 3 years after harvest or a period of from 1 to 10 years as determined by the department in the case of a natural regeneration plan and must maintain minimum stocking levels of 150 vigorous, well-distributed undamaged seedlings per acre of commercial tree species.

Thus the majority of brushfields are actually young plantations (typically Douglas-fir, although many landowners are now planting mixed species) that have not yet reached the closed canopy stage or shaded out the shrub species. The type may have large amounts of bare soil, and often has slash and other logging debris on the ground. Vegetation (other than planted conifers) often consists of remnants from the forest understory and early successional annuals. There are vine maple, Sitka alder, beaked hazelnut (*Corylus cornuta*), serviceberry (*Amelanchier alnifolia*), Himalayan blackberry (*Rubus discolor*), bracken fern (*Pteridium aquilinum*), sword fern, oceanspray (*Holodiscus discolor*), fireweed (*Epilobium angustifolium*), wooly yarrow (*Achillea millefollium*), pearly everlasting (*Anaphalis margaritacea*) and grasses as ground cover.

Vegetation control has occurred in conjunction with forest management and includes herbicide application, mechanical control, or both. These areas are visually and functionally different from areas where control has not occurred. Despite control efforts, or where they have not occurred, dense shrub thickets frequently occur, dominated by the native vine maple. Within the thickets are small alders and Douglas-fir that occasionally grow taller than the vine maple. These areas also may have patches of alder saplings, salmonberry (*Rubus spectabilis*), vine maple, red elderberry, oceanspray, lupine (*Lupinus* sp.), Oregon oxalis, and grass. Small diameter coarse woody material (CWM) is common. Within the project's proposed impact area there are approximately 45.8 acres of brushfield/shrub vegetation community.

Conifer-Hardwood Forest. Conifer-Hardwood Forest is found in the project vicinity in the closed sapling-pole stand condition, under the USDA Forest Service vegetation classification system (Brown 1985). The forest canopy in these stands is dominated by a mix of bigleaf maple and Douglas-fir, with some red alder. Canopy height typically ranges from 40 to 60 feet. Canopy closure is between 60 and 80 percent. Maple forms about 30 percent of the canopy cover with Douglas-fir forming most of the rest of the canopy. Stands may have distinct tree canopy layers with deciduous overtopping emerging conifer or remnant conifer over the deciduous component. Stands with shrub layers that merge with the canopy layers are found in the project vicinity. The shrub layer varies from open to dense and contains vine maple, salmonberry, thimbleberry (*Rubus parviflora*),red elderberry, beaked hazelnut, and Pacific dogwood. The herbaceous layer contains sword fern, trailing blackberry, oxalis, grasses, and moss. Within the project's proposed impact area there are approximately 147.9 acres of conifer-hardwood vegetation community.

CWM is dependent on stand age, but is typically low to moderate. Deciduous snags out-number conifer snags, although depending on stand origin, short well decayed conifer snags may be present.

Conifer Forest. Coniferous Forest is found in the project area in closed sapling-pole-sawtimber stands and large sawtimber stands. Within the project area and most of the region, Coniferous Forests are dominated by Grand fir and Douglas-fir. The closed sapling-pole-sawtimber is a continuum of tree diameter sizes with saplings being relatively small, poles being in the 8-12 inch range, and sawtimber ranging from 12 to 23 inches. Important to these stand types is the closed canopy and relative short live crowns found in the pole and sawtimber stages. The closed canopy results in the exclusion of most shrub species and many herbs.

CWM in this stage is typically low and consists of remnants from previous stands. Snags are typically rare, although small diameter snags become more frequent in the pole and sawtimber stages as shading and resource competition kills subdominants.

Large sawtimber is considered to be at least 21 inches in DBH. Within-stand differentiation has begun and dominants are beginning to overtop and out-compete other tree species. Competition for space results in more light reaching the forest floor and shrub and herbaceous communities typically become more diverse. CWM and snags are generally rare, although the number of snags and amount of CWM may be variable amount stands, dependent on past harvest practices, stand management, and actual stand age.

These forests are used for commercial forestry, and are generally regenerated after harvest, although some may be the result of natural disturbance combined with commercial planting. They are subject to timber management activities including harvest, replanting, and stand improvement activities. These forests are widespread in the project vicinity. Within the project's proposed impact area there are approximately 85.8 acres of conifer vegetation community.

3.2 Rare Plants

No special status plant species were observed within the proposed project area in the course of the rare plant surveys.

4.0 References and Personal Communication

Cooke, S. S. (1997). *A Field Guide to the Common Wetland Plants of Washington and Northwestern Oregon*. Seattle Audubon Society. Seattle, Washington

Department of the Interior, Fish and Wildlife Service. 50 CFR Part 17; RIN 1018-AE-53. February 24, 2000. *Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for "Erigeron decumbens" var. "decumbems" (Willamette daisy). Final Rule.* Region 1 U.S. Fish and Wildlife Service, Ecological Services, Portland, OR.

Eastman, Donald C. (1990). *Rare and Endangered Plants of Oregon.* Beautiful America Publishing. Wilsonville, Oregon

Caplow, Florence. 2002. *Personal Communication with Peggy O'Neill*. Washington Department of Natural Resouces.

Caplow, Florence. 2003. *Personal Communication with Peggy O'Neill*. Washington Department of Natural Resouces.

Gaines, X.M. and D.G Swan. 1972. *Weeds of Eastern Washington and Adjacent Areas.*Camp-Na-Bor-Lee Association, Inc., Davenport, Washington.

Gammon, John. 2002. *Personal Communication with Peggy O'Neill.* Washington Department of Natural Resouces.

Guard, B.J. 1955. *Wetland Plants of Oregon and Washington*. Lone Pine Publishing, Renton, WA

Hitchcock, A.S. 1951. Manual of the Grasses of the United States. 2nd ed., rev. by A. Chase. U.S. Dept. of Agriculture, Misc. Publ. no. 200, Wash. D.C. 1051 pp.

Hitchcock, C.L. and A. Cronquist. 1973. *Flora of the Pacific Northwest.* University of Washington Press, Seattle, Washington.

Hitchock, C. L., A. Cronquist, M. Ownbey, J.W. Thompson. 1969. *Vascular Plants of the Pacific Northwest. Part 1: Vascular Crytogams, Gymnosperms, and Monocotyledons.* University of Washington Press, Seattle, Washington.

_____. 1964. *Vascular Plants of the Pacific Northwest. Part 2: Salicaceae to Saxifragaceae.* University of Washington Press, Seattle, Washington.

_____. 1961. *Vascular Plants of the Pacific Northwest. Part 3: Saxifragaceae to Ericaceae.* University of Washington Press, Seattle, Washington.

_____. 1959. *Vascular Plants of the Pacific Northwest. Part 4: Ericaceae through Campanulaceae.* University of Washington Press, Seattle, Washington.

_____. 1955. *Vascular Plants of the Pacific Northwest. Part 5: Compositae.* University of Washington Press, Seattle, Washington.

Jolley, R. 1988. *Wildflowers of the Columbia Gorge: a Comprehensive Field Guide.* Oregon Historical Society Press, Portland, Oregon.

Lyons, C.P. 1999. *Wildflowers of Washington.* Lone Pine Publishing, Renton, Washington.

Lyons, C.P. and B Merilees. 1995. *Trees, Shrubs & Flowers to Know in British Columbia & Washington.* Lone Pine Publishing, Rendmond, Washington.

Meinke, Robert J. (1982). *Threatened and Endangered Vascular Plants of Oregon: an Illustrated Guide.* Oregon State University Press. Corvallis, Oregon

Oregon Natural Heritage Program. 2001. *Rare, Threatened and Endangered Plants and Animals of Oregon.* Oregon Natural Heritage Program, Portland, Oregon.

Niehaus, T. F. and C. L. Ripper (1976). 1976). *A Field Guide to Pacific States Wildflowers: Washington, Oregon, California, and Adjacent Areas.* The Peterson Field Guide Series. Houghton Mifflin Company. Boston and New York.

NPSO. 1998. *Survey of Wildflowers, Flowering Shrubs, Ferns, and Grasses of the Columbia River Gorge.* Native Plant Society of Oregon

Pojar, J. and A, MacKinnon. 1994. Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia, & Alaska. Lone Pine Publishing, Redmond, Washington.
Taylor, R. J. 1990. *Northwest Weeds*. Mountain Press Publishing Company, Missoula, Montana.

Potash, Laura. 1998. *Management Recommendations for Mingan moonwort (Botrychium minganense* Victorin*).* United States Bureau of Land Management.

Taylor, R. J. 1990. *Northwest Weeds*. Mountain Press Publishing Company, Missoula, Montana.

U.S. Fish and Wildlife Service (USFWS). 1993. Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review. Federal Register 58(188): 51144-51190. Sept. 30, 1993.

_____. 1996a. Endangered and Threatened Species; Notice of Reclassification of 96 Candidate Taxa. Federal Register 61(40):7457-7463. Feb. 28, 1996.

_____. 1996b. Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or Threatened Species. Federal Register 61(40):7596-7613. Feb. 28, 1996.

USGS. 1981. 7.5-minute Topographic Quadrangle Map: Bingen, Washington. US Geological Survey, Washington, DC.

Whitson, T. (Editor). 2000. *Weeds of the West.* Western Society of Weed Science, University of Wyoming.

WNHIS. 2003. Special Status Plants Species and Habitats Data Search. Washington Natural Heritage Information System.

WNHP. 2003. *Rare Plant List for Skamania County.* Washington Natural Heritage Program. http://www.dnr.wa.gov/nhp/refdesk/lists/plantsxco/skamania.html

WNHP. 2003. *Field Guide to Selected Rare Plants.* Washington Natural Heritage Program. http://www.dnr.wa.gov/nhp/refdesk/fguide/htm/fgmain.htm

Appendix A
Plant Species Observed

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003
Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Aceraceae				
	Acer circinatum	vine maple	X	
	Acer macrophyllum	big leaf maple	X	
Apiaceae				
	Daucus carota	Queen Anne's lace		X
	Oenanthe sarmentosa	Pacific water -parsley	X	
	Osmorhiza chilensis	mountain sweet-cicely	X	
	Sanicula crassicaulis	Pacific sanicle	X	
Apocynaceae				
	Apocynum androsaemifolium	spreading dogbane	X	
Araliaceae				
	Oplopanax horridus	Devil's club	X	
Aristolochiaceae				
	Asarum caudatum	wild ginger		
Asteraceae				
	Achillea millefolium	wooly yarrow	X	
	Adenocaulon bicolor	pathfinder		
	Anaphalis margaritacea	pearly-everlasting	X	
	Antennaria luzuloides	woodrush pussytoes	X	
	Centaurea cyanus	bachelor's button		X
	Centaurea diffusa	diffuse knapweed		X
	Chrysanthemum leucanthemum	ox-eye daisy		X
	Cichorium intybus	chicory		X
	Cirsium arvense	Canada thistle		X
	Cirsium vulgare	bull thistle		X
	Gnaphalium palustre	marsh cudweed	X	
	Hieracium albiflorum	white-flowered hawkweed	X	
	Hieracium scouleri	wooly-weed	X	
	Lactuca serriola	prickly lettuce		X
	Taraxacum officinale	dandelion		X
	Tragopogon dubius	yellow salsify		X
Berberidaceae				
	Achlys triphylla	vanilla leaf	X	
	Berberis nervosa	Cascade Oregongrape	X	
	Vancouveria hexandra	white insideout flower	X	
Betulaceae				
	Alnus sinuata	Sitka alder	X	
	Corylus cornuta	beaked hazelnut	X	
Boraginaceae				
	Cryptantha flaccida	common cryptantha	X	
Brassicaceae				
	Erysimum occidentale	pale wallflower	X	
Campanulaceae				
	Campanula scouleri	Scouler's bluebell	X	

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003
Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Caprifoliaceae				
	Linnaea borealis	twin flower	X	
	Lonicera hispidula	hairy honeysuckle	X	
	Lonicera sp.	honesuckle	X	
	Sambucus racemosa	red elderberry	X	
	Symphoricarpos albus	snowberry	X	
Caryophyllaceae				
	Stellaria jamesiana	sticky chickweed		
Cornaceae				
	Cornus nutallii	Pacific dogwood	X	
Cupressaceae				
	Thuja plicata	western red cedar	X	
Cyperaceae				
	Eleocharis palustris	creeping spikerush	X	
Dryopteridaceae				
	Athyrium filix-femina	lady fern	X	
Equisitaceae				
	Equisetum arvense	field horsetail	X	
Ericaceae				
	Arctostaphylos patula	green-leaf manzanita	X	
	Chimaphylla menziesii	little pipsissewa	X	
	Chimaphylla umbellata	common pipsissewa	X	
	Pyrola picta	white vein pyrola	X	
	Vaccinium sp.	huckleberry	X	
Fabaceae				
	Cytisus scoparius	Scotch broom		X
	Lathyrus latifolius	everlasting peavine		X
	Lathyrus polyphyllus	leafy peavine	X	
	Lotus purshiana	spanish-clover	X	
	Lupinus caudatus	Kellog spurred lupine	X	
	Lupinus polyphyllus	large-leaf lupine	X	
	Lupinus sp.	lupine	X	
	Trifolium dubium	least hop clover		X
	Trifolium sp.	clover		
	Vicia sp.	vetch		
Grossulariaceae				
	Ribes sanguineum	red-flowering currant	X	
Hydrophyllaceae				
	Nemophila parviflora	small-flowered nemophila	X	
	Phacelia hastata	silver-leaf phacelia	X	
Hypericaceae				
	Hypericum perforatum	common St. John's-wort		X
Juncaceae				
	Juncus effusus	common rush	X	
	Luzula parviflora	small-flowered wood rush	X	

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003 Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Lamiaceae				
	Stachys cooleyae	Cooley's hedge-nettle	X	
Liliaceae				
	Clintonia uniflora	bead lily	X	
	Disporum hookeri	Hooker's fairy-bell	X	
	Lilium columbianum	Columbia lily	X	
	Smilacina racemosa	western false Solomon's seal	X	
	Smilacina stellata	star-flowered false Solomon's	X	
	Trillium ovatum	western trillium	X	
Onagraceae				
	Epilobium angustifolium	fireweed		X
	Epilobium sp.	epilobium		
	Oenothera strigosa	common evening-primrose	X	
Orchidaceae				
	Calypso bulbosa	fairy-slipper	X	
	Corallorhiza maculata	spotted coral-root	X	
	Corallorhiza mertensiana	Merten's coral-root	X	
	Corallorhiza striata	striped coral-root	X	
Pinaceae				
	Abies grandis	grand fir	X	
	Pseudotsuga menziesii	Douglas-fir	X	
	Tsuga heterophylla	western hemlock	X	
Plantaginaceae				
	Plantago lanceolata	English plantain	X	
	Plantago major	common plantain	X	
Poaceae				
	Bromus tectorum	cheat grass		X
Polemoniaceae				
	Microsteris gracilis	midget phlox	X	
Polygonaceae				
	Rumex acetosella	sheep sorrel		X
	Rumex occidentalis	western dock	X	
Polypodiaceae				
	Adiantum pedatum	maidenhair fern	X	
	Polystichum munitum	sword fern	X	
	Pteridium aquilinum	bracken fern	X	
Portulacaceae				
	Claytonia perfoliata	miner's lettuce	X	
	Claytonia siberica	Siberian spring beauty	X	
Primulaceae				
	Trientalis latifiolia	western starflower	X	
Ranunculaceae				
	Actaea rubra	baneberry	X	
	Anemone deltoidea	Columbia wind flower	X	

TABLE 1 Plant Species Observed May 28-30 and July 28-29, 2003
Saddleback Wind Project

FAMILY	SCIENTIFIC NAME	COMMON NAME	NATIVE	NON-NATIVE
Rhamnaceae				
	Ceanothus integerrimus	deerbrush	X	
	Ceanothus sanguineus	redstem ceanothus	X	
	Ceanothus velutinus	tobacco-brush	X	
Rosaceae				
	Aruncus sylvester	goatsbeard	X	
	Fragaria virginiana	wild strawberry	X	
	Holodiscus discolor	oceanspray	X	
	Prunus emarginata	bitter cherry	X	
	Prunus virginiana	common chokecherry	X	
	Rosa gymnocarpa	baldhip rose	X	
	Rosa woodsii	Wood's rose	X	
	Rubus leucodermis	blackcap	X	
	Rubus parviflora	thimbleberry	X	
	Rubus ursinus	blackberry	X	
Rubiacea				
	Galium aparine	cleavers	X	
Salicaceae				
	Populus balsamifera	black cottonwood	X	
	Salix lasiandra	Pacific willow	X	
	Salix scouleriana	Scouler's willow	X	
	Salix sitchensis	Sitka willow	X	
Saxifragaceae				
	Mitella diversifolia	varied-leaved mitrewort	X	
	Tellima grandiflora	fringecup	X	
	Tiarella trifoliata	foamflower	X	
Scrophulariaceae				
	Linaria dalmatica	dalmatian toadflax		X
	Penstemon sp.	penstemon	X	
	Penstemon subserratus	fine-toothed penstemon	X	
	Verbascum thapsus	wooly mullein	X	
	Veronica scutellata	marsh speedwell	X	
Valerianaceae				
	Plectritis macrocera	white plectritis	X	
Violaceae				
	Viola glabella	stream violet	X	

Appendix B
Potential Special Status Plant Species

TABLE 2 Status, Distribution and Habitat Data for Special Status Plant Species Identified as Occurring or Potentially Occurring in the Vicinity of the Saddleback Wind Project.

Family	Scientific Name	Common Name	Phenology	Habitat	Associated Species	WA State	Federal Status	Sources
Asteraceae								
	Balsamorhiza deltoidea	Puget balsamroot	mid March to mid June	Open places, usually avoiding the thinner soils; in the Puget trough, from south Vancouver Island to southern California.		Review		WNHP (2001); NPSO (1998)
	Erigeron howellii	Howell's daisy	May to early July	In Washington, Erigeron howellii occurs primarily on steep north-facing slopes at elevations ranging from 1600 to 3400 feet. The taxon generally occurs within microsites that have very little soil development and limited development of competing vegetation. The sites are essentially in a stable, herb-dominated condition.		Threatened	SC	WNHP (2002)
	Erigeron oreganus	Gorge daisy	June	Moist shady cliffs and ledges; Columbia River Gorge, mostly frequently collected on the Oregon side.		Threatened	SC	WNHP (2002); Jolley (1988)
	Microseris borealis	northern microseris	July - August	Marshes at mid to high elevations west of Bonneville Dam. Blooms in the morning.		Sensitive		WNHP (2002): Jolley (1988)
Boraginaceae								
	Hackelia diffusa var. *diffusa*	diffuse stickseed	May through June	Shaded area, cliffs, talus, wooded flats and slopes.	Symphoricarpos albus, Philadelphus lewisii, Osmorhiza occidentalis, Acer glabrum, Fritillaria pudica, Erysimum occidentale	Sensitive		WNHP (2001)

FEDERAL STATUS DESIGNATIONS:
(E) Listed Endangered
(T) Listed Threatened
(CH) Critical Habitat
(PE) Proposed Endangered
(PT) Proposed Threatened
(PCH) Proposed Critical Habitat

STATE STATUS DESIGNATIONS:
(LE) Listed Endangered
(PE) Proposed Endangered
(PT) Proposed Threatened
(SC or C) Sensitive-critical
(SV or V) Sensitive-vulnerable
(SoC) Species of Concern
(SP or P) Sensitive peripheral or naturally rare
(SU or U) Sensitive-undetermined

TABLE 2 Status, Distribution and Habitat Data for Special Status Plant Species Identified as Occurring or Potentially Occurring in the Vicinity of the Saddleback Wind Project.

Family	Scientific Name	Common Name	Phenology	Habitat	Associated Species	WA State	Federal Status	Sources
Brassicaceae								
	Rorippa columbiae	persistentsepal yellowcress	April to October (depending on water regime)	Has been observed near all types of bodies of water, including the Columbia River, intermittent snow-fed streams, permanent lakes, snow-fed lakes, internally-drained lakes, which may be dry for extended periods of time, wet meadows, irrigation ditches, and roadside ditches. The species apparently requires wet soil throughout the growing season. It is known from a wide variety of soil types, including clay, sand, gravel, sandy silt, cobblestones, and rocks. Individuals are usually found in open habitats that have low vegetative cover. A common feature of all of the known sites Is inundation for at least part of the year. R. columbiae typically occurs in the lowest vegetated riparian zone in a band spanning approximately 1-1.5 meters in elevation.	NA	Threatened	SC	WNHP (2001)
Campanulaceae								
	Githopsis specularioides	common blue-cup	Mid-April to mid-June	Open places at lower elevations; typically open habitats within forested landscapes.	Vary, but often include Pseudotsuga menziesii, Pinus ponderosa, Quercus garryana. Other associated species: Agropyron spicatum, Festuca idahoensis, Bromus mollis, Lomatium sp., Collinsia parviflora.			WNHP (2001); Jolley (1988)
Caryophyllaceae								
	Silene douglasii var. *monantha*	Douglas' silene	May - June or later, depending on elevation.	Rocky, well-drained soils, wet areas. Sagebrush plains to montane slopes.		Review		WNHP (2001); John Gammon, Washington DNR (2002) Florence Caplow Washington DNR (2002)
Cyperaceae								
	Carex macrochaeta	large-awn sedge	June - August	Moist or wet, open places, often near the beach. Northwest coast of Asia, east through the Aleutian Islands to the Alaska peninsula, and south near the coast to southern B.C.; reputedly also in the Columbia River Forge at Multnomah Falls, Oregon. An old (1836) collection by Garry is supposed to have come from Ft. Vancouver, WA.		Sensitive		WNHP (2002)

FEDERAL STATUS DESIGNATIONS:
(E) Listed Endangered
(T) Listed Threatened
(CH) Critical Habitat
(PE) Proposed Endangered
(PT) Proposed Threatened
(PCH) Proposed Critical Habitat

STATE STATUS DESIGNATIONS:
(LE) Listed Endangered
(PE) Proposed Endangered
(PT) Proposed Threatened
(SC or C) Sensitive-critical
(SV or V) Sensitive-vulnerable
(SoC) Species of Concern
(SP or P) Sensitive peripheral or naturally rare
(SU or U) Sensitive-undetermined

TABLE 2 Status, Distribution and Habitat Data for Special Status Plant Species Identified as Occurring or Potentially Occurring in the Vicinity of the Saddleback Wind Project.

Family	Scientific Name	Common Name	Phenology	Habitat	Associated Species	WA State	Federal Status	Sources
Fagaceae								
	Chrysolepsis chrysophylla	golden chinquapin	May through July	Dry, open sites to fairly thick woodland, from sea level up to 5500 feet elevation.		Sensitive		WNHP (2002); Florence Caplow, Washington DNR (2003)
Fumiariaceae								
	Corydalis aquae-gelidae	Clackamas corydalis	June to September	Occurs primarily in the western hemlock (Tusga heterophylla) and Pacific silver fir (Abies amabilis) zone. (Franklin and Dyrness, 1973), at elevations ranging from 2500 to 3800 feet. It is found growing in or near cold flowing water, including seeps and small streams, often occurring within the stream channel itself. Current information suggests that C, aquae-gelidae prefers intermediate levels of overstory canopy closure which provide enough light for flowering and reproduction, yet not so much light that a dense cover of shrubs develops.		Threatened	SC	WNHP (2002)
Iridaceae								
	Sisyrinchium sarmentosum	pale blue-eyed grass	mid-June to early August	Occurs in meadows and small openings from 1600 to 4200 feet. The meadows, which fill with snow and/or water I winter and spring, area variously dominated by grasses and sedges. Conifers such as lodgepole pine (Pinus contorta), and Engelmann spruce (Picea engelmannii), and shrubs such as hardhack (Spiraea douglasii), border the meadows and are occasional invaders. The sites are relatively flat, often being slightly concave. Most sites are within either the Little White Salmon River or the White Salmon River drainages. The underlying bedrock is basalt from various flows.	Pinus contorta, Picea engelmannii, Spiraea douglasii	Threatened	SC	WNHP (2001)

FEDERAL STATUS DESIGNATIONS:
(E) Listed Endangered
(T) Listed Threatened
(CH) Critical Habitat
(PE) Proposed Endangered
(PT) Proposed Threatened
(PCH) Proposed Critical Habitat

STATE STATUS DESIGNATIONS:
(LE) Listed Endangered
(PE) Proposed Endangered
(PT) Proposed Threatened
(SC or C) Sensitive-critical
(SV or V) Sensitive-vulnerable
(SoC) Species of Concern
(SP or P) Sensitive peripheral or naturally rare
(SU or U) Sensitive-undetermined

TABLE 2 Status, Distribution and Habitat Data for Special Status Plant Species Identified as Occurring or Potentially Occurring in the Vicinity of the Saddleback Wind Project.

Family	Scientific Name	Common Name	Phenology	Habitat	Associated Species	WA State	Federal Status	Sources
Juncaceae								
	Juncus howellii	Howell's rush	July - August	Moist ground in the mountains; chiefly Californian, form Siskiyou to Trinity and Butte cos., but possibly northeast to northeast Oregon and west central Idaho.		Review		WNHP (2002)
Lentibulariaceae								
	Utricularia intermedia	flat-leaved bladderwort	July through August	Shallow ponds, slow-moving streams, and wet sedge or rush meadows. Generally occurs only in significant wetlands where standing water is present year around,. bog-like areas.	Scirpus acutus, Ranunculus flammula, Juncus supiniformis, Juncus balticus, Equisetum fluviatile, Carex sitchensis	Sensitive		WNHP (2001) John Gammon, Washington DNR (2002) Florence Caplow Washington DNR (2002)
Lycopodiaceae								
	Lycopodiella inundata	bog clubmoss		Mostly in sphagnum bogs, seldom in other very wet places.		Sensitive		WNHP (2002)
Ophioglossaceae								
	Botrychium lunaria	moonwort	May through July	Moist or wet, more or less open places at middle to high elevation in the mountains, e.g., about mountain springs; generally neither in meadows nor in deep forest, at least in our range.		Sensitive		WNHP (2002); Florence Caplow, Washington DNR (2003)
	Botrychium minganense	Mingan grape-fern	May through July	Exhibits wide ecological amplitude, occuring in a wide range of habitats, particularly east of the Cascades, where it occurs in open shrubland and barren slopes. However, it typically occurs in older forest stands. The colonies are associated with riparian zones and old growth western redcedar (*Thuja plicata*) in dense shade, sparse understory, on alluvium substrate and often a duff layer of *Thuja* branchlets. Generally occur on soils saturated in the Spring, but tend to dry out later in the growing season. Plants do not occur in soils wet enough to support skunk cabbage, but grow adjacent to these areas.		Review		WNHP (2001); Florence Caplow, Washington DNR (2003)
	Botrychium pinnatum	St. John's moonwort	May through July	Moist or wet, more or less open places in the mountains, but not at highest altitudes.		Sensitive		WNHP (2002); Florence Caplow, Washington DNR (2003)

FEDERAL STATUS DESIGNATIONS:
(E) Listed Endangered
(T) Listed Threatened
(CH) Critical Habitat
(PE) Proposed Endangered
(PT) Proposed Threatened
(PCH) Proposed Critical Habitat

STATE STATUS DESIGNATIONS:
(LE) Listed Endangered
(PE) Proposed Endangered
(PT) Proposed Threatened
(SC or C) Sensitive-critical
(SV or V) Sensitive-vulnerable
(SoC) Species of Concern
(SP or P) Sensitive peripheral or naturally rare
(SU or U) Sensitive-undetermined

TABLE 2 Status, Distribution and Habitat Data for Special Status Plant Species Identified as Occurring or Potentially Occurring in the Vicinity of the Saddleback Wind Project.

Family	Scientific Name	Common Name	Phenology	Habitat	Associated Species	WA State	Federal Status	Sources
Orchidaceae								
	Cypripedium fasciculatum	clustered lady's slipper	May through mid-June	Mid-to late-seral Douglas-fir (Psuedotsuga menziesii) or Ponderosa pine (Pinus ponderosa) overstory with a closed herbaceous layer and variable shrub layer, mostly on northerly aspects. It can also be found in grand fir (Abies grandis) forest with Swauk sandstone, thick duff or sandy loam soils.	Psuedotsuga menziesii, Pinus ponderosa, Pachistima myrsinites, Holodiscus discolor, Spiraea betulifolia, Berberis nervosa, Calamagrostis rubescens, Arnica cordifolia, Carex geyeri, Abies grandis	Threatened	SC	WNHP (2001)
	Plantathera sparsifolia	canyon bog-orchid	Late May-August	Open, wet areas, seeps and bogs.	Plantathere stricta, P. dilatata, Polygonum bistirtoides, Drosera rotundifolia, Gentiana rotundifolia.	Sensitive		WNHP (2002)
	Spiranthes porrifolia	western ladies-tresses	May through August	Wet meadows, along stream, in bogs, and on seepage slopes.	Pinus ponderosa, Psuedotsuga menziesii, Quercus garryana, Purshia tridentata, Allium amplectens, Delphinium burkei, Brodiaea coronaria, Oenothera villosa, Lotus corniculatus, Verbascum blattaria, Chicorium intybus,, Melilotus alba, Trifolium arvense, Lathyrus latifolius	Sensitive		WNHP (2001)
Polemoniaceae								
	Polemonium carneum	great polemonium	mid to late June	Thickets, woodland, and forest opening, from near sea level to moderate elevation in the mountains.		Threatened		WNHP (2002); Jolley (1988)
Portulacaceae								
	Montia diffusa	branching montia	late April to mid June	Mostly in moist woods on the west side of the Cascades.		Sensitive		WNHP (2001); NPSO (1998)
Ranunculaceae								
	Cimicifuga elata	Tall bugbane	late May -Aug	Occurs in and along margins of moist forest at low to middle elevations. From B.C., Olympic Peninsula, along western WA Cascades and Puget Trough, south to NW Oregon. In Washington, C. elata generally grows in or along the margins of mixed, mature or o old growth stands of mesic	Pseudotsuga menziesii, Thuja plicata, Acer macrophyllum, Alnus rubra, Acer circinatum, Holodiscus discolor, Corylus cornuta, Polystichum munitum, Symphoricarpos albus.	T		ONHP (2001); Pojar & MacKinnon (1994); WNHP (2001)

FEDERAL STATUS DESIGNATIONS:
(E) Listed Endangered
(T) Listed Threatened
(CH) Critical Habitat
(PE) Proposed Endangered
(PT) Proposed Threatened
(PCH) Proposed Critical Habitat

STATE STATUS DESIGNATIONS:
(LE) Listed Endangered
(PE) Proposed Endangered
(PT) Proposed Threatened
(SC or C) Sensitive-critical
(SV or V) Sensitive-vulnerable
(SoC) Species of Concern
(SP or P) Sensitive peripheral or naturally rare
(SU or U) Sensitive-undetermined

TABLE 2 Status, Distribution and Habitat Data for Special Status Plant Species Identified as Occurring or Potentially Occurring in the Vicinity of the Saddleback Wind Project.

Family	Scientific Name	Common Name	Phenology	Habitat	Associated Species	WA State	Federal Status	Sources
				coniferous forest, or mixed coniferous-deciduous forest.				
Saxifragaceae								
	Bolandra oregana	bolandra	early May to early July	Moist, mossy rocks, usually near waterfalls, on both sides of the lower Columbia River. Gorge, and along the Snake Rive and its tributaries in southeast Washington, northeast Oregon, and adjacent Idaho.		Sensitive		WNHP (2001); NPSO (1998)
	Parnassia fimbriata var. *hoodiana*	fringed grass-of-parnassus	July - September	Bogs, wet meadows, and stream banks, lower montane to arctic-alpine.		Sensitive		WNHP (2002); Jolley (1988)
	Sullivantia oregana	Oregon sullivantia	May through August	Occurs on moist cliffs, especially near waterfalls. Probably grows in shallow pockets of basalt-derived soils. Occurs in microsites that remain wet to moist much of the year.	Dodecatheum dentatum, Tolmiea menziesii, Oxalis trillifolia.	Threatened	SC	WNHP (2002); Jolley (1988)
Scrophulariaceae								
	Collinsia sparsiflora var. *bruceae*	few-flowered collinsia	mid-March through April	In Washington, the taxon occurs in thin soils over basalt on a variety of slopes, from almost flat to rather steep, generally south-facing. The microsites are generally quite open, but may be adjacent to or found within open stands of ponderosa pine and Oregon white oak. These habitats are moist in spring, but become dry by summer.	There is generally a dense herbaceous layer, commonly with Balsamorhiza sagittata, Lomatium macrocarpum, Sisyrinchium douglasii, Lupinus bicolor, Fritillaria pudica, Lithophragma sp.. Weedy annual species such as Poa bulbosa, and Erodium cicutarium.			WNHP (2002)
	Penstemon barrettiae	Barrett's beardtongue	late April to early June	In Washington, P. Barrettiae generally grows in crevices along basalt cliff faces, on ledges of rock outcrops, on open talus and occasionally along well drained roadsides. It occurs mostly at lower elevations, but its range is up to 3200 feet. It generally occurs on rocky substrates of basaltic origin, with little soil development. Soils area composed of wind blown material and organic matter and provide good drainage.	Psuedotsuga menziesii, Pinus ponderosa	Threatened	SC	WNHP (2001)

FEDERAL STATUS DESIGNATIONS:
(E) Listed Endangered
(T) Listed Threatened
(CH) Critical Habitat
(PE) Proposed Endangered
(PT) Proposed Threatened
(PCH) Proposed Critical Habitat

STATE STATUS DESIGNATIONS:
(LE) Listed Endangered
(PE) Proposed Endangered
(PT) Proposed Threatened
(SC or C) Sensitive-critical
(SV or V) Sensitive-vulnerable
(SoC) Species of Concern
(SP or P) Sensitive peripheral or naturally rare
(SU or U) Sensitive-undetermined

Appendix C
Species Descriptions for Potentially Occurring Rare Plants

TABLE 3 Special Status Plant Descriptions
Saddleback Wind Project

Family	Scientific Name	Common	Description
Asteraceae			
	Balsamorhiza	Puget balsamroot	Perennial with a deep-seated, woody taproot and multicipital caudex; basal leaves long-petiolate, the blade mostly triangular-hastate, or with more cordate base, up to 30 cm. Long and 20 mm wide, green, inconspi8cuously hirsute and often glandular, thinner and less veiny than in B. careyana, often crenate; stem 2-10 dm tall, scapiform, but usually with several strongly reduced narrow leaves; central head large, the disk rarely less than 2.5 cm wide; lateral heads, when present, obviously smaller; involucre only slightly or scarcely wooly, the outer bracts tending to be enlarged and foliaceous, surpassing the disk' rays commonly about 13 or about 21 (fewer on the reduced lateral heads), 2-5 cm long, soon deciduous, not becoming papery; achenes glabrous.
	Erigeron howellii	Howell's daisy	Perennial from a rhizome, 8 to 20 inches tall, scantily short-villous under the heads. Leaves thin, glabrous, the lowermost ones with elliptical or suborbicular blade 1 to 3 inches long and 1/2 to 2 inches wide, abruptly contracted to the 3/4 to 5 inch petiole. Middle cauline leaves ample, ovate to cordate, strongly clasping at the base; upper leaves similar but smaller. Heads solitary, the disk 1/2 to 3/4 inch wide. Involucral bracts loose, equal, glandular, somewhat herbaceous. Rays 30-501/2 to 1 inch long, 1/16 to 1/8 inch wide, white. Disk corollas 1/8 to 1/4 inch long, more flaring than in E. peregrinus. Achenes mostly asymmetrically 5-nerved. Pappus of 20-30 capillary bristles.
	Erigeron oreganus	Gorge daisy	Perennial with a stout mostly simple caudex and stout root; herbage glandular and loosely viscid-villous; stem lax, 5-15 cm long; basal leaves tufted, spatulate to obovate, coarsely toothed or incised, up to 9 cm long and 2.5 cm wide; cauline leaves well developed, broadly lanceolate to elliptic or ovate, up to 4 cm long and 1 cm wide; heads 1-severa in a leafy inflorescence, the disk 9-13 mm wide; involucre 5-7 mm high, glandular and viscid-villous, the bracts loose, equal, thin, green; rays mostly 30-60, bluish to more often pink or white, 5-8 mm long; disk corollas usually 3.4-4.7 mm long; pappus simple, of about 15-20 bristles which are characteristically curled and twisted for at least the upper half.
	Microseris borealis	northern microseris	Perennial (with stout taproot). Stems leafless with solitary flower head. Leaves with minute teeth on margins.
Boraginaceae			
	Hackelia diffusa var.	diffuse stickseed	Perennial 1 2/3 to 2/12 inches tall. Stems few, erect or ascending, internodes long near the base, short near midstem, the plant therefore appearing leafy near the middle. Pubescence strongly spreading, hirsute, becoming antrorsely appressed in the inflorescence. Radial leaves few to many, 5 to 9 inches long, 1/2 to 1 inch wide, elliptic, petiolate for 1/3 their length, hirsute, all but the lowermost cauline leaves sessile, the lower ones 3 2/3 to 6 inches long, 1/2 to 2/3 inch wide, elliptic, becoming lanceolate or linear-lanceolate above, at mid-stem 2 1/2 to 4 inches long and 1/4 to 1/3 inch wide. Pedicel 1/4 to 1/3 inch long in fruit. Calyx 1/8 inch long, lanceolate or linear-lanceolate. Corolla limb blue or cream, with a yellowish throat, 1/4 to 1/2 inch wide. Fornices with appendages papillate-puberulent to short pilose, not always evidently emarginate. Anthers 1/16 inch long. Nutlets 1/8 inch long, ovate, dorsal surface rough, verrucose-hispidulous, the intramarginal prickles distinct, 10. Prominent marginal prickles distinct to their bases, 1/16 to 1/8 inch long, these alternating with 1-3 short barbs.

TABLE 3 Special Status Plant Descriptions
Saddleback Wind Project

Family	Scientific Name	Common	Description
Brassicaceae			
	Rorippa columbiae	persistentsepal yellowcress	Low-growing perennial with stems that usually are 4-12 inches long. The stems generally grow flat on the ground but are sometimes erect and much-branched. The stems arise from underground stems and rhizomes and can at times form large clusters of stems. The leaves are divided almost to their center into several pairs of opposite leaflets, and sometimes have small teeth on the edge. Flowers are borne both on the ends of the stems and in the axis of leaves. The flowers are approximately 1/3 inch wide and have four bright yellow petals, which are about 1/10 inch long. The sepals are flat and ovate to oblong and tend to persist through fruiting. The fruits are almost oblong and are 1/4 inch long and are usually
Campanulace			
	Githopsis speculariodes	common blue-cup	Annual herb with branched or unbranched stems up to 12 inches tall. In Washington it has usually been observed to be less than 6 inches tall. The plants are leafy stemmed, and the narrow, toothed, alternate leaves are sessile, up to 2/3 inch long and 1/16 inch wide. Flowers occur single, and are irregularly scattered on the upper stems, or are strictly terminal on small, unbranched plants. Flowers are deep blue, with a whitish throat, 3/8 inch long or less. Flowers have five lobes, and the lobes are about as long the flower tube. The sepals, 1/4 to 1/2 inch long, tend to obscure the flowers from view.
Caryophyllac			
	Silene douglasii. var. *monantha*	Douglas' silene	Caespitose perennial with a stout taproot, branched caudex, and numerous decumbent simple stems 1-4 (7) dm tall, finely and densely pubescent throughout with crisped and usually retrorse hairs, very rarely slightly glandular above; leaves mostly matted at the base of the stems and on the new shoots, narrowly to broadly oblanceolate to linear-lanceolate, mostly 2-5 (8) cm long, 2-7 (12) mm broad, acute, long-petiolate; cauline leaves 1-8 pairs, becoming smaller and sessile above; flowers usually 1-7, linear-bracteate, cymose, the lower ones sometimes remote from the terminal; calyx tubular, (10) 12-15 mm long, becoming inflated, papery, and tubular-campanulate in fruit, 10-nerved, usually thickly puberulent, less commonly nearly glabrous, very rarely somewhat glandular; corolla creamy-white or greenish, pink, or purplish-tinged; claw of the petals 8-12 mm long, sometimes auriculate, the blade oblong, 4-6 (8) mm long, bilobed 1/5 to 1/3 of the length but otherwise usually entire (very rarely with a small lateral tooth on each margin below the sinus); appendages 2, linear or oblong, 1 (3) mm long; carpophore 3-4 mm long, finely puberulent; styles 3 (4or 5); capsule 1-celled; seeds about 1.3 mm long, rugose-tesselate, the margins more prominently rounded-papillate.
Cyperaceae			
	Carex macrochaeta	large-awn sedge	Stems loosely clustered on a system of short, branching rhizomes, 1-7 dm tall, aphyllopodic; roots pubescent, covered with a yellowish-brown felt; leaves rather few, flat, mostly 2-5 mm wide, glabrous, evidently to obscurely white-papillate on the lower surface; staminate spike solitary (seldom 2 or 3), terminal, 1-3 cm long, with black or dark brown, awn-tipped scales; pistillate spikes (1) 2-4, not crowded, the lowest one loose or nodding on a slender, flexuous, often elongate peduncle and subtended by a leafy bract which may or may not surpass the inflorescence and which is sheathless or has a short sheath up to about 5 mmm long; upper pistillate spikes shorter-pedunculate or even sub-sessile, with shorter and less-foliaceous subtending bracts; pistillate scales black or sometimes merely dark purple or brown, often with a paler mid-vein, the body shorter or sometimes long than the perigynium, usually narrower distally than the perigynium, distinctly awn-tipped, the awn sometimes as much as 1 cm long, always at least some of the awns in the spike 2 mm long or more; perygynia glabrous, narrow, commonly lance-elliptic, light green or sometimes partly or wholly dark purplish, 10- to 15-nerved, 3.3-4.8 mm long, beakless or with a very short beak seldom over 0.2 mm long; stigmas 3; achene trigonous, 1.7-2.3 mm long, loosely enclosed in the lower half or three-fifths of the perigynium.

TABLE 3 Special Status Plant Descriptions
Saddleback Wind Project

Family	Scientific Name	Common	Description
Fagaceae			
	Chrysolepsis chrysophylla	golden chinquapin	Large shrub or small tree (3) 5-30 m tall, the bark thick and heavily furrowed; leaves with petioles scarcely 1 cm long, the blades lanceolate to oblong-lanceolate or -elliptic, (3) 5-10 cm long, entire, thick and coriaceous, dark green and glabrous or sparsely scurfy-tomentose above, yellow-green to golden and densely scurfy-tomentose beneath, the vase acute, gradually to abruptly acuminate; involucre a 4-valved, spiny bur 1.5-2 cm broad, containing 1 (2) hard-shelled nuts about
Fumiariaceae			
	Corydalis aquae-gelidae	Clackamas corydalis	Perennial from deep-seated, fleshy roots, the stems succulent and strongly fistulose, 12 to 44 inches tall, simple to branched; leaves several, yellowish-green, glaucous on the lower surface, the lower cauline ones up to 24 inches long often equaling the racemes, from 4 to 6 times pinnate, the ultimate segments very numerous, more or less elliptic, 3/16 to 1/2 inch long and 1/16 to 3/16 inches broad; racemes simple to compounded, conspicuously bracteate, rather compactly 30 to 60 flowered, ultimately elongate and up to 9 inches long; corolla 1/2 to 3/4 inch long, pale to deep pinkish with a slight trace of purple, the inner petals more deeply colored at the tip; spurred petal conspicuously crested, usually without free margins or the margins very slightly upturned; spur 3/8 inch long; capsule ellipsoid, 3/8 to 1/2 inch long, about 1/3 as thick, the style 1/4 to 1/2 as long; seeds about 1/16 inch long.
Iridaceae			
	Sisyrinchium sarmentosum	pale blue-eyed grass	Perennial herb up to 12 inches tall, although generally it is only 6 to 8 inches in height. The leaves are narrow and area generally, but not always, shorter than the stem. Both the stems and leaves are a pale green or blue-green color. Each stem has 2-7 flowers on slender pedicels. The perianth is pale blue with a yellow spot in the center. The tepals are about 1/2 inch in length and pale blue in color. The anthers are yellow. A technical description needs to be consulted for positive
Juncaceae			
	Juncus howellii	Howell's rush	Rhizomatous perennial 2-6 dm tall, the stems slightly compressed, exceeding the leaves; sheaths with membranous margins freed above and forming erect auricles 1-3 mm long; blades 2-4 mm broad dorsiventrally flattened, grasslike, nonseptate; heads (2) 3-9, in a terminal inflorescence 2-9 cm long, each head 3- to 8 (15)-flowered, 7-17 mm broad (pressed); involucral bract rarely as much as 15 mm long; perianth segments lanceolate-acuminate, 5-6.5 mm long, subequal, medium- to chestnut-brown with a broad greenish midstripe, usually minutely papillose toward the tip (under 20X magnification); stamens 6, the anthers 1.8-2.6 mm long, much longer than the filaments; capsule ovoid, 0,5-0.7 mm long, covered with a strongly reticulate membrane that forms a conspicuous appendage at each end.
Lentibulariac			
	Utricularia intermedia	flat-leaved bladderwort	Submersed plants with very slender stems, commonly creeping along the bottom; leaves numerous, alternate, mostly 1/4 to 3/4 inch long, commonly 3-parted at the base and then 1-3 time dichotomous, the segments often unequal, slender, flat, not much narrower in successive dichotomies, the ultimate ones rather blunt; blades borne on specialized branches distinct from the leaves, 1/16 to 3/16 inch wide; winter buds ovoid or ellipsoid, 3/16 to 18 inch long, flowers mostly 2-4 in lax racemes at the end of an emergent peduncle 2 1/2 to 8 inches long;; corolla yellow, the proper tube very short, the lower lip commonly 1/3 to 1/2 inch long, with a well-developed palate; upper li not much more than half as long as the lower; spur nearly as long as the broad, slightly lobed lower lip; fruiting pedicels suberect.

TABLE 3 Special Status Plant Descriptions
Saddleback Wind Project

Family	Scientific Name	Common	Description
Lycopodiacea			
	Lycopodiella inundata	bog clubmoss	Main stem annual, more or less elongate, prostrate or arching, irregularly rooting, leafy, giving rise to scattered, erect, leafy branches, each of which is up to about 1 dm tall and terminates in a cone 1.5-4 cm long; plant perennating by a winter bud; leaves crowded, in 8-10 ranks, think, narrow, mostly entire, 4-8 mm long and less than 1mm wide, broadest near the base, tapering gradually to the softly acicular tip, the ones on the lower side of the main stem twisted into a more or less erect position, those of the erect stems loosely ascending; sporophylls numerous, crowded, expanded at the base, otherwise resembling the vegetative leaves, the long, slender, green tips loosely ascending; sporangia ellipsoid-globose, about 1 mm wide; spores 43 microns or more in diameter,, rounded-triangular or nearly circular in outline, the outer face irregularly ridged-reticulate, the commissural faces papillate, the commissures in furrows; gametophyte cylindrical, erect, with distal filamentous lobes, distally emergent and photosynthetic.
Ophioglossac			
	Botrychium lunaria	moonwort	Plants (3) 6-18 (22) cm tall, glabrous throughout; sterile blade sessile or on a short stalk up to about 5 mm long, about equaling or more often somewhat shorter than the common stalk, which is (1.5) 4-10 cm long, the blade itself mostly 1.5 to 7 cm long and 0.7 to 3 (3.5) cm wide, distinctly pinnate, with (2) 3-6 (7) pairs of pinnae, these sessile, dichotomously veined, without a midrib, broadly flabellate, broader than long, crowded and often somewhat overlapping, the lowest pair not notable different from the next pair; fertile stalk and fruiting spike each 0.5 to 7 cm long, subequal or either one longer than the other; both the sterile blade and the fertile spike erect or nearly so in bud; bud glabrous, completely hidden by the sheathing base of the common stalk.
	Botrychium minganense	Mingan grape-fern	A small, herbaceous perennial fern. The sterile blade (trophophore) is dull green in color, narrowly oblong to linear in overall outline, about 10 cm long by 2.5 cm wide. The sterile blade is once-pinnate, with up to 10 pairs of pinnae. In general the segments are well-developed, cuneate to flabellate in shape, and spaced separately from each other along the rachis. The margins of the pinnae are entire to shallowly crenate. The lowest pinnae are narrowly fan-shaped. The above-ground or visible parts of this species consist of a single upright stem arising from the ground and terminating in a cluster of tiny ball-like structures that resemble a bunch of grapes. Branching off from the main stem is the sterile, fern like leaf blade (the trophophore).At the base of the common stalk, but just below the ground, are seveal layers of leaf primordia that are the preformed buds of plants that will emerge in future years.
	Botrychium pinnatum	St. John's moonwort	Plants mostly 1-2 dm tall, glabrous from the first, commonly yellow-green; sterile blade attached near or more commonly above the middle of the plant (the common stalk mostly 4-13 cm long) sessile or nearly so, mostly ovate or ovate-oblong in outline, mostly 2-5 cm long and 1.5-4 cm wide, somewhat fleshy, evidently veiny, bipinnate or subbipinnate (at least toward the bade), the pinnae mostly 3-6 pairs, the ultimate segments rounded, not much if at all longer than wide, somewhat crowded; fertile stalk mostly 1-4 cm long, the fertile spike 1.5-6 cm long, erect even in bud; sterile blade erect in bud except for the inclined but not clasping tip; bud glabrous, wholly concealed by the base of the common stalk.

TABLE 3 Special Status Plant Descriptions
Saddleback Wind Project

Family	Scientific Name	Common	Description
Orchidaceae			
	Cypripedium fasciculatum	clustered lady's slipper	Perennial herbaceous plant with a single erect stem 2-8 inches tall and a single pair of broad, parallel-veined, pleated leaves at or above the middle of the stem, which is covered with wooly hairs. Flowers droop in a tight cluster of 2-4 at the tip of the stem and consist of greenish-brown or greenish-purple petals and sepals, usually purple-lined or mottled, and a greenish-yellow pouch with brownish-purple margins, often with a purplish tinge. The stem above the leaves becomes erect and elongates as the capsules develop.
	Plantathera sparsifolia	canyon bog-orchid	Plant glabrous, 12 to 32 inches tall, the stems leafy mostly on the lower half. Leaves narrowly oblong-lanceolate, up to 10 inches long and mostly 1/2 to 1 1/4 inches broad. Raceme much elongate and usually very lax flowered, 6 to 16 inches long, the first several flowers rarely overlapping. Bracts usually shorter than the flowers but the lowermost sometimes considerably loner. Flowers greenish. Upper sepal broadly ovate to suborbicular, blunt, concave and converging with the upper petals to form a distinct hood, 1/4 to 1/3 inch long, 3-nerved. Lateral sepals spreading, falcately oblong-lanceolate, 1/4 to 1/2 inch long, 3-nerved. Lip pendent, thickish, linear to linear-lanceolate, 1/4 to 1/2 inch long. Spur cylindric to slightly clavate and mostly abruptly narrowed at the tip, from slightly shorter to somewhat longer than the lip, mostly somewhat curved. Column rather large, well over half as long as the upper sepal, the pollen sacs 1/16 inch long, well-separated by the connective.
	Spiranthes porrifolia	western ladies-tresses	Terrestrial, glabrous 8-20 inches tall; leaves 3 to 5, elliptic-lanceolate, basal or on lower portion of stem, sometimes absent at flowering time; stems with a few bracts above the leaves; inflorescence a dense spiral of up to forty small yellowish flowers in several vertical ranks; floral bracts lanceolate, 1/2 inch long; dorsal sepal lanceolate, lateral sepals similar but oblique; petals linear-lanceolate; lip ovate, not expanded at apex, base with prominent protuberances; column 1/16 inch long with dorsal anther; ovary sessile, stout, 1/16 inch long.
Polemoniace			
	Polemonium carneum	great polemonium	Perennial with loosely clustered (sometime solitary) stems from a woody rhizome or caudex, loosely erect, 3-10 dm tall, viscid-villous in the inflorescence, otherwise glabrous or nearly so except for the villous-ciliate margins of the petioles or the lower portion thereof, or sometimes the stem viscid-villous throughout; leaflets mostly 11-19, lanceolate to ovate or elliptic, generally acute, thin, mostly 1.5-4.5 cm long and 6-23 mm wide, the 3 terminal ones sometimes partly confluent; basal leaves long-petiolate, cauline progressively less so, long-pedicellate, in an open terminal, generally leafy inflorescence; calyx 7.5-14 mm long at anthesis, the lobes shorter or longer than the tube; corolla campanulate, (15) 18-28 mm long, the lobes longer than the tube, variable in color, often flesh-colored, salmon, or yellow, sometimes lavender to
Portulacacea			
	Montia diffusa	branching montia	Low, spreading, diffusely (more or less dichotomously) branched annual, up to 3-4 dm broad and as much as 1.5-2 dm tall; basal leaves few, the blade lanceolate or rhombic-lanceolate to suborbicular, mostly 1-2.5 cm long, often nearly as broad, abruptly narrowed to a petiole 2-4 time as long; cauline leaves alternate, not greatly reduced even in the inflorescence, usually more or less lanceolate-rhombic, the lower ones with blades sometimes as much as 5 cm long; racemes often ancillary to ordinarily foliage leaves, clustered and paniculate toward the branch ends, the lower 1 or 2 of the several flowers often from the axil of a leafy bract; sepals 2-3 mm long, unequal; petals white or pale pink, 3-4 mm long; stamens 5; capsule equaling or slightly exceeding the sepals, obovoid-pointed, 3-valved; seeds usually (1) 2-3, black, finely and regularly papillate with low, oval protuberances, 1.2-1.5 mm long, with a short conical strophiole nearly 0.5 mm long.

TABLE 3 Special Status Plant Descriptions
Saddleback Wind Project

Family	Scientific Name	Common	Description
Ranunculace			
	Cimicifuga elata	Tall bugbane	Tall woodland perennial with large expansive, bi- and triternate-toothed leaves. The leaves are downy-hairy above, smooth below and usually arranged in clusters of three, with 9-17 leaflets. The leaflets have 5-7 lobes, coarsely toothed margins and are similar in shape to maple leaves. Stem leaves gradually become smaller as the height of their attachment increases. Plants usually have a single, sometimes branched flowering stem, 3-6 feet tall, from a horizontal rhizome that is up to 4 inches long and 1 inch in diameter. The long, open racemes consist of many 1/4 inch white flowers whose sepals drop at once, giving the appearance of a "bottle brush" of long white stamens and pistils. As its fruits mature, the terminal raceme often becomes declined at a 45-90 degree angle from the axis of the main stem. The fruit is a dry flat capsule containing approximately 10 red to purple-brown seeds. Each flower usually produces 1 capsule; occasionally 2 or 3 capsules are produced. Somewhat similar to false bugbane (Trautvetteria caroliniensis) with tall (1-2 m), branched stems, large compound leaves (somewhat like those of Actea rubra), numerous small, white-stamened flowers in a narrow, terminal, branched inflorescence, and several-seeded follicles.
Saxifragacea			
	Bolandra oregana	bolandra	Weakly glandular-pubescent, herbaceous perennial with numerous bulblets along the very short, horizontal rootstocks, the stems mostly single, (1.5) 2-4 (6) dm tall; basal and lower cauline leaves with slender petioles up to 15 cm long, the blades reniform (2) 3-7 cm broad, shallowly lobed and with 9013 acutely dentate or usually somewhat serrate-dentate segments; petioles much shortened on the upper leaves and the stipules much more conspicuous and leaflike; bracts of the inflorescence somewhat clasping, 1-3 cm long, deeply crenate-dentate' panicle branches (1) 2-7, remote, spreading, 1-7 flowered; calyx accrescent and eventually 14-18 mm long, the linear-lanceolate, usually purplish lobes equaling or slightly exceeding the campanulate-tubular portion; petals purplish, linear, about equal to the calyx lobes, the stamens about 1/3 as long, the filament reddish-purple; capsule about 1 cm long, the carpels fused only 1/5 to 1/4 their length.
	Parnassia fimbriata var. *hoodiana*	fringed grass-of-parnassus	Rootstock short, rather stout, from slightly ascending to nearly erect; flowering stems 1-several, mostly 1.5-3 (5) dm tall. The bract cordate and more or less clasping, mostly 5-15 (20) mm long, borne from slightly below to considerably above midlength of the scape; petioles (1) 3-10 (15) cm long; leaf blades (1.5) 2-4 (5) cm broad, mostly reniform or somewhat reniform-auriculate and broader than long, but not uncommonly more nearly cordate or truncate at base, and sometimes slightly cuneate and somewhat longer than broad; calyx fused with the ovary for only about 1 mm, the segments oblong-ovate to elliptic-oval, 4-7 mm long, usually 5 (7) -veined, entire or more commonly crenulate-fimbriate, at least toward the rounded tip; petals white, 5- to 7-veined, 8-12 mm long (about twice as long as the calyx lobes, more or less cuneate-obovate in general appearance but claw-like at the base and with numerous long, filiform-linear, plainly cellular-verrucose fimbriae, becoming more or less erose to entire on the upper half; staminoidia thickened and scalelike, flared above the middle and usually with a central, subterminal, larger lobe and 7-9 marginal, short, thick, rounded lobes, but sometimes with 5-many elongate, slender, capitate-tipped segments; filaments stout, about equaling the calyx segments, anthers 2-2.5 mm long; capsule ovoid, about 1 cm long. Variety hoodiana: Staminodia ending in longer, more slender, filamentlike, usually capitate segments. Segments of the staminodia mostly less than 10, slender, strongly capitate, all marginal, equaling (or longer than) the rather narrow basal scale.
	Sullivantia oregana	Oregon sullivantia	Delicate, yellowish-green perennial spreading by long slender stolons, nearly or quite glabrous except for some glandular pubescence on the upper portion of the flowering stems and on the inflorescence, the hairs mostly purplish-tipped. The basal leaves are long-petiolate, the blade reniform, 1/2 to 4 inches broad, incisely lobed to 1/2 their length into 7 to 9 cuneate segments and again once or twice sharply toothed. Flowering stems 2 to 8 inches tall with 1 to 3 leaves that are greatly reduced upward. Flowers erect, but becoming sharply reflexed in fruit. Calyx glabrous, pale green, 1/10 to 1/8 inch long, more or less campanulate. Petals slightly long than the calyx lobes, the blade oval to obovate-oblanceolate, narrowed to a very short, broad claw. Stamens shorter than the sepals, the cordate anthers about equaling the slender filaments. Capsule about 1/8 inch long, seeds brown 1/16 inch long.

TABLE 3 Special Status Plant Descriptions
Saddleback Wind Project

Family	Scientific Name	Common	Description
Scrophularia			
	Collinsia sparsiflora var. *bruceae*	few-flowered collinsia	Plants annual, 2 to 8 inches tall, simple or often branched, erect, glabrous or minutely spreading-hirtellous. Leaves opposite throughout, the lower petiolate, with broadly elliptic or ovate to subround, often few-toothed blade about 1/2 inch long or less, often deciduous, the others narrow and becoming sessile, commonly linear to linear-oblong or linear-lanceolate, mostly entire, up to about 1 1/4 inches long and 1/4 inch wide. Flowers long-pedicellate, 1-3 at each of the upper nodes, their subtending leaves more or less reduced. Calyx 1/4 to 1/2 inch long, the lanceolate to narrowly lance-triangular, acute to acutish lobes prominent, firm-foliaceous, much longer than the tube, commonly concealing much of the corolla tube. Corolla blue-lavender or often white, 1/3 to 1/2 inch long, the tube abruptly bent near the base, forming and oblique angle with the calyx and strongly enlarged on the upper side at the bend. Keel generally somewhat hairy externally near the tip. Upper pair of filaments shortly spreading-hairy over most of their length. Capsule subglobose, 1/8 to 1/4 inch wide. Sees flattened, irregularly wing-margined, evidently ce3llular-reticulate, 1/8 inch long. Can be distinguished from other species of Collinsia by the following characters: upper filaments pubescent rather than glabrous; calyx nearly as long or as long as corolla; capsule subglobose rather than ellipsoid; seed flattened with a narrow wing margin, rather than turgid with a thickened margin, or flattened with a wide margin.
	Penstemon barrettiae	Barrett's beardtongue	Medium-sized perennial herb with stems 8-16 inches tall, much branched and somewhat shrubby at the base. The leaves area evergreen, thick, leathery or succulent, bluish- to grayish-green, and toothed along the margins. The rose-purple flowers are 1 to 1 1/2 inches long, tubular, and strongly two-lipped at the end. The flowers are approximately 1/2 inch wide at the mouth, and hairy on the inside of the lower lip.

Figures 1 and 2 are missing from Appendix C-3 as the full report was not provided to URS

C-4

Baseline Avian Use Surveys of the Project in Fall 2004, Summer 2006, and Winter-Spring 2008-2009

West, Inc. 2009

FINAL REPORT

Wildlife Baseline Studies for the Whistling Ridge Wind Resource Area Skamania County, Washington

Final Report
September 11 – November 4, 2004,
May 21 – July 14, 2006, and
December 4, 2008 – May 29, 2009

Prepared for:

SDS Lumber
P.O. Box 266
Bingen, WA 98605

Prepared by:

Greg Johnson, Tamara Enz, and Kimberly Bay

Western **E**co**S**ystems **T**echnology**,** Inc.
2003 Central Avenue
Cheyenne, Wyoming

WEST, Inc.

August 7, 2009

EXECUTIVE SUMMARY

SDS Lumber has proposed a wind-energy facility in Skamania County, Washington, near the town of White Salmon. SDS Lumber contracted Western EcoSystems Technology, Inc. to conduct surveys and monitor wildlife resources in the Whistling Ridge Wind Resource Area to estimate the impacts of project construction and operations on wildlife. The following document contains results for fixed-point bird use surveys and incidental wildlife observations.

The proposed wind-energy facility contains minimal habitat diversity. Approximately 82.0% of the 1,151-acre (1.8 square mile; 4.7 square kilometer) area is composed of evergreen forest. The next most common habitat is developed open space, which comprises 8.5% of the Whistling Ridge Wind Resource Area. Shrub-scrub habitat comprises 7.1% and grassland areas comprise 1.8% of the study area. All other habitats collectively comprise less than 1% of the Whistling Ridge Wind Resource Area.

The principal objectives of the study were to: 1) provide site specific bird resource and use data that would be useful in evaluating potential impacts from the proposed wind-energy facility; 2) provide information that could be used in project planning and design of the facility to minimize impacts to birds; and 3) recommend further studies or potential mitigation measures, if warranted.

The objective of the fixed-point bird use surveys was to estimate the seasonal, spatial, and temporal use of the study area by birds, particularly raptors. Fixed-point surveys were conducted from September 11, 2004 through November 4, 2004, May 21, 2006 through July 14, 2006, and again in December 4, 2008 through May 29, 2009. A total of 261 20-minute fixed-point surveys were completed and 86 bird species were identified.

Waterfowl use only occurred during spring (0.07 birds/plot/20-min survey), and consisted of a single group of Canada geese. Raptor use was highest during the fall (0.63 birds/plot/20-min survey) and lowest during the spring (0.16). The most common raptors observed in the study area were red-tailed hawk, Cooper's hawk, and sharp-shinned hawk. Vultures had the highest use in summer (0.31 birds/plot/20-min survey) and much lower use during all other seasons. Upland gamebirds had much lower use than other bird types recorded, with highest use recorded during spring (0.11 birds/plot/20-min survey). Passerines had the highest use among all bird types across all seasons, with use ranging from 14.13 birds/plot/20-minute survey in the summer to 1.65 in winter.

Levels of bird use varied within the study area by point. For all bird species combined, use was highest at points D, C, and B (13.7, 12.8, and 11.8 birds/20-minute survey, respectively). Bird use at other points ranged from 5.31 to 11.0 birds/20-minute survey. The higher mean use at points D, C, and B was due mostly to relatively high use by passerines at these points (11.1, 11.5, and 11.0 birds/20-minute survey, respectively). Passerine use at other points ranged from 4.15 to 8.94 birds/20-minute survey. Waterfowl use only occurred at point J, with 0.62 birds/20-minute survey. Raptor use was highest at point A (0.56 birds/20-minute survey), and ranged from zero to 0.35 birds/20-minute survey at other points. Vultures were observed at approximately half of the

points (A, B, C, D, E, and H); use ranged from 0.04 birds/20-minute survey at point A to 0.36 at point D.

Survey points were located within evergreen forest habitat in the Whistling Ridge Wind Resource Area. No obvious flyways or concentration areas were observed. No strong association with topographic features within the study area was noted for raptors or other large birds. Although some differences in bird use were detected among survey points, the differences are not large enough to suggest that any portions of the Whistling Ridge Wind Resource Area should be avoided when siting turbines due to very high bird use.

During the study, 523 single or groups of birds totaling 1,449 individuals were observed flying during fixed-point bird use surveys. For all bird species combined, 65.7% of birds were observed flying below the likely zone of risk, 31.3% were within the zone of risk, and 3.0% were observed flying above the zone of risk for typical turbines that could be used in the Whistling Ridge Wind Resource Area. Bird types most often observed flying within the turbine zone of risk were doves/pigeons (58.8%), raptors (58.6%) and vultures (53.6%). Waterfowl were always observed flying above the zone of risk. Upland gamebirds, passerines, and other birds were typically observed flying below the zone of risk.

For all bird species with at least 10 separate groups of flying birds, only six species were observed flying within the zone of risk during more than 50% of observations: red crossbill (90.2%), common raven (55.1%), western bluebird (62.3%), band-tailed pigeon (59.4%), red-tailed hawk (70.0%), and turkey vulture (53.6%). Based on the use (measure of abundance) of the study area by each species and the flight characteristics observed for those species, the red crossbill and common raven had the highest probability of turbine exposure, with exposure indices of 0.29 and 0.23, respectively. The raptor species with the highest exposure index was the red-tailed hawk, which was ranked eleventh of all species, although its exposure index was only 0.05.

The objective of incidental wildlife observations was to provide a record of wildlife seen outside of the standardized surveys. Incidental observations included six bird species and five mammal species. The most abundant bird species recorded incidentally was pine siskin.

Based on fixed-point bird use data collected for the Whistling Ridge Wind Resource Area, mean annual raptor use was 0.28 raptors/plot/20-minute survey. The annual rate was low relative to raptor use at 36 other wind-energy facilities that implemented similar protocols to the present study and had data for three or four different seasons. Mean raptor use in the study area was low compared to these other wind resource areas, ranking twenty-ninth.

A regression analysis of raptor use and raptor collision mortality for 13 new-generation wind-energy facilities where similar methods were used to obtain raptor use estimates showed a significant (R^2 = 69.9%) correlation between raptor use and raptor collision mortality. Due to the low raptor use in comparison to most wind resource areas, using this regression to predict raptor collision mortality the Whistling Ridge Wind Resource Area yielded an estimated fatality rate of zero. However, A 90% prediction interval around this estimate is zero to 0.25 fatalities per megawatt per year.

Based on species composition of the most common raptor fatalities at other western wind-energy facilities and species composition of raptors observed at the Whistling Ridge Wind Resource Area during the surveys, the majority of the fatalities of diurnal raptors will likely consist of red-tailed hawk. Based on the seasonal use estimates, it is expected that risk to raptors would be unequal across seasons, with the lowest risk in spring and winter, and highest risk during the fall.

The data collected during this study suggests that the Whistling Ridge Wind Resource Area does not receive substantial use by waterfowl, and does not appear to be within a major migratory pathway for raptors. In addition, the study area does not appear to provide important stopover habitat for migrant songbirds based on fixed-point bird use surveys. Construction and operation of the wind-energy facility may displace some types of birds.

Some species considered to be sensitive or of conservation concern were observed within the Whistling Ridge Wind Resource Area. During all surveys and incidental observations, five sensitive bird species were observed including 30 Vaux's swifts, 15 pileated woodpeckers, five northern goshawks, three bald eagles, and two golden eagles. This is a tally that in some cases may represent repeated observations of the same individual.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
INTRODUCTION 1
STUDY AREA 1
METHODS 2
Fixed-Point Bird Use Surveys 2
Bird Use Survey Plots 2
Bird Survey Methods 2
Observation Schedule 2
Incidental Wildlife Observations 3
Statistical Analysis 3
Quality Assurance and Quality Control 3
Data Compilation and Storage 3
Fixed-Point Bird Use Surveys 3
Bird Diversity and Species Richness 3
Bird Use, Composition, and Frequency of Occurrence 4
Bird Flight Height and Behavior 4
Bird Exposure Index 4
Spatial Use 4
RESULTS 5
Fixed-Point Bird Use Surveys 5
Bird Diversity and Species Richness 5
Bird Use, Composition, and Frequency of Occurrence by Season 5
Waterfowl 5
Raptors 5
Vultures 6
Upland Gamebirds 6
Passerines 6
Bird Flight Height and Behavior 6
Bird Exposure Index 7
Spatial Use 7
Incidental Wildlife Observations 7
Bird Observations 7
Mammal Observations 7
DISCUSSION AND IMPACT ASSESSMENT 8
Bird Impacts 8
Direct Effects 8
Raptor Use and Exposure Risk 8
Non-Raptor Use and Exposure Risk 9
Sensitive Species Use and Exposure Risk 11
Indirect Effects 11
Raptor Displacement 11

Displacement of Non-Raptor Bird Species 12
CONCLUSIONS AND RECOMMENDATIONS 13
REFERENCES 15

LIST OF TABLES

Table 1. The land cover types, coverage, and composition within the Whistling Ridge Wind Resource Area. 23
Table 2. Summary of bird use (number of birds/plot/20-min survey), species richness (species/20-min survey), and sample size by season and overall during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009. 24
Table 3. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009. 25
Table 4. Mean bird use (number of birds/plot/20-min survey), percent of total composition (%), and frequency of occurrence (%) for each bird type and species by season during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009. 30
Table 5. Flight height characteristics by bird type during fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009. 35
Table 6. Relative exposure index and flight characteristics by species during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009. 36
Table 7. Incidental wildlife observed while conducting all surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009. 40
Table 8. Summary of sensitive species observed at the Whistling Ridge Wind Resource Area during fixed-point bird use surveys (FP) and as incidental wildlife observations (Inc.), September 11, 2004 – May 29, 2009. 41

LIST OF FIGURES

Figure 1. Location of the Whistling Ridge Wind Resource Area. 42
Figure 2. Elevation and topography of the Whistling Ridge Wind Resource Area. 43
Figure 3. The land cover types and coverage within the Whistling Ridge Wind Resource Area (USGS NLCD 2001). 44
Figure 4. Fixed-point bird use survey points at the Whistling Ridge Wind Resource Area. 45

Figure 5. Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds major bird types at the Whistling Ridge Wind Resource Area. 46

Figure 6a. Flight paths of waterfowl at the Whistling Ridge Wind Resource Area. 53

Figure 6b. Flight paths of accipiters at the Whistling Ridge Wind Resource Area. 54

Figure 6c. Flight paths of buteos at the Whistling Ridge Wind Resource Area. 55

Figure 6d. Flight paths of other raptors at the Whistling Ridge Wind Resource Area. 56

Figure 7. Comparison of annual raptor use between the Whistling Ridge Wind Resource Area and other US wind-energy facilities. 57

Figure 8. Regression analysis comparing raptor use estimates versus estimated raptor mortality. 58

Figure 9. Comparison of mean overall bird use between the Whistling Ridge Wind Resource Area and other Pacific Northwest wind resource areas. 59

INTRODUCTION

SDS Lumber has proposed a wind-energy facility in Skamania County, Washington, near the town of White Salmon (Figures 1 and 2). SDS Lumber contracted Western EcoSystems Technology, Inc. (WEST) to conduct surveys and monitor wildlife resources in the Whistling Ridge Wind Resource Area (WRWRA) to estimate the impacts of wind-energy facility construction and operations on wildlife.

The principal objectives of the study were to: 1) provide site specific bird resource and use data that would be useful in evaluating potential impacts from the proposed wind-energy facility; 2) provide information that could be used in project planning and design of the facility to minimize impacts to birds; and 3) recommend further studies or potential mitigation measures, if warranted. The protocols for the baseline studies are similar to those used at other wind-energy facilities across the nation, and follow the guidance of the National Wind Coordinating Collaborative (Anderson et al. 1999). The protocols have been developed based on WEST's experience studying wildlife at proposed wind-energy facilities throughout the US, and were designed to help predict potential impacts to birds (particularly raptors).

Baseline surveys were conducted from September 11 through November 4, 2004, May 15 through July 14, 2006, and December 4, 2008 through May 29, 2009 at the WRWRA. Surveys were conducted across all four seasons and included fixed-point bird use surveys and incidental wildlife observations. Other baseline data have previously been collected at this site, including bat acoustical surveys, habitat mapping, rare plant surveys, and targeted surveys for species of concern including spotted owl (*Strix occidentalis*), northern goshawk (*Accipiter gentilis*), and western gray squirrel (*Sciurus griseus*). The results of those studies are included in other reports.

In addition to site-specific data, this report presents existing information and results of studies conducted at other wind-energy facilities. The ability to estimate potential bird mortality at the proposed WRWRA is greatly enhanced by operational monitoring data collected at existing wind-energy facilities. For several wind-energy facilities, standardized data on fixed-point surveys were collected in association with standardized post-construction (operational) monitoring, allowing comparisons of bird use with bird mortality. Where possible, comparisons with regional and local studies were made.

STUDY AREA

The proposed wind resource area is in southeast Skamania County, approximately four miles (6.4 kilometers [km]) northwest of White Salmon, Washington (Figure 1). The specific study area is just north of Underwood Mountain and includes Sections 5, 6, 7, & 8, Township 3N, Range 10E. The WRWRA consists of hilltops dominated by coniferous forests with some clearcuts and linear clearings associated with powerline rights-of-way (Figure 2). Elevation of the study area ranges from approximately 1,700 – 2,400 feet (ft; 518 – 732 meters [m]).

Approximately 82.0% of the 1,151-acre (1.8 square mile [mi^2]; 4.7 km^2) area is composed of evergreen forest (Table 1; Figure 3). Forests in the project area are managed by SDS Lumber for

commercial timber production. The next most common habitat is developed, open space, which comprises 8.5% of the WRWRA. Shrub-scrub habitat comprises 7.1% and grassland areas comprise 1.8% of the WRWRA. All other habitats collectively comprise less than one percent of the WRWRA (Table 1).

METHODS

Fixed-Point Bird Use Surveys

The objective of the fixed-point bird use surveys was to estimate the seasonal, spatial, and temporal use of the study area by birds, particularly raptors, defined here as kites, accipiters, buteos, harriers, eagles, falcons, and owls. Fixed-point surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980). The points were selected to survey representative habitats and topography of the study area, while also providing relatively even coverage. All birds seen during each 20-minute (min) fixed-point survey were recorded.

Bird Use Survey Plots
Ten points were selected to achieve relatively even coverage of the study area and survey representative habitats and topography within the study area. Six of the points were used for the 2004 and 2006 surveys seasons, with four additional points being added for the 2008/2009 study season (Figure 4). Each survey plot was an 800-m (2,625-ft) radius circle centered on the point.

Bird Survey Methods
All species of birds observed during fixed-point surveys were recorded. Observations of large birds beyond the 800 m radius were recorded, but were not included in the statistical analyses; for small birds observations beyond the 100 m (328 ft) radius were excluded. A unique observation number was assigned to each observation.

The date, start and end time of the survey period, and weather information such as temperature, wind speed, wind direction, and cloud cover were recorded for each survey. Species or best possible identification, number of individuals, sex and age class (if possible), distance from plot center when first observed, closest distance, altitude above ground, activity (behavior), and habitat(s) were recorded for each observation. The behavior of each bird observed, and the vegetation type in which or over which the bird occurred, were recorded based on the point of first observation. Approximate flight height and flight direction at first observation were recorded to the nearest 5-m (16-ft) interval.

Locations of raptors, other large birds, and species of concern seen during fixed-point bird use surveys were recorded on field maps by observation number. Flight paths and perched locations were digitized using ArcGIS 9.3. Any comments were recorded in the comments section of the data sheet. Any unusual wildlife observations were recorded on the incidental datasheets.

Observation Schedule
Sampling intensity was designed to document bird use and behavior by habitat and season within the study area. Fixed-point surveys were conducted from September 11 through November 4,

2004 (fall migration period), from May 21 through July 14, 2006 (summer breeding season), from December 4, 2008 through March 15, 2009 (winter), and from March 16 through May 29, 2009 (spring migration period). Surveys were conducted approximately weekly during the spring, summer and fall, and every other week during the winter. Surveys were conducted during daylight hours and survey periods were varied to approximately cover all daylight hours during a season. To the extent practical, each point was surveyed about the same number of times. A total of 261 20-min fixed-point surveys were conducted at the WRWRA.

Incidental Wildlife Observations

The objective of incidental wildlife observations was to provide a record of wildlife seen outside of the standardized surveys. All raptors, unusual or unique birds, sensitive species, mammals, reptiles, and amphibians were recorded in a similar fashion to standardized surveys. The observation number, date, time, species, number of individuals, sex/age class, distance from observer, activity, height above ground (for bird species), habitat, and, in the case of sensitive species, the location was recorded by Universal Transverse Mercator (UTM) or Global Positioning System (GPS) coordinates.

Statistical Analysis

Quality Assurance and Quality Control
Quality assurance and quality control (QA/QC) measures were implemented at all stages of the study, including in the field, during data entry and analysis, and report writing. Following field surveys, observers were responsible for inspecting data forms for completeness, accuracy, and legibility. A sample of records from an electronic database was compared to the raw data forms and any errors detected were corrected. Irregular codes or data suspected as questionable were discussed with the observer and/or project manager. Errors, omissions, or problems identified in later stages of analysis were traced back to the raw data forms, and appropriate changes in all steps were made.

Data Compilation and Storage
A Microsoft® ACCESS database was developed to store, organize, and retrieve survey data. Data were keyed into the electronic database using a pre-defined format to facilitate subsequent QA/QC and data analysis. All data forms, field notebooks, and electronic data files were retained for reference.

Fixed-Point Bird Use Surveys
Bird Diversity and Species Richness
Bird diversity was illustrated by the total number of unique species observed. Species lists, with the number of observations and the number of groups, were generated by season, including all observations of birds detected regardless of their distance from the observer. Species richness was calculated as the mean number of species observed per plot per survey (i.e., number of species/plot/20-min survey). Species diversity and richness were compared between seasons for fixed-point bird use surveys.

Bird Use, Composition, and Frequency of Occurrence

For the standardized fixed-point bird use estimates, only observations of large birds detected within the 800-m radius plot were used; small birds observations were limited to 100 m. Estimates of mean bird use (i.e., number of birds/plot/20-min survey) were used to compare differences between bird types, seasons, and other wind-energy facilities.

The frequency of occurrence was calculated as the percent of surveys in which a particular species or bird type was observed. Percent composition was calculated as the proportion of the overall mean use for a particular species or bird type. Frequency of occurrence and percent composition provide relative estimates of species exposure to the proposed wind-energy facility. For example, a species may have high use estimates for the area based on just a few observations of large groups; however, the frequency of occurrence will indicate that the species occurs during very few of the surveys and therefore, the species may be less likely affected by the wind resource area.

Bird Flight Height and Behavior

To calculate potential risk to bird species, the first flight height recorded was used to estimate the percentages of birds flying within the likely "zone of risk" (ZOR) for collision with turbine blades of 35 to 130 m (114 to 427 ft) above ground level (AGL), which is the blade height of typical turbines that could be used at the WRWRA.

Bird Exposure Index

A relative index of collision exposure (R) was calculated for bird species observed during the fixed-point bird use surveys using the following formula:

$$R = A*P_f*P_t$$

Where A equals mean relative use for species *i* (large bird observations within 800 m of the observer or 100 m for small birds) averaged across all surveys, P_f equals the proportion of all observations of species *i* where activity was recorded as flying (an index to the approximate percentage of time species *i* spends flying during the daylight period), and P_t equals the proportion of all initial flight height observations of species *i* within the likely ZOR.

Spatial Use

Data were analyzed by comparing use among plots. Mapped flight paths were qualitatively compared to study area features such as topographic features. The objective of mapping observed bird locations and flight paths was to look for areas of concentrated use by raptors and other large birds and/or consistent flight patterns within the study area. This information can be useful in turbine layout design or adjustments of individual turbines for micro-siting.

RESULTS

Surveys were completed at the WRWRA from September 11 through November 4, 2004, May 21 through July 14, 2006 and December 4, 2008 – May 29, 2009. Eighty-eight bird species and five mammal species were identified during surveys completed at the WRWRA. Results of the fixed-point surveys and incidental wildlife observations, and the specific numbers of unique species for each survey type, are discussed in the sections below.

Fixed-Point Bird Use Surveys

Bird Diversity and Species Richness

Eighty-six unique species were observed over the course of all fixed-point bird use surveys, with a mean number 4.51 species/survey (Table 2). More unique species were observed during the spring (67 species), followed by summer (55), fall (39), and winter (16; Table 2). The mean number of species per survey was higher in the summer (10.84 species/survey), compared to spring (4.54), fall (4.02) and winter (1.16; Table 2). A total of 2,663 individual bird observations within 1,407 separate groups were recorded during the fixed-point surveys (Table 3). Cumulatively, six species (7.0% of all species) composed approximately 43.7% of the observations: dark-eyed junco (*Junco hyemalis*), American robin (*Turdus migratorius*), white-crowned sparrow (*Zonotrichia leucophrys*), yellow-rumped warbler (*Dendroica coronata*), common raven (*Corvus corax*), and Steller's jay (*Cyanocitta stelleri*). All other species comprised less than 5% of the observations. A total of 76 individual raptors were recorded within the WRWRA, representing 11 species (Table 3).

Bird Use, Composition, and Frequency of Occurrence by Season

Mean bird use, percent composition, and frequency of occurrence for all species and bird types by season were calculated (Table 4). The highest overall bird use occurred in the summer (15.98 birds/plot/20-min survey), followed by fall (14.34), spring (9.13), and winter (1.99). Passerines were the most abundant bird type observed across all seasons.

Waterfowl

Waterfowl were only observed during spring (0.07 birds/plot/20-minute survey; Table 4). The only waterfowl species recorded was Canada goose (*Branta canadensis*), which consisted of one group of eight individuals observed. Waterfowl comprised 0.8% of overall bird use in spring and were observed during 0.9% of spring surveys.

Raptors

Raptor use was much higher during fall (0.63 birds/plot/20-min survey; Table 4), compared to summer (0.22), winter (0.17) and spring (0.16; Table 4). High raptor use in fall consisted mostly of sharp-shinned hawk (*Accipter striatus*; 0.13 birds/plot/20-min survey), unidentified buteo (0.13), and Cooper's hawk (*Accipiter* cooperii; 0.12). Cooper's hawk had the highest use of any one raptor species in spring (0.06 birds/plot/20-min survey), red-tailed hawk (*Buteo jamaicensis*) had the highest use in summer (0.13), and bald eagle (*Haliaeetus leucocephalus*) had the highest use in winter (0.08), although this was due to observations of only two individual bald eagles. Raptors comprised 8.4% of the overall bird use in winter and 4.4% in fall, compared to 1.8% overall bird use in spring and 1.4% in summer. Raptors were observed during 34.8% of surveys

in the fall and 22.2% in the summer, compared to 13.3% of the surveys in the winter and 12.9% in the spring.

Vultures

Vulture use was much higher in summer (0.31 birds/plot/20-minute survey; Table 4), than in spring (0.08), fall (0.08), and winter (zero). The only vulture species observed was turkey vulture (*Cathartes aura*). Vultures comprised 1.9% of overall bird use during summer surveys, 0.9% during spring surveys, and 0.5% during fall surveys. Vultures were observed during 11.1% of summer surveys, compared to 6.7% of spring surveys and 5.9% of fall surveys.

Upland Gamebirds

Upland gamebirds had relatively low use in spring, summer, and fall (0.11 birds/plot/20-min survey, 0.02, and 0.02, respectively; Table 4). Only three upland gamebird species were observed within the WRWRA, including wild turkey (*Meleagris gallopavo*), sooty grouse (*Dendragapus fuliginosus*), and ruffed grouse (*Bonasa umbellus*). Upland gamebirds comprised 1.2% of overall bird use during spring surveys and only 0.1% during both summer and fall surveys. Upland gamebirds were observed during 10.1% of surveys in the spring compared to 2.2% of summer surveys and 1.9% of fall surveys.

Passerines

Passerines had the highest use of any bird type during all four seasons (Table 4). Passerine use was highest in summer (14.13 birds/plot/20-min survey) and fall (12.53), and lower during spring (7.88) and winter (1.69). Passerine use varied by season. Passerines with the highest use by season were American robin in spring (1.31 birds/plot/20-min survey), white-crowned sparrow in summer (2.07), dark-eyed junco in fall (2.19), and common raven in winter (0.69). Passerines comprised greater than 80% of overall bird use during all seasons. Passerines were observed during 90% or more of the surveys during spring, summer, and fall surveys, and 58.3% of surveys in winter.

Bird Flight Height and Behavior

Flight height characteristics were estimated for both bird types and bird species (Tables 5 and 6). During the study, 523 single birds or groups totaling 1,449 individuals were observed flying during fixed-point bird use surveys (Table 5). Overall, 31.3% of birds observed flying were recorded within the ZOR for collision with turbine blades of 35 to 130 m (114 to 427 ft) AGL, 65.7% were below the ZOR, and 3.0% were flying above the ZOR (Table 5). More than half (58.6%) of flying raptors were observed flying within the ZOR, 15.5% were below the ZOR, and only 25.9% were above the ZOR. Raptor subtypes that were observed within the ZOR most often were falcons (100%), accipiters (65.2%), and eagles (60.0%). Doves/pigeons had the highest percentage of flying birds within the ZOR (58.8%) followed by raptors (58.6%) and vultures (53.6%). Upland gamebirds, passerines, and other birds were typically observed flying below the ZOR (Table 5).

Six species had at least 10 groups observed flying and were observed flying within the ZOR during at least 50% of observations, including red crossbill (*Loxia curvirostra*; 90.2%), common raven (*Corvus corax*; 55.1%), western bluebird (*Sialia mexicana*; 62.3%), band-tailed pigeon (*Columba fasciata*; 59.4%), red-tailed hawk (70.0%) and turkey vulture (53.6%; Table 6). Ten

species were always seen flying within the likely ZOR; however, these were based on fewer than five observations.

Bird Exposure Index
A relative exposure index was calculated for each species (Table 6). This index is only based on initial flight height observations and relative abundance (defined as the use estimate) and does not account for other possible collision risk factors such as foraging or courtship behavior. Red crossbill (0.29) and common raven (0.23) had exposure indices higher than any other species. Red-tailed hawk had the highest exposure index of any raptor species (0.05); all other raptor species had an exposure index of 0.02 or less (Table 6).

Spatial Use
For all bird species combined, use was highest at points D, C, and B (13.7, 12.8 and 11.8 birds/20-min survey, respectively). Bird use at other points ranged from 5.31 to 11.0 birds/20-min survey (Figure 5). The higher mean use estimates for points D, C, and B were largely due to higher passerine use at these points (11.1, 11.5, and 11.0 birds/20-min survey, respectively). Passerine use at the other points ranged from 4.15 to 8.94 birds/20-min survey. Waterfowl use only occurred at point J with 0.62 birds/20-min survey. Raptor use was highest at point A (0.56 birds/20-min survey), and ranged from zero to 0.35 birds/20-min survey at other points. Vultures were observed at approximately half of the points (A, B, C, D, E, and H); use ranged from 0.04 birds/20-min survey at point A to 0.36 at point D. Upland gamebird use was highest at point G (0.17 birds/20-min survey), and ranged from zero to 0.09 birds/20-min survey at other points.

Flight paths for waterbirds, waterfowl, shorebirds, raptors, and vultures were digitized and mapped (Figures 6a-d). No obvious flyways or concentration areas were observed for any species. The available data do not indicate that any portions of the study area warrant being excluded from development due to very high bird use.

Incidental Wildlife Observations

There were six bird species observed incidentally, totaling 23 birds within eight separate groups during the study (Table 7). Five mammal species were also observed incidentally at the WRWRA.

Bird Observations
The most abundant bird species recorded as an incidental wildlife observation was pine siskin (*Carduelis pinus*; nine individuals). Two species, osprey (*Pandion haliaetus*) and common poorwill (*Phalaenoptilus nuttallii*), were only seen incidentally at the WRWRA. Canada goose, red-tailed hawk, and ruffed grouse (*Bonasa umbellus*) were also observed incidentally.

Mammal Observations
A total of five mammal species including 43 mule deer (*Odocoileus hemionus*), nine black-tailed deer (*Odocoileus hemionus columbianus*), three elk (*Cervus elephus*), one Douglas squirrel (*Tamiasciurus douglasii*), and one gray squirrel (*Sciurus* sp.) were observed incidentally during the fixed-point surveys at the WRWRA (Table 8). The gray squirrel was only observed for a

brief period and therefore it could not be positively identified as being either a state threatened western gray squirrel or an eastern gray squirrel (*Sciurus carolinensis*).

DISCUSSION AND IMPACT ASSESSMENT

Bird Impacts

Direct Effects

The most probable direct impact to birds from wind-energy facilities is direct mortality or injury due to collisions with turbines or guy wires of meteorological (met) towers. Collisions may occur with resident birds foraging and flying within the study area or with migrant birds seasonally moving through the study area. Project construction could affect birds through loss of habitat, or potential fatalities from construction equipment. Impacts from the decommissioning of the facility are anticipated to be similar to construction in terms of noise, disturbance, and equipment. Potential mortality from construction equipment is expected to be very low. Equipment used in wind-energy facility construction generally moves at slow rates or is stationary for long periods (e.g., cranes). The risk of direct mortality to birds from construction is most likely potential destruction of a nest during initial site clearing if conducted during the nesting season.

Substantial data on bird mortality at wind-energy facilities are available from studies in California and throughout the West and Midwest. Of 841 bird fatalities reported from California studies (more than 70% from the Altamont Pass facility in California), about 39% were diurnal raptors, about 19% were passerines (excluding house sparrows [*Passer domesticus*] and European starlings [*Sturnus vulgaris*]), and about 12% were owls. Non-protected birds including house sparrows, European starlings, and rock pigeons (*Columba livia*) comprised about 15% of the fatalities. Other bird types generally made up less than 10% of the fatalities (Erickson et al. 2002b). During 12 fatality monitoring studies conducted outside of California, diurnal raptor fatalities comprised about 2% of the wind-energy facility-related fatalities and raptor mortality averaged 0.03/turbine/year. Passerines (excluding house sparrows and European starlings) were the most common collision victims, comprising about 82% of the 225 fatalities documented. For all bird species combined, estimates of the number of bird fatalities per turbine per year from individual studies ranged from zero at the Searsburg wind-energy facility in Vermont (Kerlinger 1997) and the Algona facility in Iowa (Demastes and Trainer 2000), to 7.7 at the Buffalo Mountain facility in Tennessee (Nicholson 2003). Using mortality data from a 10-year period from wind-energy facilities throughout the entire United States, the average number of bird collision fatalities is 3.1 per megawatt (MW) per year, or 2.3 per turbine per year (NWCC 2004).

Raptor Use and Exposure Risk

The annual mean raptor use at the WRWRA (0.28 raptors/plot/20-min survey) was compared with other wind-energy facilities that implemented similar protocols and had data for three or four seasons. Similar studies were conducted at 36 other wind-energy facilities. The annual mean raptor use at these wind-energy facilities ranged from 0.09 to 2.34 raptors/plot/20-min survey (Figure 7). Based on the results from these wind-energy facilities, a ranking of seasonal raptor mean use was developed as: low (0 – 0.5 raptors/plot/20-min survey); low to moderate (0.5 –

1.0); moderate (1.0 – 2.0); high (2.0 – 3.0); and very high (> 3.0). Under this ranking, mean raptor use (number of raptors divided by the number of 800 m plots and the total number of surveys) at the WRWRA is considered to be low. Compared to the other wind-energy facilities, the WRWRA ranked twenty-ninth (Figure 7).

Although high numbers of raptor fatalities have been documented at some wind-energy facilities (e.g. Altamont Pass), a review of studies at wind-energy facilities across the United States reported that only 3.2% of casualties were raptors (Erickson et al. 2001a). Indeed, although raptors occur in most areas with the potential for wind-energy development, individual species appear to differ from one another in their susceptibility to collision (NRC 2007). Results from Altamont Pass in California suggest that mortality for some species is not necessarily related to abundance (Orloff and Flannery 1992). American kestrels (*Falco sparverius*), red-tailed hawks, and golden eagles (*Aquila chrysaetos*) were killed more often than predicted based on abundance. Thus far, only three northern harrier (*Circus cyaneus*) fatalities at existing wind energy facilities have been reported in publicly available documents, despite the fact they are commonly observed during point counts at these facilities (Erickson et al. 2001a; Whitfield and Madders 2006). Because northern harriers often forage close to the ground, risk of collision with turbine blades is considered low for this species. Relative use by American kestrels at the High Winds facility was almost six times the use of American kestrels at the Altamont Pass facility (Kerlinger 2005). It is likely that many factors, in addition to abundance, are important in predicting raptor mortality.

An exposure index analysis may also provide insight into what species has a higher likelihood of turbine casualties. The index considers relative probability of exposure based on abundance, proportion of daily activity spent flying, and proportion of flight height of each species within the ZOR for turbines likely to be used at the wind-energy facility. For the WRWRA, the raptor species with the highest exposure index was the red-tailed hawk, which was ranked eleventh of all species (Table 6). The exposure index analysis is based on observations of birds during the daylight period and does not take into consideration flight behavior (e.g., during foraging or courtship) or abundance of nocturnal migrants. It also does not take into consideration habitat selection, the ability to detect and avoid turbines, and other factors that may vary among species and influence likelihood for turbine collision. For these reasons, the actual risk for some species may be lower or higher than indicated by this index

A regression analysis of raptor use and mortality for 13 new-generation wind-energy facilities, where similar methods were used to estimate raptor use and mortality, found that there was a significant correlation between use and mortality (R^2 = 69.9%; Figure 8). Using this regression to predict raptor collision mortality at the WRWRA, based on an adjusted mean raptor use of 0.28 raptors/20-min survey, yields an estimated fatality rate of zero due to the low raptor use observed. A 90% prediction interval around this estimate is zero to 0.25 fatalities/MW/year. Based on the relative abundance of red-tailed hawks, Cooper's hawks, and sharp-shinned hawks, there is higher potential for fatalities of these three species compared to other species.

Non-Raptor Use and Exposure Risk

Mean overall bird use at the WRWRA was 9.3 birds/800-m radius plot/20-minute survey. Mean overall bird use for 24 other WRAs in the Pacific Northwest has ranged from 5-23.6. The

WRWRA ranks 19th compared to these 24 other WRA (Figure 9). To date, no relationships have been observed between overall use by bird types other than raptors, and fatality rates of those bird types at wind-energy facilities. However, the overall avian use at the WRWRA is low compared to most other WRAs in the Pacific Northwest and therefore high levels of avian mortality would not be expected.

Most bird species in the US are protected by the Migratory Bird Treaty Act (MBTA 1918). Passerines (primarily perching birds) have been the most abundant bird fatality at wind energy facilities outside California (Erickson et al. 2001a, 2002b), often comprising more than 80% of the bird fatalities. Both migrant and resident passerine fatalities have been observed. Given that passerines made up a large proportion of the birds observed during the baseline study, passerines would be expected to make up the largest proportion of fatalities at the WRWRA. Exposure indices based on observations within 100 m indicate that red crossbill is the most likely passerine to be exposed to collision from wind turbines at the WRWRA. Other passerine species likely most at risk based on abundance and flight behavior would include common raven, American robin, western bluebird, tree swallow (*Tachycineta bicolor*), evening grosbeak (*Coccothraustes vespertinus*), Vaux's swift (*Chaetura vauxi*), and American goldfinch (*Carduelis tristis*; Table 6b). Other non-raptor species with high exposure indices include turkey vulture and band-tailed pigeon. Most non-raptors had relatively low exposure indices due to the majority of individuals flying below the likely zone of risk. Due to the low exposure risks at WRWRA, it is unlikely that non-raptor populations will be adversely affected by direct mortality from the operation of the wind-energy facility.

The only waterfowl species observed in the WRWRA was a single group of eight Canada goose recorded during spring fixed-point bird use surveys, and another group of six individuals were observed incidentally. Wind-energy facilities with year-round use by water dependent species have shown the highest mortality, although the levels of waterfowl/waterbird/shorebird mortality appear insignificant compared to the use of the facilities by these groups. Of 1,033 bird carcasses collected at US wind-energy facilities, waterbirds comprised about 2%, waterfowl comprised about 3%, and shorebirds comprised less than 1% (Erickson et al. 2002b). At the Klondike, Oregon wind-energy facility, only two Canada goose fatalities were documented (Johnson et al. 2003) even though 43 groups totaling 4845 individual Canada geese were observed during pre-construction surveys (Johnson et al. 2002a). The recently constructed Top of Iowa wind-energy facility is located in cropland between three Wildlife Management Areas (WMAs) with historically high bird use, including migrant and resident waterfowl. During a recent study, approximately one million goose-use days and 120,000 duck-use days were recorded in the WMAs during the fall and early winter, and no waterfowl fatalities were documented during concurrent and standardized wind-energy facility fatality studies (Jain 2005). Similar findings were observed at the Buffalo Ridge wind-energy facility in southwestern Minnesota, which is located in an area with relatively high waterfowl/waterbird use and some shorebird use. Snow geese (*Chen caerulescens*), Canada geese, and mallards (*Anas platyrhynchos*) were the most common waterfowl observed. Three of the 55 fatalities observed during the fatality monitoring studies were waterfowl, including two mallards and one blue-winged teal (*Anas discors*). Two American coots (*Fulica americana*), one grebe, and one shorebird fatality were also found (Johnson et al. 2002b). Based on available evidence, waterfowl do not seem especially vulnerable to turbine collisions and significant impacts are not likely.

Sensitive Species Use and Exposure Risk

All sensitive species observed at the WRWRA are summarized in Table 8. No federal-listed species were observed during the study (Table 3). One gray squirrel was observed as an incidental observation. However, the gray squirrel was only observed for a brief period and therefore it could not be positively identified as being either a state threatened western gray squirrel or an eastern gray squirrel. One state sensitive species, bald eagle, was observed during fixed-point surveys at the WRWRA (two observations; Table 2). Four state candidate species, Vaux's swift, pileated woodpecker (*Dryocopus pileatus*), northern goshawk, and golden eagle, were observed during fixed point surveys (Table 8). The bald eagle and golden eagle are also legally protected under the Bald and Golden Eagle Protection Act (BGEPA 1940), while the others are protected under the Migratory Bird Treaty Act (MBTA 1918).

Use of the WRWRA by bald eagle, northern goshawk, and golden eagle was very low, and significant impacts are not expected. Vaux's swifts were fairly common and were commonly observed flying at turbine rotor-swept heights; therefore, some turbine mortality may occur for these species over the life of the facility. These collisions would likely be rare occurrences and it is unlikely the WRWRA would have any negative impacts on population levels in and near the study area. Based on seasonality of the observations, the Vaux's swifts appear to be migrants through the WRWRA rather than local breeding residents

Indirect Effects

The presence of wind turbines may alter the landscape so that wildlife use patterns are affected, displacing wildlife away from the project facilities and suitable habitat. Some studies from wind-energy facilities in Europe consider displacement effects to have a greater impact on birds than collision mortality (Gill et al. 1996). The greatest concern with displacement impacts for wind-energy facilities in the US has been where these facilities have been constructed in grassland or other native habitats (Leddy et al. 1999; Mabey and Paul 2007), Although Crockford (1992) suggests that disturbance appears to impact feeding, resting, and migrating birds, rather than breeding birds, results from studies at the Stateline wind-energy facility in Washington and Oregon (Erickson et al. 2004) and the Buffalo Ridge wind-energy facility in Minnesota (Johnson et al. 2000a) suggest that breeding birds are also affected by wind-facility operations.

Raptor Displacement

In addition to possible direct effects on raptors within the study area (discussed above), indirect effects caused by disturbance-type impacts, such as construction activity near an active nest or primary foraging area, also have a potential impact on raptor species. Birds displaced from wind-energy facilities might move to areas with fewer disturbances, but with lower quality habitat, with an overall effect of reducing breeding success. Most studies on raptor displacement at wind-energy facilities, however, indicate effects to be negligible (Howell and Noone 1992; Johnson et al. 2000a, 2003; Madders and Whitfield 2006). Notable exceptions to this include a study in Scotland that described territorial golden eagles avoiding the entire wind-energy facility area, except when intercepting non-territorial birds (Walker et al. 2005). A study at the Buffalo Ridge wind-energy facility in Minnesota found evidence of northern harriers avoiding turbines on both a small scale (< 100 m from turbines) and a larger scale in the year following construction (Johnson et al. 2000a). Two years following construction, however, no large-scale displacement of northern harriers was detected.

The only published report of avoidance of wind turbines by nesting raptors occurred at Buffalo Ridge, Minnesota, where raptor nest density on 101 mi^2 (262 km^2) of land surrounding a wind-energy facility was 5.94 nests/39 mi^2 (5.94 nests/101 km^2), yet no nests were present in the 12 mi^2 (31 km^2) facility itself, even though habitat was similar (Usgaard et al. 1997). However, this analysis assumes that raptor nests are uniformly distributed across the landscape, an unlikely event, and even though no nests were found, only two nests would be expected for an area 12 mi^2 in size if the nests were distributed uniformly. At a wind-energy facility in eastern Washington, based on extensive monitoring using helicopter flights and ground observations, raptors still nested in the study area at approximately the same levels after construction, and several nests were located within 0.5 miles (0.8 km) of turbines (Erickson et al. 2004). At the Foote Creek Rim Wind-Energy Facility in southern Wyoming, one pair of red-tailed hawks nested within 0.3 miles (0.5 km) of the turbine strings, and seven red-tailed hawk nests, one great horned owl (*Bubo virginianus*) nest, and one golden eagle nest located within one mile (1.6 km) of the wind-energy facility successfully fledged young (Johnson et al. 2000b). The golden eagle pair successfully nested 0.5 mile from the facility for three different years after it became operational. A Swainson's hawk (*Buteo swainsoni*) also nested within 0.25 mile (0.4 km) of a turbine string at the Klondike I wind-energy facility in Oregon after the facility was operational (Johnson et al. 2003). These observations suggest that there will be limited nesting displacement of raptors at the WRWRA.

Displacement of Non-Raptor Bird Species

Studies concerning displacement of non-raptor species have concentrated on grassland passerines and waterfowl/waterbirds (Winkelman 1990; Larsen and Madsen 2000; Mabey and Paul 2007). Wind-energy facility construction appears to cause small-scale local displacement of grassland passerines and is likely due to the birds avoiding turbine noise and maintenance activities. Construction also reduces habitat effectiveness because of the presence of access roads and large gravel pads surrounding turbines (Leddy 1996; Johnson et al. 2000a). Leddy et al. (1999) surveyed bird densities in Conservation Reserve Program (CRP) grasslands at the Buffalo Ridge wind-energy facility in Minnesota, and found mean densities of 10 grassland bird species were four times higher at areas located 180 m (591 ft) from turbines than they were at grasslands nearer turbines. Johnson et al. (2000a) found reduced use of habitat by seven of 22 grassland-breeding birds following construction of the Buffalo Ridge wind energy facility in Minnesota. Results from the Stateline wind-energy facility in Oregon and Washington (Erickson et al. 2004), and the Combine Hills wind-energy facility in Oregon (Young et al. 2005), suggest a relatively small impact of the wind-energy facilities on grassland nesting passerines. Transect surveys conducted prior to and after construction of the wind-energy facilities found that grassland passerine use was significantly reduced within approximately 50 m (164 ft) of turbine strings, but areas further away from turbine strings did not have reduced bird use.

Displacement effects of wind-energy facilities on waterfowl and shorebirds appear to be mixed. Studies from the Netherlands and Denmark suggest that densities of these types of species near turbines were lower compared to densities in similar habitats away from turbines (Winkelman 1990; Pedersen and Poulsen 1991). However, a study from a facility in England, found no effect of wind turbines on populations of cormorant (*Phalacrcorax xarbo*), purple sandpipers (*Calidris maritima*), eiders (*Somateria mollissima*), or gulls, although the cormorants were temporarily displaced during construction (Lawrence et al. 2007). At the Buffalo Ridge wind-energy facility

in Minnesota, the abundance of several bird types, including shorebirds and waterfowl, were found to be significantly lower at survey plots with turbines than at reference plots without turbines (Johnson et al. 2000a). The report concluded that the area of reduced use was limited primarily to those areas within 100 m of the turbines. Disturbance tends to be greatest for migrating birds while feeding and resting (Crockford 1992; NRC 2007). The only waterfowl/waterbirds use at the WRWRA included one group of eight Canada goose observed during spring fixed-point bird use surveys and one group of six individuals during incidental observations. Based on the minimal presence of waterfowl/waterbird species, impacts should be negligible.

A study conducted in England to assess displacement of wintering farmland birds by wind turbines located in an agricultural landscape found that only common (ring-necked) pheasants (*Phasianus colchicus*) apparently avoided turbines. The other species/bird groups examined, including granivores, red-legged partridge (*Alectoris rufa*), Eurasian skylark (*Alauda arvensis*) and corvids, showed no displacement from wind turbines. In fact, Eurasian skylarks and corvids showed increased use of areas close to turbines, possibly due to increased food resources associated with disturbed areas (Devereux et al. 2008).

No studies have been conducted to assess displacement effects of birds in western coniferous forest. It is likely that some displacement may occur similar to that observed in other habitat types.

CONCLUSIONS AND RECOMMENDATIONS

Based on data collected during this study, raptor and all bird use of the WRWRA is generally lower than most wind resource areas evaluated throughout the western and Midwestern U.S. using similar methods. Based on the results of the studies to date, bird mortality at the WRWRA would likely be similar or lower than that documented at other wind-energy facilities located in the western and Midwestern United States where bird collision mortality has been relatively low.

Based on research conducted at wind-energy facilities throughout the US, raptor use at the WRWRA is generally lower than use levels recorded at other wind-energy facilities. Raptor fatality rates are expected to be within the range of fatality rates observed at other facilities where raptor use levels are lower. To date, no relationships have been observed between overall use by other bird types, and fatality rates of those bird types at wind-energy facilities. However, the flight characteristics and foraging habits of some species may result in increased exposure for these species at the WRWRA. The surveys conducted for this proposed wind resource area also do not address the impacts of the proposed facility to nocturnal migrants, such as passerines. To date, overall fatality rates for birds (including nocturnal migrants) at wind-energy facilities have been relatively low and consistent in the West. As more research is conducted at facilities in the West, more information regarding the potential direct impacts of wind-energy facilities to bird species will be obtained.

The proposed wind-energy facility contains minimal habitat diversity; approximately 82% of the WRWRA contains forested habitat, while the remaining areas are comprised of developed open

space, scrub-shrub, and grasslands (Table 1, Figure 3). Some species considered to be sensitive or of conservation concern were observed within the WRWRA. Some potential exists for wind turbines to displace birds within forested habitats. Research concerning displacement impacts to songbirds, waterfowl and waterbirds and wind-energy facilities is limited, but some studies show the potential for small scale (180 m or less) displacement, while impacts to densities of birds at larger scales has not been shown.

REFERENCES

Anderson, R., M. Morrison, K. Sinclair, and D. Strickland. 1999. Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and Methods for Determining or Monitoring Potential Impacts on Birds at Existing and Proposed Wind Energy Sites. Prepared for the Avian Subcommittee and National Wind Coordinating Committee (NWCC). December 1999. National Wind Coordinating Committee/RESOLVE. Washington, D.C. 87 pp. http://www.nationalwind.org/publications/wildlife/avian99/Avian_booklet.pdf

Bald and Golden Eagle Protection Act (BGEPA). 1940. 16 United States Code § 668-668d. June 8, 1940.

Cooper, B.A., R.J. Blaha, T.J. Mabee, and J.H. Plissner. 2004. A Radar Study of Nocturnal Bird Migration at the Proposed Cotterel Mountain Wind Energy Facility, Idaho, Fall 2003. Technical report prepared for Windland, Inc., Boise, Idaho, by ABR, Inc., Forest Grove, Oregon. January 2004.

Crockford, N.J. 1992. A Review of the Possible Impacts of Wind Farms on Birds and Other Wildlife. Joint Nature Conservancy Committee (JNCC) Report No. 27. JNCC. Peterborough, United Kingdom. 60 pp.

Demastes, J.W. and J.M. Trainer. 2000. Avian Risk, Fatality, and Disturbance at the IDWGP Wind Farm, Algona, Iowa. Final Report Submitted by the University of Northern Iowa, Cedar Falls, Iowa. 21 pp.

Devereux, C.L., M.J.H. Denny, and M.J. Whittingham. 2008. Minimal Effects of Wind Turbines on the Distribution of Wintering Farmland Birds. Journal of Applied Ecology Windfarms and Farmland Birds: 1365-2664.

Erickson, W.P., D.P. Young, Jr., G. Johnson, J. Jeffrey, K. Bay, R. Good, and H. Sawyer. 2003a. Wildlife Baseline Study for the Wild Horse Wind Project. Summary of Results from 2002-2003 Wildlife Surveys May 10, 2002- May 22, 2003. Draft report prepared for Zilkha Renewable Energy, Portland, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. November 2003.

Erickson, W.P., J. Jeffrey, D.P. Young, Jr., K. Bay, R. Good, K. Sernka, and K. Kronner. 2003b. Wildlife Baseline Study for the Kittitas Valley Wind Project: Summary of Results from 2002 Wildlife Surveys. Final Report February 2002– November 2002. Prepared for Zilkha Renewable Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. January 2003.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. Technical report for and peer-reviewed by FPL Energy, Stateline Technical Advisory Committee, and the Oregon Energy Facility Siting Council, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. December 2004. http://www.west-inc.com

Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington. Prepared for Puget Sound Energy, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 2008.

Erickson, W.P., G.D. Johnson, K. Bay, and K. Kronner. 2002a. Ecological Baseline Study for the Zintel Canyon Wind Project. Final Report April 2001 – June 2002. Technical report prepared for Energy Northwest. Prepared for Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. June 2002.

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002b. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Technical report prepared for Bonneville Power Administration, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. December 2002. http://www.bpa.gov/Power/pgc/wind/Avian_and_Bat_Study_12-2002.pdf

Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, Jr. , K.J. Sernka, and R.E. Good. 2001a. Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Bird Collision Mortality in the United States. National Wind Coordinating Committee (NWCC) Publication and Resource Document. Prepared for the NWCC by WEST, Inc., Cheyenne, Wyoming. August 2001. http://www.nationalwind.org/publications/default.htm and http://www.west-inc.com

Erickson, W.P., E. Lack, M. Bourassa, K. Sernka, and K. Kronner. 2001b. Wildlife Baseline Study for the Nine Canyon Wind Project, Final Report May 2000-October 2001 Technical report prepared for Energy Northwest, Richland, Washington.

Gill, J.P., M. Townsley, and G.P. Mudge. 1996. Review of the Impacts of Wind Farms and Other Aerial Structures Upon Birds. Scottish Natural Heritage Review No. 21. Scottish Natural Heritage. Battleby, United Kingdom.

Howell, J.A. and J. Noone. 1992. Examination of Avian Use and Mortality at a U.S. Windpower Wind Energy Development Site, Montezuma Hills, Solano County, California. Final Report to Solano County Department of Environmental Management, Fairfield, California. 41pp.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Jeffrey, J.D., W.P. Erickson, K.J. Bay, V.K. Poulton, W.L. Tidhar, and J.E. Baker. 2008. Wildlife Baseline Studies for the Golden Hills Wind Resource Area, Sherman County, Oregon. Final Report May 2006 – October 2007. Prepared for BP Alternative Energy North America Inc., Houston, Texas, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G.D. 2004. Analysis of Potential Wildlife and Habitat Impacts from the Klondike II Project, Sherman County, Oregon. Technical report prepared by WEST, Inc., for CH2M HILL and PPM Energy.

Johnson, G.D. and W.P. Erickson. 2004. Analysis of Potential Wildlife/Wind Plant Interactions, Bighorn Site, Klickitat County, Washington. Prepared for CH2M HILL, Portland, Oregon by WEST, Inc., Cheyenne, Wyoming. August 2004.

Johnson, G.D., W.P. Erickson, K. Bay, and K. Kronner. 2002a. Baseline Ecological Studies for the Klondike Wind Project, Sherman County, Oregon. Final report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon. May 29, 2002.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002b. Collision Mortality of Local and Migrant Birds at a Large-Scale Wind-Power Development on Buffalo Ridge, Minnesota. Wildlife Society Bulletin 30(3): 879-887.

Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. March 2003. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. http://www.west-inc.com

Johnson, G.D., J. Jeffrey, J. Baker, and K. Bay. 2007. Baseline Avian Studies for the Windy Flats Wind Energy Project, Klickitat County, Washington. Prepared for Windy Point Partners, LLC., by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. May 29, 2007.

Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R.E. Good. 2000b. Wildlife Monitoring Studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999. Final report prepared for SeaWest Energy Corporation, San Diego, California, and the Bureau of Land Management, Rawlins, Wyoming, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 9, 2000. http://www.west-inc.com and http://www.west-inc.com/reports/fcr_final_baseline.pdf

Kerlinger, P. 1997. A Study of Avian Fatalities at the Green Mountain Power Corporation's Searsburg, Vermont Windpower Facility - 1997. Prepared for Vermont Department of Public Service, Green Mountain Power Corporation, National Renewable Energy Laboratory and Vermont Environmental Research Associates. 12 pp.

Kerlinger, P. 2005. Summary of Bird Studies and Collision Rates at Wind Power Projects. Rebuttal testimony of Paul Kerlinger for the East Haven Windfarm. February 9, 2005. http://easthavenwindfarm.com/filing/feb/ehwf-pk-reb1.pdf

Kerlinger, P., L. Culp, and R. Curry. 2005. Post-Construction Avian Monitoring Study for the High Winds Wind Power Project, Solano County, California. Year One Report. Prepared for High Winds, LLC and FPL Energy.

Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.

Kronner, K., B. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Fatality Monitoring Study: 2006−2007. Final report prepared for PPM Energy and the Big Horn Wind Project Technical Advisory Committee by Northwest Wildlife Consultants, Inc. (NWC), Mid-Columbia Field Office, Goldendale, Washington. June 1, 2008.

Larsen, J.K. and J. Madsen. 2000. Effects of Wind Turbines and Other Physical Elements on Field Utilization by Pink-Footed Geese (*Anser brachyrhynchus*): A Landscape Perspective. Landscape Ecology 15: 755-764.

Lawrence, E.S., S. Painter, and B. Little. 2007. Responses of Birds to the Windfarm at Blyth Harbour, Northumberland, UK. *In*: Birds and Windfarms: Risk Assessment and Mitigation. M. J. de Lucas, G. F. E. Janss, and M. Ferrer, eds. Quercus, Madrid, Spain. Pp. 47-69.

Leddy, K.L. 1996. Effects of Wind Turbines on Nongame Birds in Conservation Reserve Program Grasslands in Southwestern Minnesota. M.S. Thesis. South Dakota State University, Brookings. 61 pp.

Leddy, K.L., K.F. Higgins, and D.E. Naugle. 1999. Effects of Wind Turbines on Upland Nesting Birds in Conservation Reserve Program Grasslands. Wilson Bulletin 111(1): 100-104.

Mabey, S. and E. Paul. 2007. Impact of Wind Energy and Related Human Activities on Grassland and Shrub-Steppe Birds. A Critical Literature Review Prepared for the National Wind Coordinating Committee (NWCC) and The Ornithological Council. 183 pp. http://www.nationalwind.org/pdf/IMPACTOFWINDENERGYANDRELATEDHUMANACTIVITIESONGRASSLANDANDSHRUB-STEPPEBIRDS.pdf

Madders, M. and D.P. Whitfield. 2006. Upland Raptors and the Assessment of Wind Farm Impacts. Ibis 148: 43-56.

Migratory Bird Treaty Act (MBTA). 1918. 16 United States Code § 703-712. July 13, 1918.

National Research Council (NRC). 2007. Environmental Impacts of Wind-Energy Projects. National Academies Press. Washington, D.C. www.nap.edu

National Wind Coordinating Committee (NWCC). 2004. Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and Remaining Questions. Fact Sheet. 2nd Edition. November 2004. http://www.nationalwind.org/publications/default.htm

Nicholson, C.P. 2003. Buffalo Mountain Windfarm Bird and Bat Mortality Monitoring Report: October 2001 - September 2002. Tennessee Valley Authority, Knoxville, Tennessee. February 2003.

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2004. Ecological Baseline Studies for the Roosevelt Wind Project, Klickitat County, Washington. Final Report. Prepared by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. September 2004.

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2005a. Ecological Baseline Studies and Wildlife Impact Assessment for the White Creek Wind Power Project, Klickitat County, Washington. Prepared for Last Mile Electric Cooperative, Goldendale, Washington, by Northwest Wildlife Consultants, Inc., Goldendale, Washington, and Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 12, 2005.

Northwest Wildlife Consultants, Inc. (NWC) and Western Ecosystems Technology, Inc. (WEST). 2005b. Wildlife Baseline Study for the Leaning Juniper Wind Power Project, Gilliam County, Oregon. Prepared for PPM Energy, Portland, Oregon and CH2M HILL, Portland, Oregon by NWC, Pendleton, Oregon, and WEST, Inc., Cheyenne, Wyoming. November 3, 2005.

Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. (WEST). 2007. Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, Oregon. Analysis conducted by WEST, Cheyenne, Wyoming. July 17, 2007.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report P700-92-001 to Alameda, Contra Costa, and Solano Counties, and the California Energy Commission, Sacramento, California, by Biosystems Analysis, Inc., Tiburon, California. March 1992.

Pedersen, M.B. and E. Poulsen. 1991. Impact of a 90m/2mw Wind Turbine on Birds - Avian Responses to the Implementation of the Tjaereborg Wind Turbine at the Danish Wadden Sea. Dansek Vildundersogelser 47: 1-44. Miljoministeriet & Danmarks Miljoundersogelser.

Reynolds, R.T., J.M. Scott, and R.A. Nussbaum. 1980. A Variable Circular-Plot Method for Estimating Bird Numbers. Condor 82(3): 309-313.

URS Corporation, Western EcoSystems Technology, Inc. (WEST), and Northwest Wildlife Consultants, Inc. (NWC). 2001. Avian Baseline Study for the Stateline Project. Prepared for FPL Energy Vansycle, LLC, Juno Beach, Florida.

US Geological Survey (USGS) National Land Cover Database (NLCD). 2001. Land Use/Land Cover NLCD Data. USGS Headquarters, USGS National Center. Reston, Virginia.

Usgaard, R.E., D.E. Naugle, R.G. Osborn, and K.F. Higgins. 1997. Effects of Wind Turbines on Nesting Raptors at Buffalo Ridge in Southwestern Minnesota. Proceedings of the South Dakota Academy of Science 76: 113-117.

Walker, D., M. McGrady, A. McCluskie, M. Madders, and D.R.A. McLeod. 2005. Resident Golden Eagle Ranging Behaviour Before and After Construction of a Windfarm in Argyll. Scottish Birds 25: 24-40. http://www.natural-research.org/projects/documents/SB25-EAGLESDOC.pdf

Washington Department of Fish and Wildlife (WDFW). 2009. Species of Concern in Washington State. Current as of June 1, 2009. Species of concern list: http://www.wdfw.wa.gov/wlm/diversty/soc/soc.htm

Western Ecosystems Technology, Inc. (WEST). 2005a. Ecological Baseline Study at the Elkhorn Wind Power Project. Exhibit A. Final report prepared for Zilkha Renewable Energy, LLC., Portland, Oregon, by WEST, Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005b. Ecological Baseline Study for the Proposed Reardon Wind Project, Lincoln County, Washington. Draft Final Report. Prepared for Energy Northwest, Richland, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. June 2005.

Western EcoSystems Technology, Inc. (WEST). 2005c. Wildlife and Habitat Baseline Study for the Proposed Biglow Canyon Wind Power Project, Sherman County, Oregon. March 2004 - August 2005. Prepared for Orion Energy LLC., Oakland, California. October, 2005. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2006a. Diablo Winds Wildlife Monitoring Progress Report, March 2005 - February 2006. Technical report submitted to FPL Energy and Alameda County California. WEST. Cheyenne, Wyoming.

Western EcoSystems Technology, Inc. (WEST). 2006b. Wildlife Baseline Study for the North Valley County Wind Project: Summary of Results from 2006 Wildlife Surveys. Prepared for POWER Engineers, Boise, Idaho, and Wind Hunter, LLC., Grapevine, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. December 8, 2006.

Western EcoSystems Technology, Inc. (WEST). 2007. Wildlife and Habitat Baseline Study for the Vantage Wind Power Project, Kittitas County, Washington. Draft report prepared for Invenergy by Western EcoSystems Technology, Inc. (WEST), Cheyenne Wyoming and Walla Walla, Washington. June 2007.

Western EcoSystems Technology, Inc. (WEST) and Colorado Plateau Research Station (CPRS). 2006. Avian Studies for the Proposed Sunshine Wind Park, Coconino County, Arizona. Prepared for Sunshine Arizona Wind Energy, LLC., Flagstaff, Arizona, by WEST, Cheyenne, Wyoming, and the CPRS, Northern Arizona University, Flagstaff, Arizona. May 2006.

Western EcoSystems Technology, Inc. (WEST), EDAW, Inc., and Bloom Biological, Inc. 2007. Baseline Avian Use and Risk Assessment for the Homestead Wind Energy Project, Kern County, California. 2005 – 2006. Prepared for Horizon Wind Energy by Western EcoSystems Technology, Inc. (WEST), EDAW, Inc., San Diego, California, and Bloom Biological, Inc., Santa Anna, California. April 19, 2007.

Whitfield, D.P. and M. Madders. 2006. A Review of the Impacts of Wind Farms on Hen Harriers *Circus cyaneus* and an Estimation of Collision Avoidance Rates. Natural Research Information Note 1 (revised). Natural Research Ltd., Banchory, United Kingdom.

Winkelman, E. 1990. Impact of the Wind Park near Urk, Netherlands, on Birds: Bird Collision Victims and Disturbance of Wintering Fowl. International Ornithological Congress 20: 402-403.

Woodward-Clyde International-Americas, (WCIA) and Western EcoSystems Technology, Inc. (WEST). 1997. Avian Baseline Study for the Vansycle Ridge Project - Vansycle Ridge, Oregon and Wildlife Mortality Studies, Vansycle Wind Project, Washington. Prepared for Esi Vansycle Partners, L.P., North Palm Beach, Florida.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, R.E. Good, and H.H. Sawyer. 2003a. Baseline Avian Studies for the Proposed Hopkins Ridge Wind Project, Columbia County, Washington. Final Report, March 2002 - March 2003. Prepared for RES North America, LLC., Portland, Oregon, by Western EcoSystems Technology, Inc.(WEST), Cheyenne, Wyoming. April 30, 2003.

Young, D.P. Jr., W.P. Erickson, K. Bay, J. Jeffrey, E.G. Lack, and H.H. Sawyer. 2003b. Baseline Avian Studies for the Proposed Desert Claim Wind Power Project, Kittitas County, Washington. Final Report. Prepared for Desert Claim Wind Power, LLC, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 2003.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, K. Bay, and M. Bourassa. 2005. Eurus Combine Hills Turbine Ranch. Phase 1 Post Construction Wildlife Monitoring Final Report February 2004 February 2005. Technical report for Eurus Energy America Corporation and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, K. Bay, R.E. Good, and E.G. Lack. 2003c. Avian and Sensitive Species Baseline Study Plan and Final Report. Eurus Combine Hills Turbine Ranch, Umatilla County, Oregon. Technical report prepared for Eurus Energy America Corporation, San Diego, California and Aeropower Services, Inc., Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. March 10, 2003.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007a. Puget Sound Energy, Hopkins Ridge Wind Project Phase 1, Post-Construction Avian and Bat Monitoring, First Annual Report, January - December 2006. Technical report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for Puget Sound Energy.

Young, D.P. Jr., G.D. Johnson, V.K. Poulton, and K. Bay. 2007b. Ecological Baseline Studies for the Hatchet Ridge Wind Energy Project, Shasta County, California. Prepared for Hatchet Ridge Wind, LLC, Portland, Oregon by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. August 31, 2007. http://www.co.shasta.ca.us/Departments/Resourcemgmt/drm/Hatchet%20Ridge/DEIR/App_C-1.pdf

Young, D.P. Jr., V.K. Poulton, and K. Bay. 2007c. Ecological Baseline Studies Report. Proposed Dry Lake Wind Project, Navajo County, Arizona. Prepared for PPM Energy, Portland, Oregon, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. July 1, 2007.

Table 1. The land cover types, coverage, and composition within the Whistling Ridge Wind Resource Area.

Habitat	Acres	% Composition
Developed, Open Space	97.55	8.5
Developed, Low Intensity	4.91	0.4
Deciduous Forest	2.32	0.2
Evergreen Forest	944.07	82.0
Mixed Forest	0.53	<0.1
Scrub-Shrub	81.32	7.1
Grassland	20.80	1.8
Total	**1,151.49**	**100**

Data from the National Landcover Database (USGS NLCD 2001).

Table 2. Summary of bird use (number of birds/plot/20-min survey), species richness (species/20-min survey), and sample size by season and overall during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Season	Number of Visits	Mean Use	Species Richness	# Species	# Surveys Conducted
Fall 2004	9	14.34	4.02	39	53
Summer 2006	9	15.98	10.84	55	45
Winter 2008/2009	6	1.99	1.16	16	47
Spring 2009	12	9.13	4.54	67	116
Overall	36	9.32	4.51	86	261

Table 3. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

		Fall 2004		Summer 2006		Winter 2008/09		Spring 2009		Total	
Species/Type	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
Waterfowl		**0**	**0**	**0**	**0**	**0**	**0**	**1**	**8**	**1**	**8**
Canada goose	*Branta canadensis*	0	0	0	0	0	0	1	8	1	8
Raptors		**29**	**33**	**10**	**10**	**6**	**7**	**25**	**26**	**70**	**76**
Accipiters		*16*	*16*	*4*	*4*	*1*	*1*	*10*	*10*	*31*	*31*
Cooper's hawk	*Accipiter cooperii*	6	6	0	0	1	1	8	8	15	15
northern goshawk	*Accipiter gentilis*	2	2	3	3	0	0	0	0	5	5
sharp-shinned hawk	*Accipter striatus*	7	7	1	1	0	0	2	2	10	10
unidentified accipiter		1	1	0	0	0	0	0	0	1	1
Buteos		*9*	*13*	*6*	*6*	*3*	*3*	*11*	*12*	*29*	*34*
red-tailed hawk	*Buteo jamaicensis*	6	6	6	6	3	3	11	12	26	27
unidentified buteo		3	7	0	0	0	0	0	0	3	7
Northern Harrier		*1*	*1*	*0*	*0*	*0*	*0*	*1*	*1*	*2*	*2*
northern harrier	*Circus cyaneus*	1	1	0	0	0	0	1	1	2	2
Eagles		*2*	*2*	*0*	*0*	*2*	*3*	*0*	*0*	*4*	*5*
bald eagle	*Haliaeetus leucocephalus*	0	0	0	0	2	3	0	0	2	3
golden eagle	*Aquila chrysaetos*	2	2	0	0	0	0	0	0	2	2
Falcons		*1*	*1*	*0*	*0*	*0*	*0*	*1*	*1*	*2*	*2*
American kestrel	*Falco sparverius*	0	0	0	0	0	0	1	1	1	1
prairie falcon	*Falco mexicanus*	1	1	0	0	0	0	0	0	1	1
Owls		*0*	*0*	*0*	*0*	*0*	*0*	*2*	*2*	*2*	*2*
northern saw-whet owl	*Aegolius acadicus*	0	0	0	0	0	0	1	1	1	1
snowy owl	*Bubo scandiacus*	0	0	0	0	0	0	1	1	1	1
Vultures		**4**	**4**	**6**	**14**	**0**	**0**	**10**	**12**	**20**	**30**
turkey vulture	*Cathartes aura*	4	4	6	14	0	0	10	12	20	30
Upland Gamebirds		**1**	**1**	**1**	**1**	**0**	**0**	**12**	**13**	**14**	**15**
ruffed grouse	*Bonasa umbellus*	1	1	1	1	0	0	0	0	2	2
sooty grouse	*Dendragapus fuliginosus*	0	0	0	0	0	0	2	2	2	2
wild turkey	*Meleagris gallopavo*	0	0	0	0	0	0	10	11	10	11

Table 3. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

		Fall 2004		Summer 2006		Winter 2008/09		Spring 2009		Total	
Species/Type	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
Doves/Pigeons		**5**	**29**	**9**	**23**	**0**	**0**	**3**	**4**	**17**	**56**
band-tailed pigeon	*Columba fasciata*	3	27	9	23	0	0	3	4	15	54
mourning dove	*Zenaida macroura*	2	2	0	0	0	0	0	0	2	2
Passerines		**184**	**667**	**482**	**636**	**59**	**85**	**440**	**926**	**1,165**	**2,314**
American crow	*Corvus brachyrhynchos*	0	0	0	0	0	0	3	9	3	9
American goldfinch	*Carduelis tristis*	10	89	5	8	1	1	4	17	20	115
American robin	*Turdus migratorius*	9	44	22	27	9	12	48	149	88	232
barn swallow	*Hirundo rustica*	0	0	0	0	0	0	1	1	1	1
Bewick's wren	*Thryomanes bewickii*	0	0	1	1	0	0	0	0	1	1
black-capped chickadee	*Poecile atricapillus*	6	8	1	1	1	2	2	2	10	13
black-headed grosbeak	*Pheucticus melanocephalus*	0	0	23	25	0	0	11	15	34	40
black-throated gray warbler	*Dendroica nigrescens*	0	0	21	22	0	0	0	0	21	22
brown creeper	*Certhia americana*	0	0	0	0	1	1	3	3	4	4
brown-headed cowbird	*Molothrus ater*	0	0	5	6	0	0	2	3	7	9
Bullock's oriole	*Icterus bullockii*	0	0	0	0	0	0	1	1	1	1
Cassin's finch	*Carpodacus purpureus*	0	0	0	0	0	0	1	1	1	1
Cassin's vireo	*Vireo cassinii*	0	0	2	2	0	0	0	0	2	2
cedar waxwing	*Bombycilla cedrorum*	0	0	4	10	0	0	0	0	4	10
chestnut-backed chickadee	*Poecile rufescens*	1	1	12	21	2	2	7	16	22	40
chipping sparrow	*Spizella passerina*	0	0	7	8	0	0	2	2	9	10
Clark's nutcracker	*Nucifraga columbiana*	1	1	0	0	0	0	0	0	1	1
common raven	*Corvus corax*	34	59	5	5	31	37	36	43	106	144
dark-eyed junco	*Junco hyemalis*	23	116	23	30	0	0	45	123	91	269
evening grosbeak	*Coccothraustes vespertinus*	0	0	2	9	0	0	1	14	3	23
golden-crowned kinglet	*Regulus satrapa*	10	13	1	1	2	3	4	14	17	31
golden-crowned sparrow	*Zonotrichia atricapilla*	2	20	0	0	0	0	0	0	2	20

Table 3. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

		Fall 2004		Summer 2006		Winter 2008/09		Spring 2009		Total	
Species/Type	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
gray jay	*Perisoreus canadensis*	0	0	0	0	0	0	2	6	2	6
Hammond's flycatcher	*Empidonax hammondii*	0	0	5	5	0	0	1	1	6	6
hermit thrush	*Catharus guttatus*	0	0	2	2	0	0	5	6	7	8
hermit warbler	*Dendrocia occidentalis*	0	0	0	0	0	0	9	12	9	12
house wren	*Troglodytes aedon*	0	0	3	5	0	0	1	1	4	6
lazuli bunting	*Passerina amoena*	0	0	7	7	0	0	4	13	11	20
Lincoln's sparrow	*Melospiza lincolnii*	1	1	0	0	0	0	0	0	1	1
Macgillivray's warbler	*Oporornis tolmiei*	0	0	*27*	33	0	0	6	8	33	41
mountain chickadee	*Poecile gambeli*	1	2	0	0	0	0	1	1	2	3
Nashville warbler	*Vermivora ruficapilla*	0	0	2	2	0	0	7	10	9	12
northern rough-winged swallow	*Stelgidopteryx serripennis*	0	0	2	2	0	0	0	0	2	2
olive-sided flycatcher	*Contopus cooperi*	0	0	21	21	0	0	5	6	26	27
orange-crowned warbler	*Vermivora celata*	0	0	5	6	0	0	7	8	12	14
pacific-slope flycatcher	*Empidonac difficilis*	0	0	0	0	0	0	2	4	2	4
pine siskin	*Carduelis pinus*	0	0	3	11	0	0	5	13	8	24
purple finch	*Carpodacus purpureus*	1	2	14	20	0	0	1	6	16	28
red crossbill	*Loxia curvirostra*	4	30	9	48	0	0	1	8	14	86
red-breasted nuthatch	*Sitta canadensis*	11	12	11	12	6	6	18	24	46	54
red-winged blackbird	*Agelaius phoeniceus*	0	0	0	0	0	0	4	7	4	7
ruby-crowned kinglet	*Regulus calendula*	3	3	2	2	0	0	2	3	7	8
Say's phoebe	*Sayornis saya*	0	0	0	0	0	0	1	1	1	1
song sparrow	*Melospiza melodia*	1	1	0	0	1	1	1	2	3	4
spotted towhee	*Pipilo maculatus*	5	5	34	35	0	0	16	20	55	60
Steller's jay	*Cyanocitta stelleri*	31	76	12	16	4	5	27	41	74	138
Swainson's thrush	*Catharus ustulatus*	0	0	11	12	0	0	0	0	11	12
Townsend's solitaire	*Myadestes townsendi*	0	0	2	2	0	0	8	9	10	11
Townsend's warbler	*Dendroica townsendi*	0	0	13	14	0	0	0	0	13	14

Table 3. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

		Fall 2004		Summer 2006		Winter 2008/09		Spring 2009		Total	
Species/Type	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
tree swallow	*Tachycineta bicolor*	3	15	0	0	0	0	4	8	7	23
unidentified empidonax		0	0	1	1	0	0	0	0	1	1
unidentified finch		0	0	0	0	1	15	0	0	1	15
unidentified passerine		5	28	2	2	0	0	0	0	7	30
unidentified warbler		0	0	1	1	0	0	0	0	1	1
varied thrush	*Ixoreus naevius*	5	14	0	0	0	0	8	14	13	28
violet-green swallow	*Tachycineta thalassina*	0	0	3	4	0	0	13	38	16	42
warbling vireo	*Vireo gilvus*	0	0	10	10	0	0	1	1	11	11
western bluebird	*Sialia mexicana*	4	27	1	1	0	0	11	26	16	54
western tanager	*Piranga ludoviciana*	1	1	38	41	0	0	18	24	57	66
western wood-pewee	*Contopus virens*	0	0	11	12	0	0	3	3	14	15
white-breasted nuthatch	*Sitta carolinenis*	0	0	0	0	0	0	10	13	10	13
white-crowned sparrow	*Zonotrichia leucophrys*	3	58	57	93	0	0	38	80	98	231
willow flycatcher	*Empidonax traillii*	0	0	8	9	0	0	0	0	8	9
Wilson's warbler	*Wilsonia pusilla*	0	0	16	16	0	0	2	2	18	18
yellow warbler	*Dendroica petechia*	0	0	1	1	0	0	0	0	1	1
yellow-rumped warbler	*Dendroica coronata*	9	41	14	14	0	0	27	94	50	149
Other Birds		**15**	**29**	**28**	**35**	**5**	**5**	**70**	**93**	**118**	**162**
downy woodpecker	*Picoides pubescens*	0	0	1	1	1	1	1	1	3	3
hairy woodpecker	*Picoides villosus*	2	2	6	8	0	0	10	11	18	21
northern flicker	*Colaptes auratus*	4	6	12	15	2	2	22	25	40	48
pileated woodpecker	*Dryocopus pileatus*	6	6	0	0	2	2	7	7	15	15
red-breasted sapsucker	*Sphyrapicus ruber*	0	0	0	0	0	0	22	29	22	29
rufous hummingbird	*Selasphorus rufus*	0	0	7	7	0	0	5	8	12	15
unidentified hummingbird		0	0	0	0	0	0	1	1	1	1
Vaux's swift	*Chaetura vauxi*	3	15	2	4	0	0	2	11	7	30
Unidentified Birds		**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**2**	**2**

Table 3. Total number of individuals and groups for each bird type and species, by season and overall, during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

		Fall 2004		Summer 2006		Winter 2008/09		Spring 2009		Total	
Species/Type	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs	# grps	# obs
unidentified bird		0	0	0	0	2	2	0	0	2	2
Overall		**238**	**763**	**536**	**719**	**72**	**99**	**561**	**1,082**	**1,407**	**2,663**

Table 4. Mean bird use (number of birds/plot/20-min survey), percent of total composition (%), and frequency of occurrence (%) for each bird type and species by season during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species/Type	Use				% Composition				% Frequency			
	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009
Waterfowl	**0**	**0**	**0**	**0.07**	**0**	**0**	**0**	**0.8**	**0**	**0**	**0**	**0.9**
Canada goose	0	0	0	0.07	0	0	0	0.8	0	0	0	0.9
Raptors	**0.63**	**0.22**	**0.17**	**0.16**	**4.4**	**1.4**	**8.4**	**1.8**	**34.8**	**22.2**	**13.3**	**12.9**
Accipiters	*0.31*	*0.09*	*0.03*	*0.08*	*2.1*	*0.6*	*1.7*	*0.8*	*25.2*	*8.9*	*3.3*	*7.7*
Cooper's hawk	0.12	0	0.03	0.06	0.8	0	1.7	0.7	11.9	0	3.3	6.0
northern goshawk	0.04	0.07	0	0	0.3	0.4	0	0	4.1	6.7	0	0
sharp-shinned hawk	0.13	0.02	0	0.02	0.9	0.1	0	0.2	7.4	2.2	0	1.7
unidentified accipiter	0.02	0	0	0	0.1	0	0	0	1.9	0	0	0
Buteos	*0.24*	*0.13*	*0.05*	*0.05*	*1.7*	*0.8*	*2.5*	*0.6*	*15.2*	*13.3*	*5.0*	*3.4*
red-tailed hawk	0.11	0.13	0.05	0.05	0.8	0.8	2.5	0.6	11.5	13.3	5.0	3.4
unidentified buteo	0.13	0	0	0	0.9	0	0	0	5.6	0	0	0
Northern Harrier	*0.02*	*0*	*0*	*0.01*	*0.1*	*0*	*0*	*0.1*	*1.9*	*0*	*0*	*0.8*
northern harrier	0.02	0	0	0.01	0.1	0	0	0.1	1.9	0	0	0.8
Eagles	*0.04*	*0*	*0.08*	*0*	*0.3*	*0*	*4.2*	*0*	*4.1*	*0*	*5.0*	*0*
bald eagle	0	0	0.08	0	0	0	4.2	0	0	0	5.0	0
golden eagle	0.04	0	0	0	0.3	0	0	0	4.1	0	0	0
Falcons	*0.02*	*0*	*0*	*0.01*	*0.1*	*0*	*0*	*0.1*	*1.9*	*0*	*0*	*0.8*
American kestrel	0	0	0	0.01	0	0	0	0.1	0	0	0	0.8
prairie falcon	0.02	0	0	0	0.1	0	0	0	1.9	0	0	0
Owls	*0*	*0*	*0*	*0.02*	*0*	*0*	*0*	*0.2*	*0*	*0*	*0*	*1.8*
northern saw-whet owl	0	0	0	0.01	0	0	0	0.1	0	0	0	0.9
snowy owl	0	0	0	0.01	0	0	0	0.1	0	0	0	0.8
Vultures	**0.08**	**0.31**	**0**	**0.08**	**0.5**	**1.9**	**0**	**0.9**	**5.9**	**11.1**	**0**	**6.7**
turkey vulture	0.08	0.31	0	0.08	0.5	1.9	0	0.9	5.9	11.1	0	6.7
Upland Gamebirds	**0.02**	**0.02**	**0**	**0.11**	**0.1**	**0.1**	**0**	**1.2**	**1.9**	**2.2**	**0**	**10.1**
ruffed grouse	0.02	0.02	0	0	0.1	0.1	0	0	1.9	2.2	0	0
sooty grouse	0	0	0	0.02	0	0	0	0.2	0	0	0	1.7

Table 4. Mean bird use (number of birds/plot/20-min survey), percent of total composition (%), and frequency of occurrence (%) for each bird type and species by season during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species/Type	Use				% Composition				% Frequency			
	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009
wild turkey	0	0	0	0.09	0	0	0	1.0	0	0	0	8.4
Doves/Pigeons	**0.54**	**0.51**	**0**	**0.03**	**3.7**	**3.2**	**0**	**0.4**	**9.3**	**17.8**	**0**	**2.6**
band-tailed pigeon	0.50	0.51	0	0.03	3.5	3.2	0	0.4	5.6	17.8	0	2.6
mourning dove	0.04	0	0	0	0.3	0	0	0	3.7	0	0	0
Passerines	**12.53**	**14.13**	**1.69**	**7.88**	**87.4**	**88.5**	**84.6**	**86.4**	**94.4**	**100.0**	**58.3**	**91.9**
American crow	0	0	0	0.08	0	0	0	0.9	0	0	0	2.7
American goldfinch	1.71	0.18	0.02	0.14	12.0	1.1	0.8	1.6	17.4	11.1	1.7	3.3
American robin	0.81	0.60	0.23	1.31	5.7	3.8	11.7	14.4	14.8	46.7	16.7	41.4
barn swallow	0	0	0	0.01	0	0	0	0.1	0	0	0	0.8
Bewick's wren	0	0.02	0	0	0	0.1	0	0	0	2.2	0	0
black-capped chickadee	0.15	0.02	0.03	0.02	1.0	0.1	1.7	0.2	11.1	2.2	1.7	1.8
black-headed grosbeak	0	0.56	0	0.13	0	3.5	0	1.4	0	44.4	0	9.2
black-throated gray warbler	0	0.49	0	0	0	3.1	0	0	0	46.7	0	0
brown-headed cowbird	0	0.13	0	0.03	0	0.8	0	0.3	0	11.1	0	1.7
brown creeper	0	0	0.02	0.03	0	0	0.8	0.3	0	0	1.7	2.5
Bullock's oriole	0	0	0	0.01	0	0	0	0.1	0	0	0	0.8
Cassin's finch	0	0	0	0.01	0	0	0	0.1	0	0	0	0.8
Cassin's vireo	0	0.04	0	0	0	0.3	0	0	0	4.4	0	0
cedar waxwing	0	0.22	0	0	0	1.4	0	0	0	8.9	0	0
chestnut-backed chickadee	0.02	0.47	0.05	0.14	0.1	2.9	2.5	1.6	1.9	26.7	5.0	6.0
chipping sparrow	0	0.18	0	0.02	0	1.1	0	0.2	0	15.6	0	1.7
Clark's nutcracker	0.02	0	0	0	0.1	0	0	0	1.9	0	0	0
common raven	1.12	0.11	0.69	0.34	7.8	0.7	34.8	3.7	48.9	11.1	36.0	22.9
dark-eyed junco	2.19	0.67	0	1.09	15.2	4.2	0	12.0	41.5	48.9	0	36.2
evening grosbeak	0	0.20	0	0.12	0	1.3	0	1.3	0	4.4	0	0.8
golden-crowned kinglet	0.25	0.02	0.07	0.12	1.7	0.1	3.6	1.3	19.3	2.2	4.8	3.3
golden-crowned sparrow	0.37	0	0	0	2.6	0	0	0	3.7	0	0	0

Table 4. Mean bird use (number of birds/plot/20-min survey), percent of total composition (%), and frequency of occurrence (%) for each bird type and species by season during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species/Type	Use				% Composition				% Frequency			
	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009
gray jay	0	0	0	0.05	0	0	0	0.5	0	0	0	1.7
Hammond's flycatcher	0	0.11	0	0.01	0	0.7	0	0.1	0	11.1	0	0.8
hermit thrush	0	0.04	0	0.05	0	0.3	0	0.5	0	4.4	0	4.2
hermit warbler	0	0	0	0.10	0	0	0	1.1	0	0	0	7.5
house wren	0	0.11	0	0.01	0	0.7	0	0.1	0	6.7	0	0.8
lazuli bunting	0	0.16	0	0.11	0	1.0	0	1.2	0	15.6	0	3.3
Lincoln's sparrow	0.02	0	0	0	0.1	0	0	0	1.9	0	0	0
Macgillivray's warbler	0	0.73	0	0.07	0	4.6	0	0.7	0	48.9	0	5.0
mountain chickadee	0.04	0	0	0.01	0.3	0	0	0.1	1.9	0	0	0.8
Nashville warbler	0	0.04	0	0.08	0	0.3	0	0.9	0	4.4	0	5.8
northern rough-winged swallow	0	0.04	0	0	0	0.3	0	0	0	4.4	0	0
olive-sided flycatcher	0	0.47	0	0.05	0	2.9	0	0.5	0	40.0	0	4.2
orange-crowned warbler	0	0.13	0	0.07	0	0.8	0	0.7	0	11.1	0	5.8
pacific-slope flycatcher	0	0	0	0.03	0	0	0	0.4	0	0	0	1.7
pine siskin	0	0.24	0	0.11	0	1.5	0	1.2	0	6.7	0	4.2
purple finch	0.04	0.44	0	0.05	0.3	2.8	0	0.5	1.9	31.1	0	0.8
red-breasted nuthatch	0.22	0.27	0.10	0.20	1.5	1.7	5.0	2.2	20.4	24.4	10.0	15.4
red-winged blackbird	0	0	0	0.06	0	0	0	0.6	0	0	0	3.3
red crossbill	0.56	1.07	0	0.07	3.9	6.7	0	0.7	7.4	20.0	0	0.8
ruby-crowned kinglet	0.06	0.04	0	0.03	0.4	0.3	0	0.3	5.6	4.4	0	1.7
Say's phoebe	0	0	0	0.01	0	0	0	0.1	0	0	0	0.8
song sparrow	0.02	0	0.02	0.02	0.1	0	0.8	0.2	1.9	0	1.7	0.8
spotted towhee	0.10	0.78	0	0.17	0.7	4.9	0	1.8	10.0	64.4	0	13.3
Steller's jay	1.42	0.36	0.10	0.35	9.9	2.2	4.9	3.9	47.0	26.7	7.4	22.2
Swainson's thrush	0	0.27	0	0	0	1.7	0	0	0	24.4	0	0
Townsend's solitaire	0	0.04	0	0.08	0	0.3	0	0.8	0	4.4	0	6.7
Townsend's warbler	0	0.31	0	0	0	1.9	0	0	0	24.4	0	0

Table 4. Mean bird use (number of birds/plot/20-min survey), percent of total composition (%), and frequency of occurrence (%) for each bird type and species by season during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species/Type	Use				% Composition				% Frequency			
	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009
tree swallow	0.30	0	0	0.07	2.1	0	0	0.7	4.1	0	0	3.3
unidentified empidonax	0	0.02	0	0	0	0.1	0	0	0	2.2	0	0
unidentified finch	0	0	0.36	0	0	0	17.9	0	0	0	2.4	0
unidentified passerine	0.52	0.04	0	0	3.6	0.3	0	0	9.3	4.4	0	0
unidentified warbler	0	0.02	0	0	0	0.1	0	0	0	2.2	0	0
varied thrush	0.26	0	0	0.12	1.8	0	0	1.3	9.3	0	0	6.9
violet-green swallow	0	0.09	0	0.32	0	0.6	0	3.5	0	6.7	0	11.1
warbling vireo	0	0.22	0	0.01	0	1.4	0	0.1	0	22.2	0	0.8
western bluebird	0.50	0.02	0	0.23	3.5	0.1	0	2.5	5.6	2.2	0	9.5
western tanager	0.02	0.91	0	0.20	0.1	5.7	0	2.2	1.9	75.6	0	15.0
western wood-pewee	0	0.27	0	0.03	0	1.7	0	0.3	0	24.4	0	2.5
white-breasted nuthatch	0	0	0	0.11	0	0	0	1.2	0	0	0	8.3
white-crowned sparrow	1.07	2.07	0	0.67	7.5	12.9	0	7.3	5.6	77.8	0	30.8
willow flycatcher	0	0.20	0	0	0	1.3	0	0	0	17.8	0	0
Wilson's warbler	0	0.36	0	0.02	0	2.2	0	0.2	0	35.6	0	1.7
yellow-rumped warbler	0.76	0.31	0	0.78	5.3	1.9	0	8.6	14.8	31.1	0	22.5
yellow warbler	0	0.02	0	0	0	0.1	0	0	0	2.2	0	0
Other Birds	**0.54**	**0.78**	**0.10**	**0.78**	**3.8**	**4.9**	**5.0**	**8.6**	**26.7**	**44.4**	**10.0**	**47.2**
downy woodpecker	0	0.02	0.02	0.01	0	0.1	0.8	0.1	0	2.2	1.7	0.9
hairy woodpecker	0.04	0.18	0	0.09	0.3	1.1	0	1.0	3.7	13.3	0	8.6
northern flicker	0.11	0.33	0.05	0.21	0.8	2.1	2.5	2.3	7.4	26.7	5.0	18.4
pileated woodpecker	0.11	0	0.03	0.06	0.8	0	1.7	0.6	11.5	0	3.3	5.9
red-breasted sapsucker	0	0	0	0.24	0	0	0	2.6	0	0	0	18.3
rufous hummingbird	0	0.16	0	0.07	0	1.0	0	0.7	0	15.6	0	4.2
unidentified hummingbird	0	0	0	0.01	0	0	0	0.1	0	0	0	0.8
Vaux's swift	0.28	0.09	0	0.09	2.0	0.6	0	1.0	4.1	4.4	0	1.7
Unidentified Birds	**0**	**0**	**0.04**	**0**	**0**	**0**	**2.0**	**0**	**0**	**0**	**4.0**	**0**

Table 4. Mean bird use (number of birds/plot/20-min survey), percent of total composition (%), and frequency of occurrence (%) for each bird type and species by season during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species/Type	Use				% Composition				% Frequency			
	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009	Fall 2004	Summer 2006	Winter 2008/09	Spring 2009
unidentified bird	0	0	0.04	0	0	0	2.0	0	0	0	4.0	0
Overall	**14.34**	**15.98**	**1.99**	**9.13**	**100**	**100**	**100**	**100**				

Table 5. Flight height characteristics by bird type during fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Bird Type	# Groups Flying	# Obs Flying	Mean Flight Height (m)	% Obs Flying	% within Flight Height Categories 0-35 m	35-130 m	> 130 m
Waterfowl	1	8	180.00	100	0	0	100
Raptors	52	58	86.96	84.1	15.5	58.6	25.9
Accipiters	*23*	*23*	*68.39*	*76.7*	*21.7*	*65.2*	*13.0*
Buteos	*21*	*26*	*115.57*	*92.9*	*3.8*	*53.8*	*42.3*
Northern Harrier	*2*	*2*	*23.50*	*100*	*100*	*0*	*0*
Eagles	*4*	*5*	*90.00*	*100*	*20.0*	*60.0*	*20.0*
Falcons	*2*	*2*	*57.50*	*100*	*0*	*100*	*0*
Owls	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Vultures	18	28	111.72	100	17.9	53.6	28.6
Upland Gamebirds	1	1	1.00	6.7	100	0	0
Doves/Pigeons	15	34	63.93	60.7	35.3	58.8	5.9
Passerines	384	1,235	29.79	53.6	69.7	29.5	0.8
Other Birds	52	85	18.56	52.5	75.3	24.7	0
Unidentified Birds	0	0	0	0	0	0	0
Overall	**523**	**1,449**	**38.39**	**54.8**	**65.7**	**31.3**	**3.0**

ZOR: The likely "zone of risk" for potential collision with a turbine blade, 35 – 130m or (114-427 ft) above ground level (AGL).

Table 6. Relative exposure index and flight characteristics by species during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within ZOR based on initial obs	Exposure Index	% Within ZOR at anytime
red crossbill	12	0.34	95.3	90.2	0.29	90.2
common raven	67	0.59	72.1	55.1	0.23	68.4
American robin	31	0.73	59.5	31.9	0.14	41.3
western bluebird	15	0.18	98.1	62.3	0.11	67.9
unidentified passerine	6	0.13	96.7	75.9	0.09	75.9
band-tailed pigeon	13	0.22	59.3	59.4	0.08	68.8
tree swallow	7	0.09	100	78.3	0.07	91.3
evening grosbeak	2	0.07	91.3	100	0.06	100
Vaux's swift	7	0.11	100	56.7	0.06	93.3
American goldfinch	18	0.47	96.5	12.6	0.06	12.6
red-tailed hawk	19	0.08	95.2	70.0	0.05	75.0
turkey vulture	18	0.10	100	53.6	0.05	78.6
violet-green swallow	16	0.11	100	45.2	0.05	59.5
pine siskin	8	0.07	100	58.3	0.04	58.3
purple finch	2	0.10	35.7	100	0.04	100
cedar waxwing	3	0.04	90.0	100	0.04	100
Steller's jay	37	0.52	62.3	9.3	0.03	46.5
sharp-shinned hawk	7	0.04	70.0	85.7	0.02	71.4
American crow	3	0.02	100	100	0.02	100
Cooper's hawk	11	0.05	78.6	45.5	0.02	54.5
bald eagle	2	0.03	100	66.7	0.02	66.7
northern goshawk	4	0.02	80.0	100	0.02	100
western tanager	15	0.23	30.3	20.0	0.01	25.0
northern flicker	12	0.16	25.0	25.0	0.01	25.0
northern rough-winged swallow	2	0.01	100	100	0.01	100
chestnut-backed chickadee	5	0.14	35.0	14.3	0.01	14.3
black-headed grosbeak	6	0.14	20.0	25.0	0.01	25.0

Table 6. Relative exposure index and flight characteristics by species during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within ZOR based on initial obs	Exposure Index	% Within ZOR at anytime
golden eagle	2	0.01	100	50.0	<0.01	100
mourning dove	2	0.01	100	50	<0.01	50.0
Clark's nutcracker	1	0.00	100	100	<0.01	100
prairie falcon	1	0.00	100	100	<0.01	100
brown-headed cowbird	3	0.03	33.3	33.3	<0.01	33.3
hairy woodpecker	9	0.07	52.4	9.1	<0.01	9.1
yellow-rumped warbler	25	0.45	65.1	1.0	<0.01	12.4
Townsend's solitaire	6	0.03	63.6	14.3	<0.01	14.3
American kestrel	1	0.00	100	100	<0.01	100
barn swallow	1	0.00	100	100	<0.01	100
dark-eyed junco	37	0.92	68.4	0	0	0
white-crowned sparrow	8	0.81	30.3	0	0	0
spotted towhee	4	0.21	8.3	0	0	0
red-breasted nuthatch	3	0.19	5.6	0	0	0
Macgillivray's warbler	3	0.15	9.8	0	0	0
golden-crowned kinglet	2	0.12	29.0	0	0	0
unidentified finch	1	0.11	100	0	0	0
olive-sided flycatcher	2	0.10	7.4	0	0	50.0
varied thrush	2	0.09	14.3	0	0	50.0
black-throated gray warbler	0	0.09	0	0	0	0
golden-crowned sparrow	0	0.08	0	0	0	0
Wilson's warbler	0	0.07	0	0	0	0
red-breasted sapsucker	10	0.07	51.7	0	0	0
lazuli bunting	4	0.06	55.0	0	0	0
Townsend's warbler	0	0.06	0	0	0	0
western wood-pewee	0	0.06	0	0	0	0
black-capped chickadee	2	0.05	15.4	0	0	0
pileated woodpecker	1	0.05	6.7	0	0	0

Table 6. Relative exposure index and flight characteristics by species during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within ZOR based on initial obs	Exposure Index	% Within ZOR at anytime
Swainson's thrush	0	0.05	0	0	0	0
rufous hummingbird	12	0.05	100	0	0	0
warbling vireo	0	0.04	0	0	0	0
orange-crowned warbler	5	0.04	42.9	0	0	0
chipping sparrow	0	0.04	0	0	0	0
willow flycatcher	0	0.04	0	0	0	0
Nashville warbler	3	0.03	41.7	0	0	0
white-breasted nuthatch	1	0.03	7.7	0	0	0
unidentified buteo	2	0.03	85.7	0	0	0
ruby-crowned kinglet	3	0.03	50	0	0	0
hermit warbler	3	0.03	33.3	0	0	0
wild turkey	0	0.03	0	0	0	0
Hammond's flycatcher	0	0.02	0	0	0	0
house wren	1	0.02	16.7	0	0	0
hermit thrush	0	0.02	0	0	0	0
Canada goose	1	0.02	100	0	0	0
red-winged blackbird	0	0.02	0	0	0	0
song sparrow	1	0.01	50.0	0	0	0
gray jay	2	0.01	100	0	0	0
unidentified bird	0	0.01	0	0	0	0
brown creeper	1	0.01	25.0	0	0	0
downy woodpecker	0	0.01	0	0	0	0
mountain chickadee	1	0.01	66.7	0	0	0
pacific-slope flycatcher	1	0.01	75.0	0	0	0
ruffed grouse	1	0.01	50.0	0	0	0
Cassin's vireo	0	0.01	0	0	0	0
northern harrier	2	0.01	100	0	0	50.0
sooty grouse	0	<0.01	0	0	0	0

Table 6. Relative exposure index and flight characteristics by species during the fixed-point bird use surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within ZOR based on initial obs	Exposure Index	% Within ZOR at anytime
Lincoln's sparrow	0	<0.01	0	0	0	0
unidentified accipiter	1	<0.01	100	0	0	0
Bewick's wren	0	<0.01	0	0	0	0
unidentified empidonax	0	<0.01	0	0	0	0
unidentified warbler	1	<0.01	100	0	0	0
yellow warbler	0	<0.01	0	0	0	0
northern saw-whet owl	0	<0.01	0	0	0	0
Bullock's oriole	1	<0.01	100	0	0	0
Cassin's finch	0	<0.01	0	0	0	0
Say's phoebe	1	<0.01	100	0	0	0
snowy owl	0	<0.01	0	0	0	0
unidentified hummingbird	1	<0.01	100	0	0	0

ZOR: The likely “zone of risk” for potential collision with a turbine blade, or 114-427 ft (35-130 m) above ground level (AGL).

Table 7. Incidental wildlife observed while conducting all surveys at the Whistling Ridge Wind Resource Area, September 11, 2004 - May 29, 2009.

Species	Scientific Name	# grps	# obs
pine siskin	*Carduelis pinus*	1	9
Canada goose	*Branta canadensis*	1	6
red-tailed hawk	*Buteo jamaicensis*	3	4
osprey	*Pandion haliaetus*	1	2
common poorwill	*Phalaenoptilus nuttallii*	1	1
ruffed grouse	*Bonasa umbellus*	1	1
Bird Subtotal	**6 Species**	**8**	**23**
mule deer	*Odocoileus hemionus*	7	43
black-tailed deer	*Odocoileus hemionus columbianus*	4	9
elk	*Cervus elephus*	2	3
Douglas squirrel	*Tamiasciurus douglasii*	1	1
gray squirrel	*Sciurus sp.*	1	1
Mammal Subtotal	**5 Species**	**15**	**57**

Table 8. Summary of sensitive species observed at the Whistling Ridge Wind Resource Area during fixed-point bird use surveys (FP) and as incidental wildlife observations (Inc.), September 11, 2004 – May 29, 2009.

			FP		Inc.		Total	
Species	**Scientific Name**	**Status**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Vaux's swift	*Chaetura vauxi*	SCS	7	30	0	0	7	30
pileated woodpecker	*Dryocopus pileatus*	SCS	15	15	0	0	15	15
northern goshawk	*Accipiter gentilis*	SCS	5	5	0	0	5	5
bald eagle	*Haliaeetus leucocephalus*	SSC	2	3	0	0	2	3
golden eagle	*Aquila chrysaetos*	SCS	2	2	0	0	2	2
gray squirrel	*Sciurus sp.**	ST?	0	0	1	1	1	1
Total	**5 Species**		**31**	**55**	**1**	**1**	**32**	**56**

ST = state threatened; SSC = State species of concern; SCS = State candidate species (Data from WDFW 2009). * The gray squirrel was only observed briefly and was not positively identified as being either a western or eastern gray squirrel.

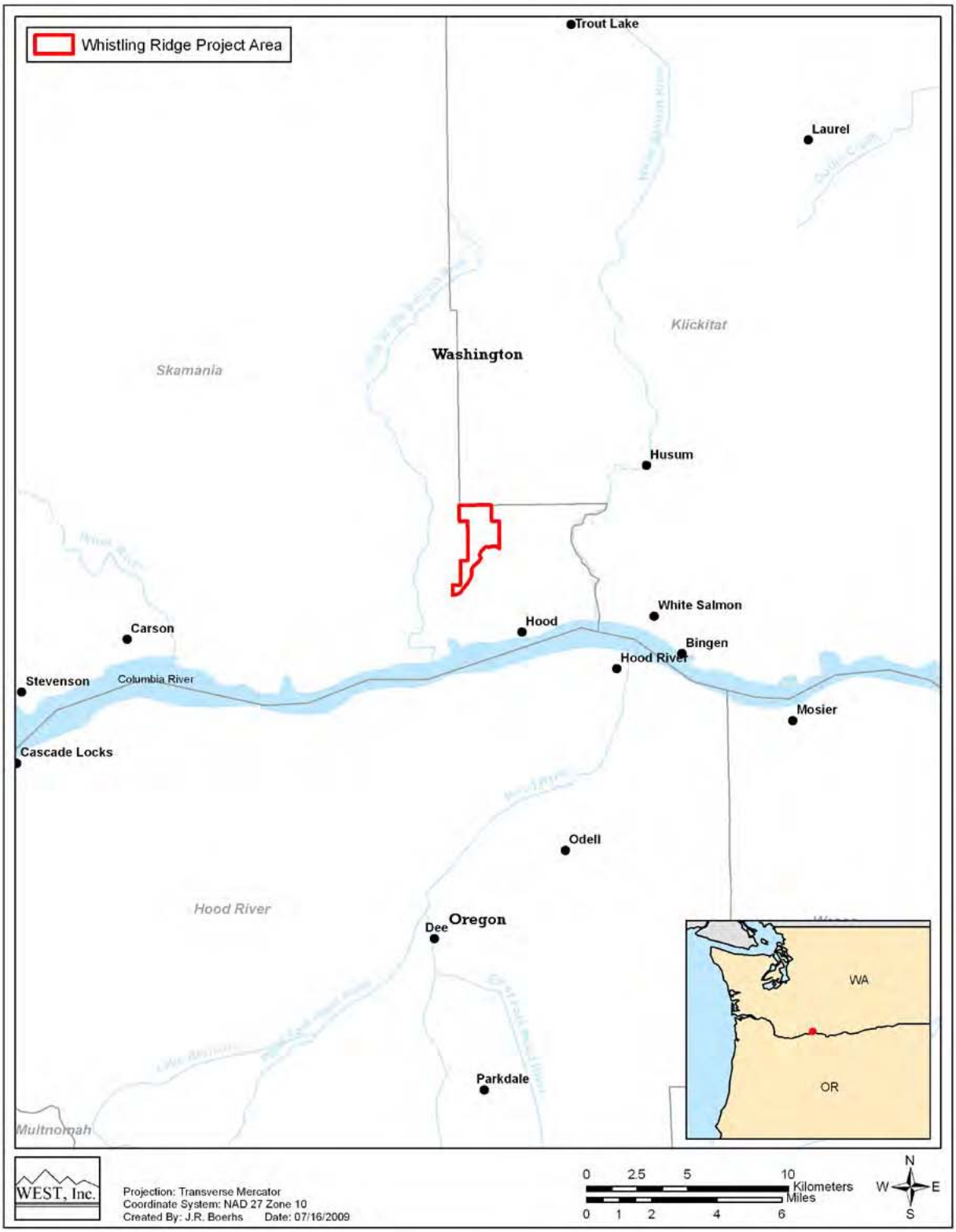


Figure 1. Location of the Whistling Ridge Wind Resource Area.

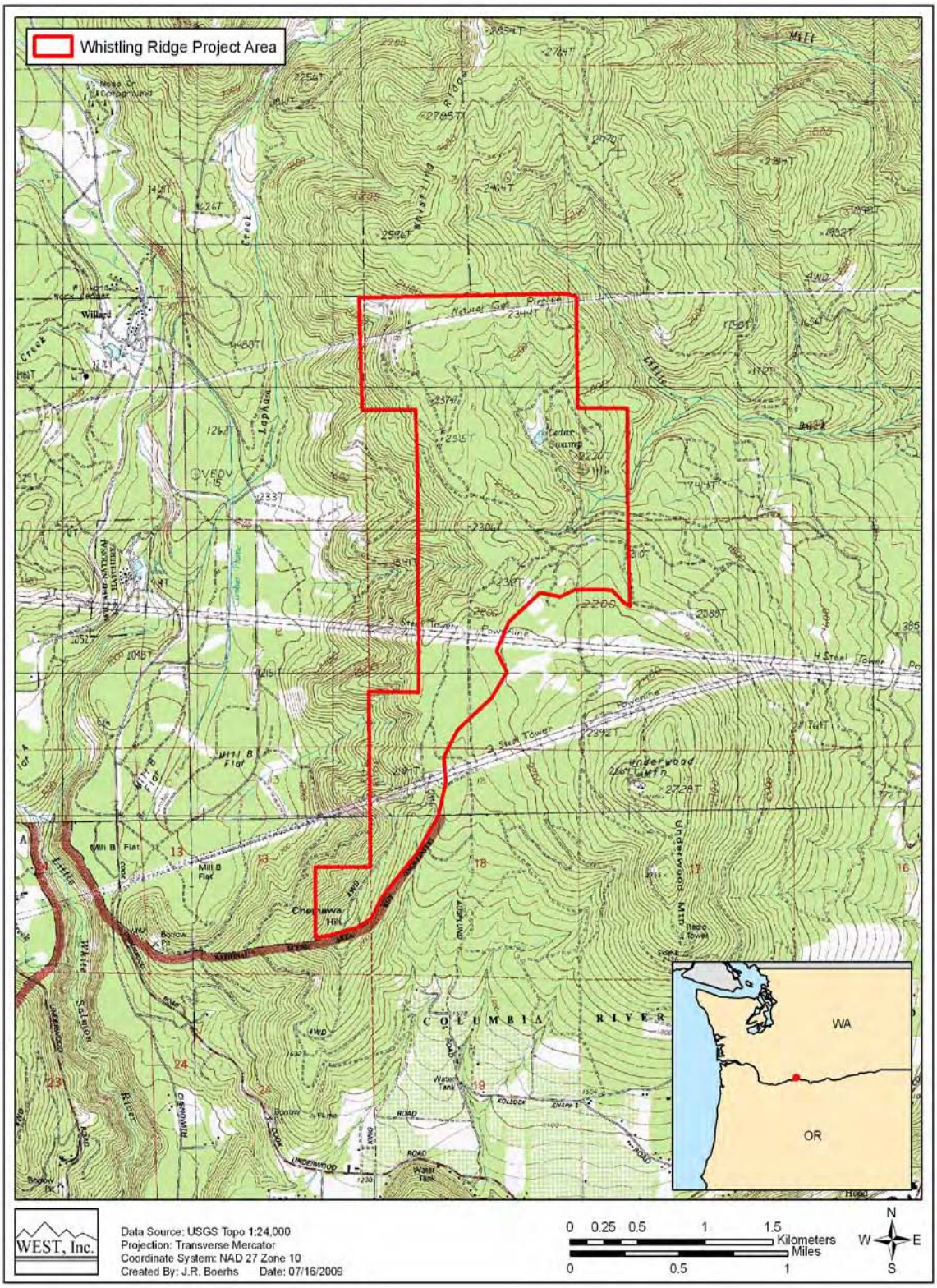


Figure 2. Elevation and topography of the Whistling Ridge Wind Resource Area.

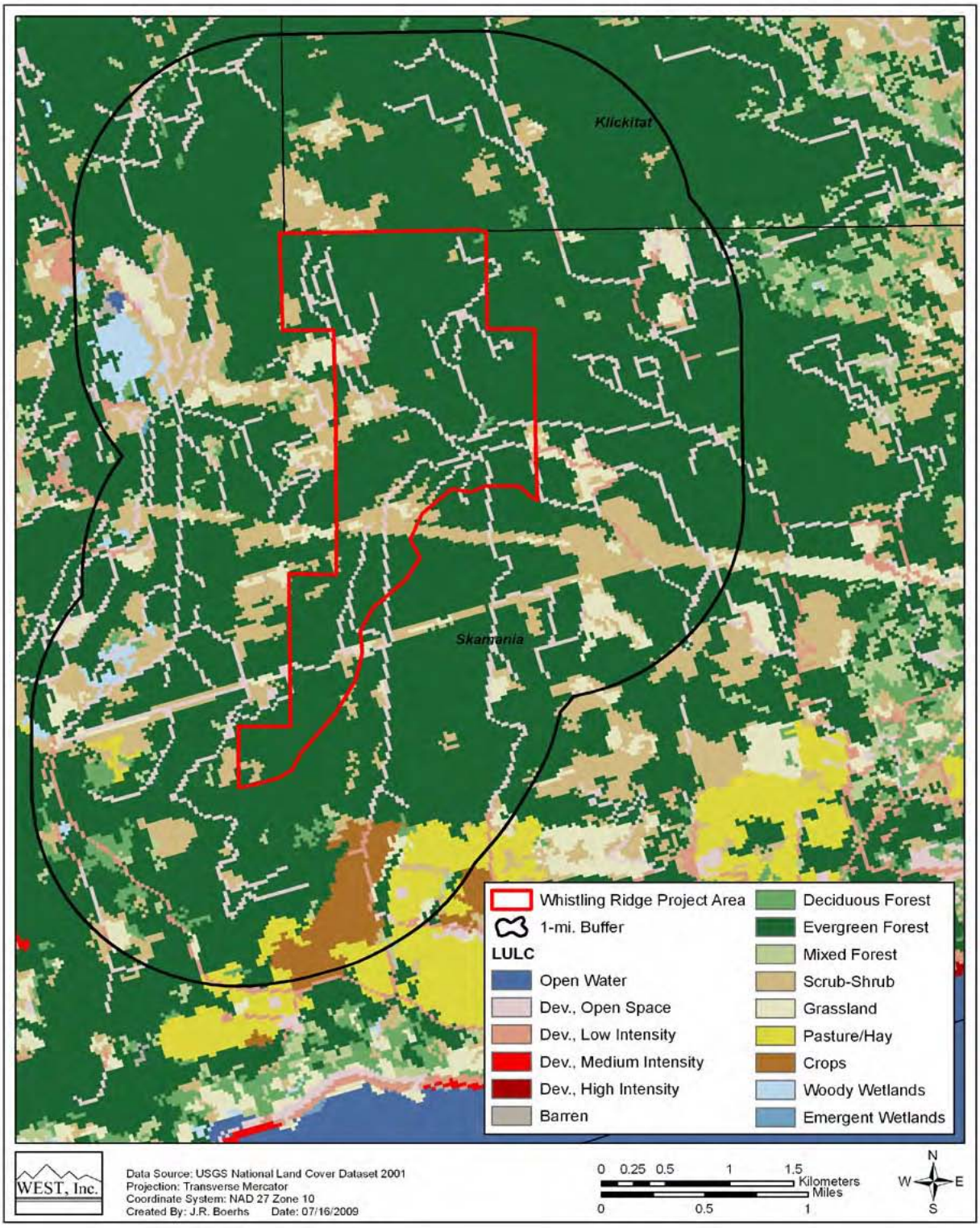


Figure 3. The land cover types and coverage within the Whistling Ridge Wind Resource Area (USGS NLCD 2001).

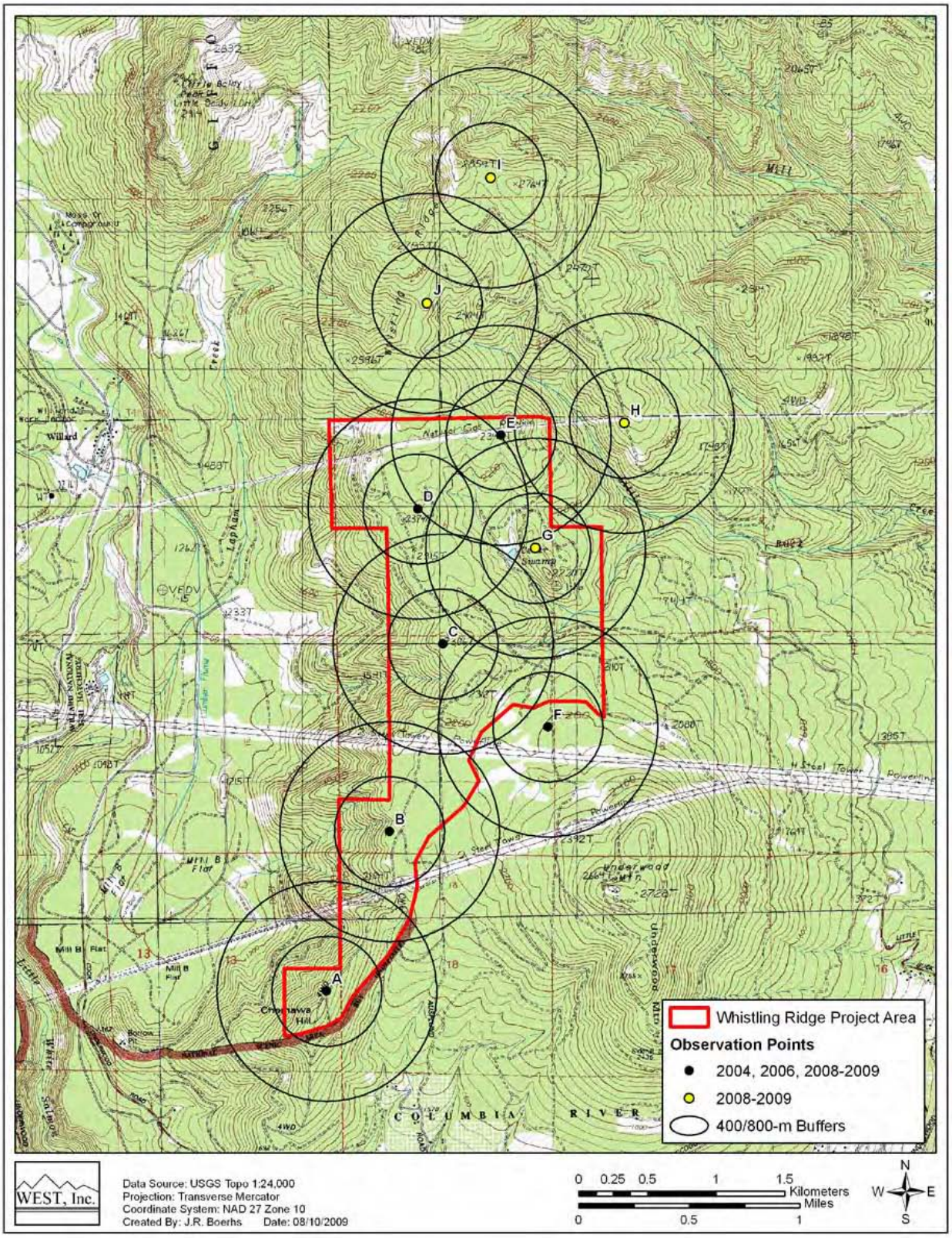


Figure 4. Fixed-point bird use survey points at the Whistling Ridge Wind Resource Area.

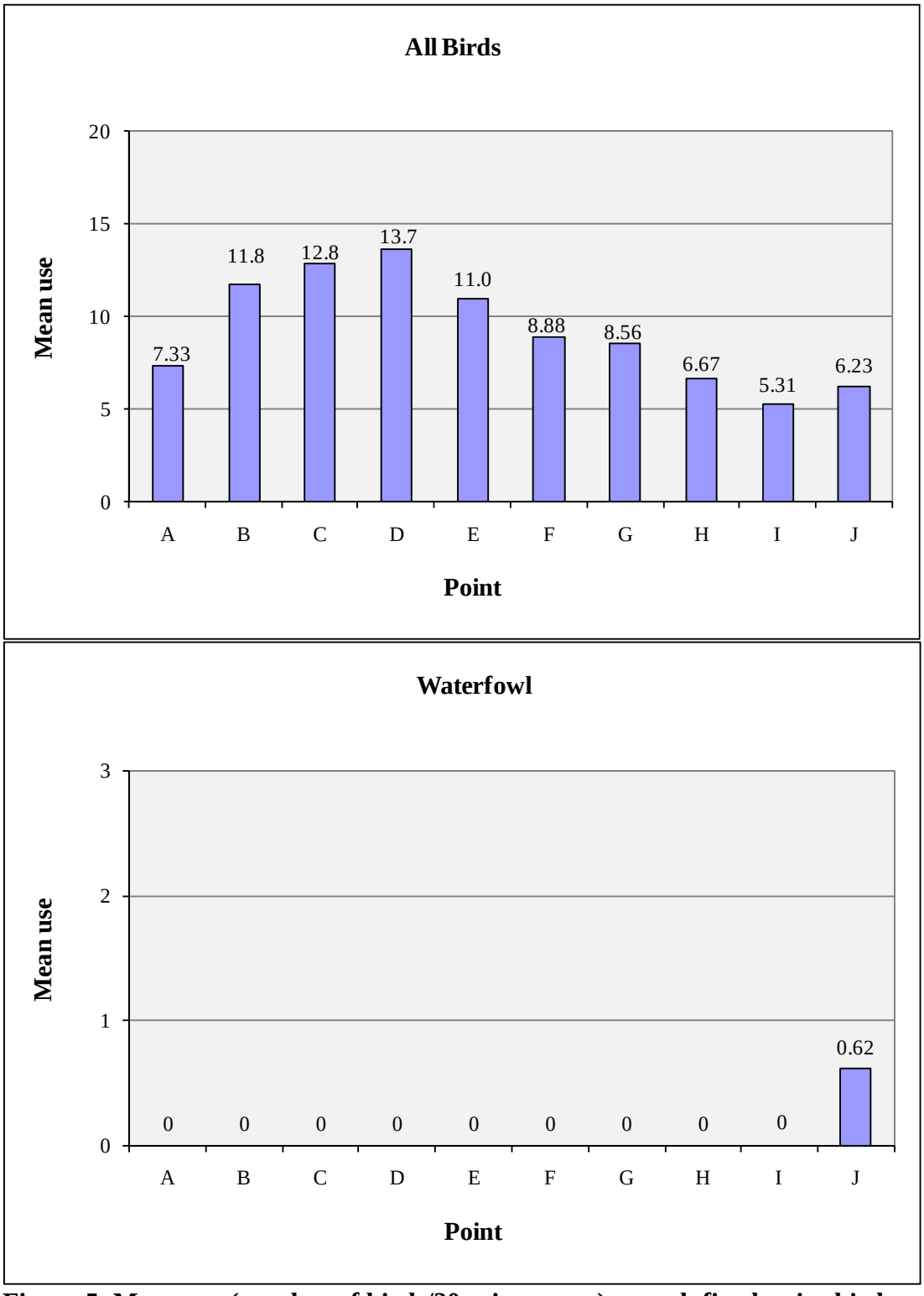


Figure 5. Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds major bird types at the Whistling Ridge Wind Resource Area.

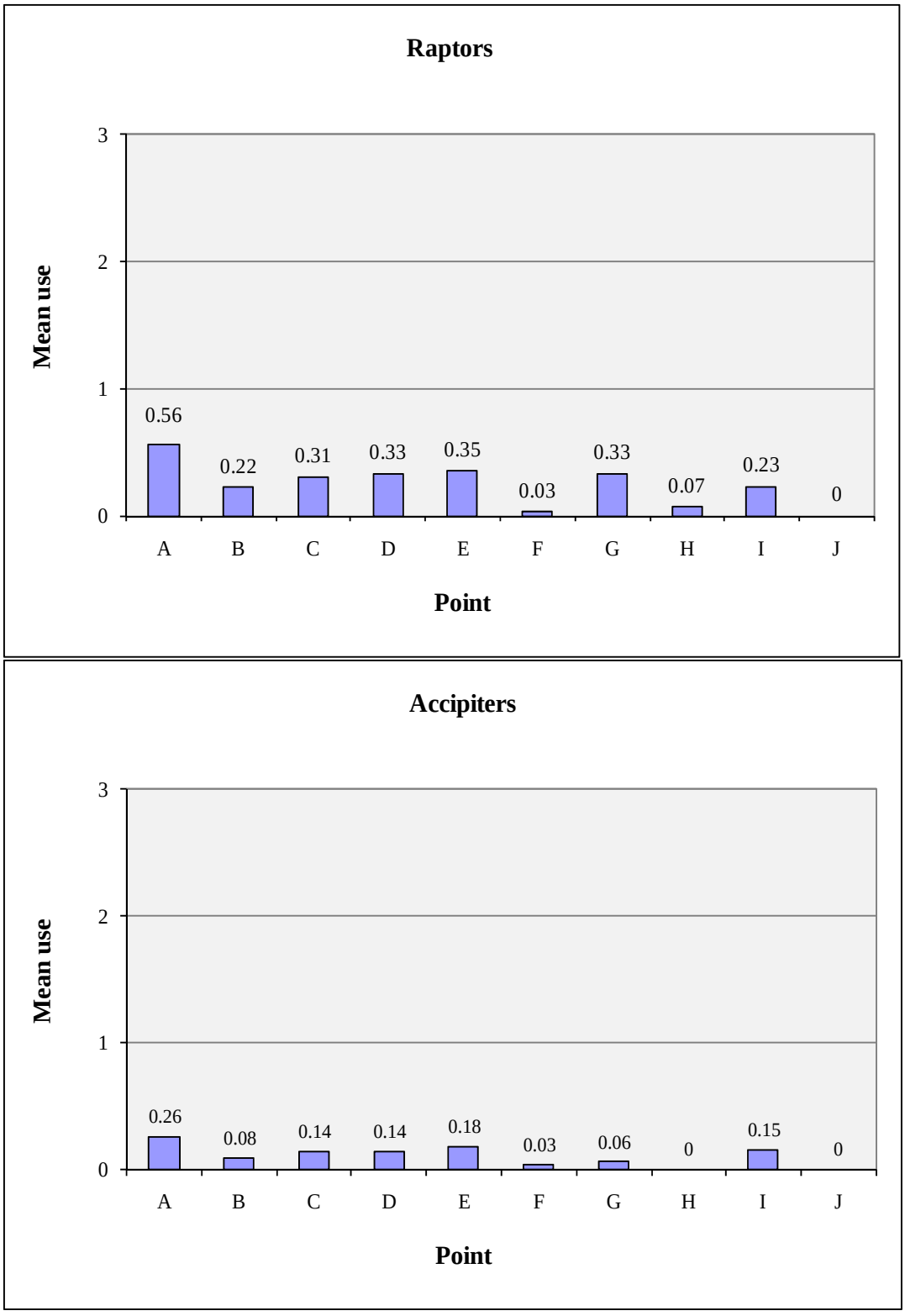


Figure 5 (*continued*). Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds and major bird types at the Whistling Ridge Wind Resource Area.

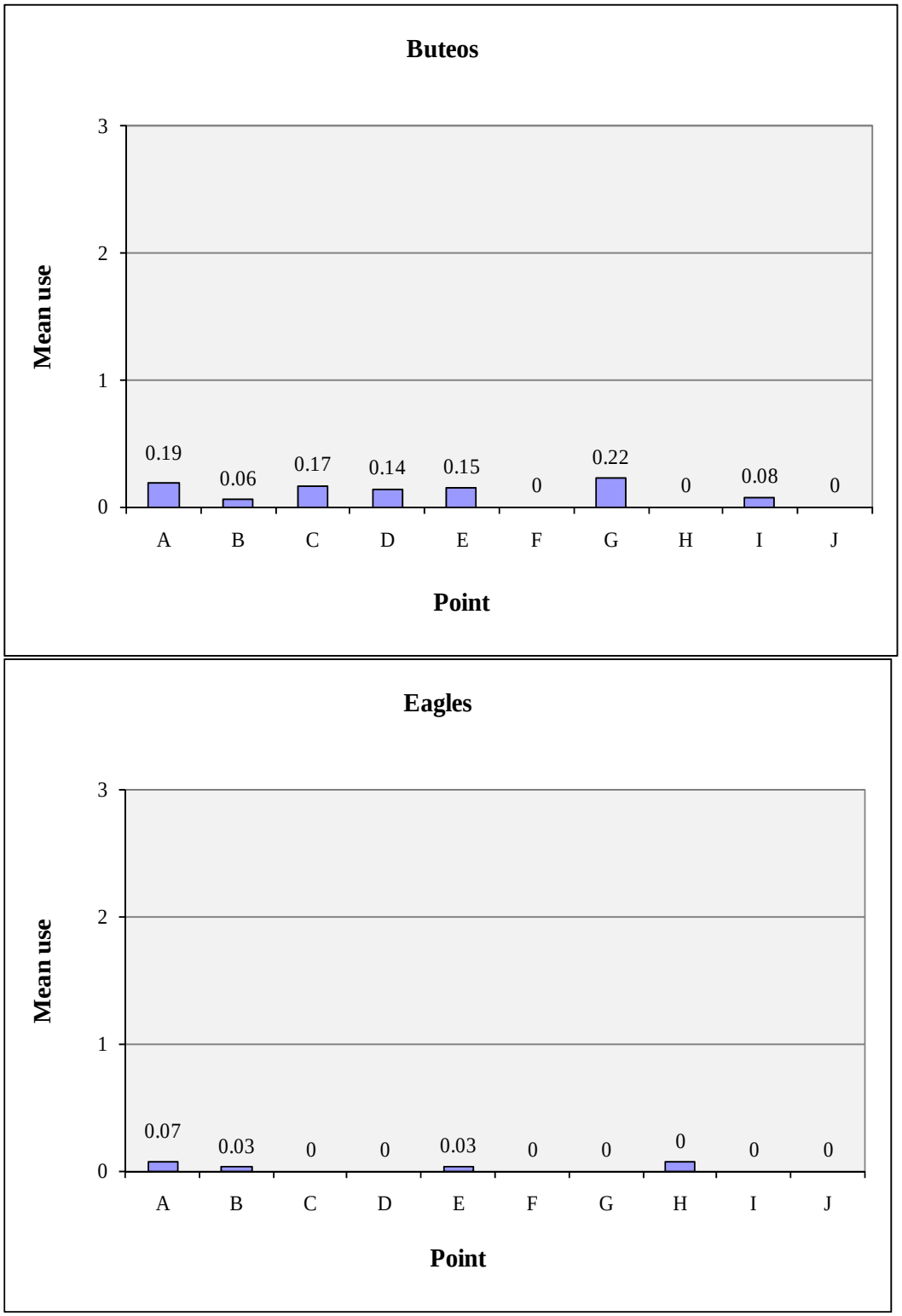


Figure 5 (*continued*). Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds and major bird types at the Whistling Ridge Wind Resource Area.

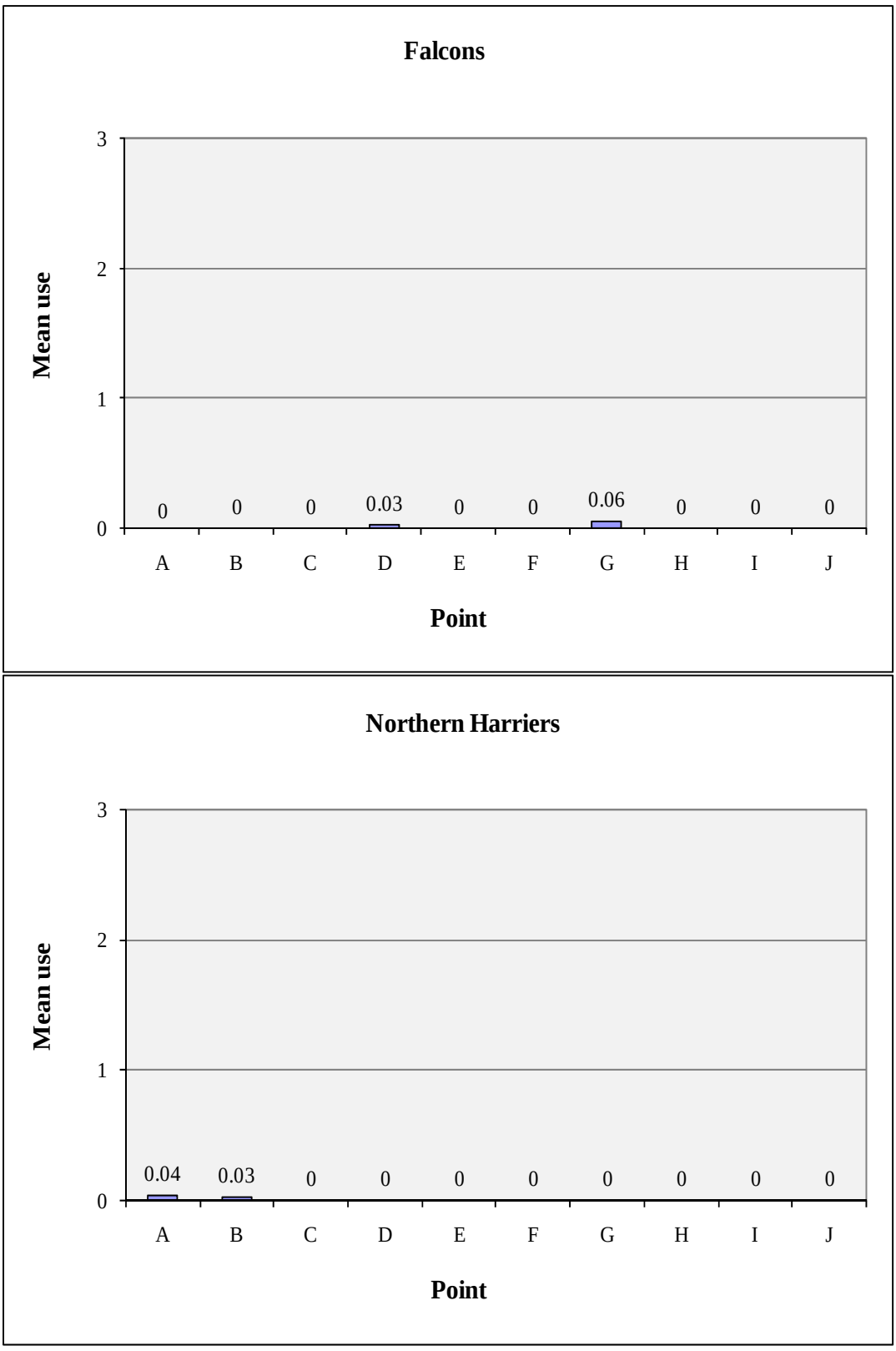


Figure 5 (*continued*). Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds and major bird types at the Whistling Ridge Wind Resource Area.

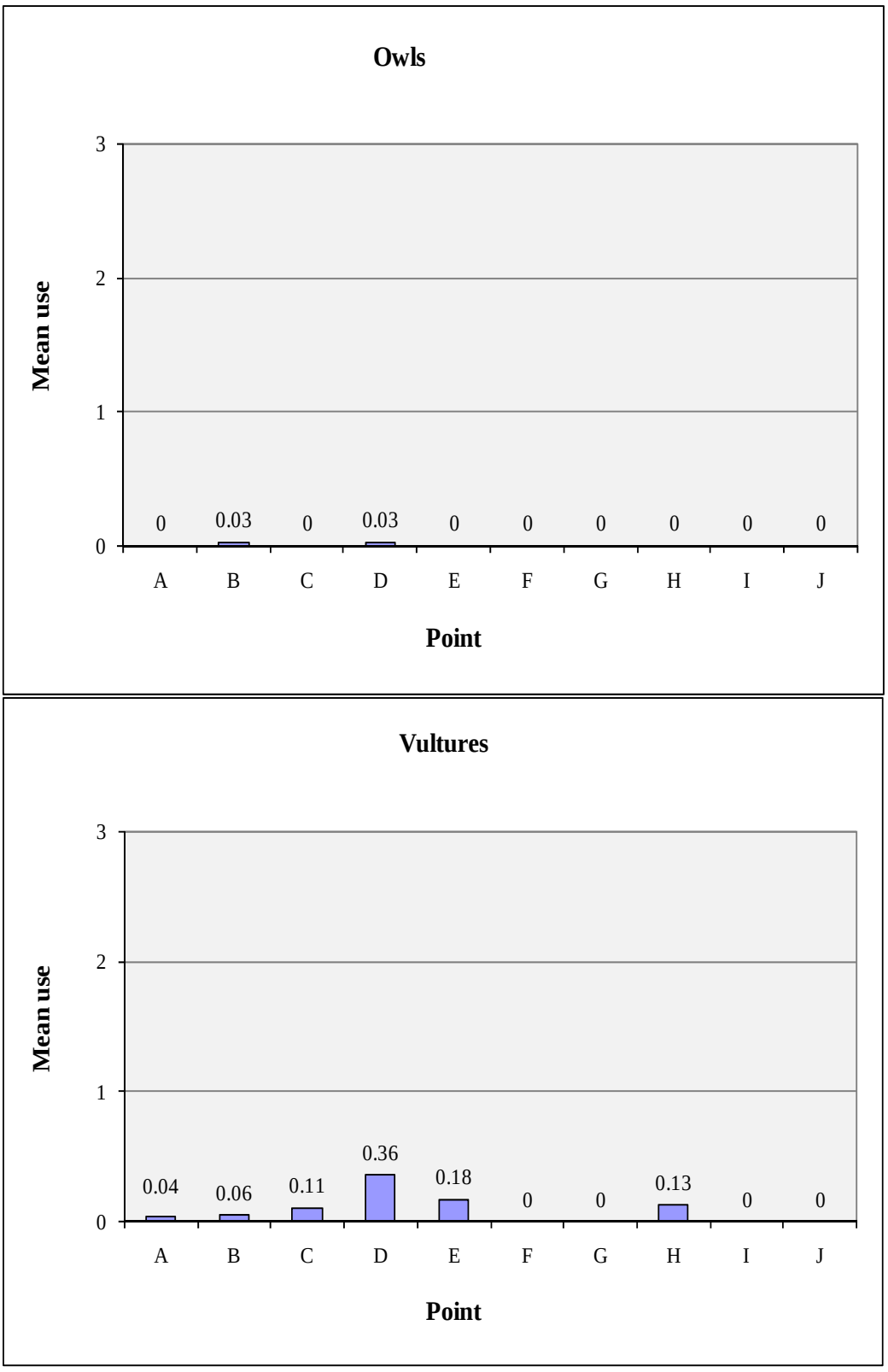
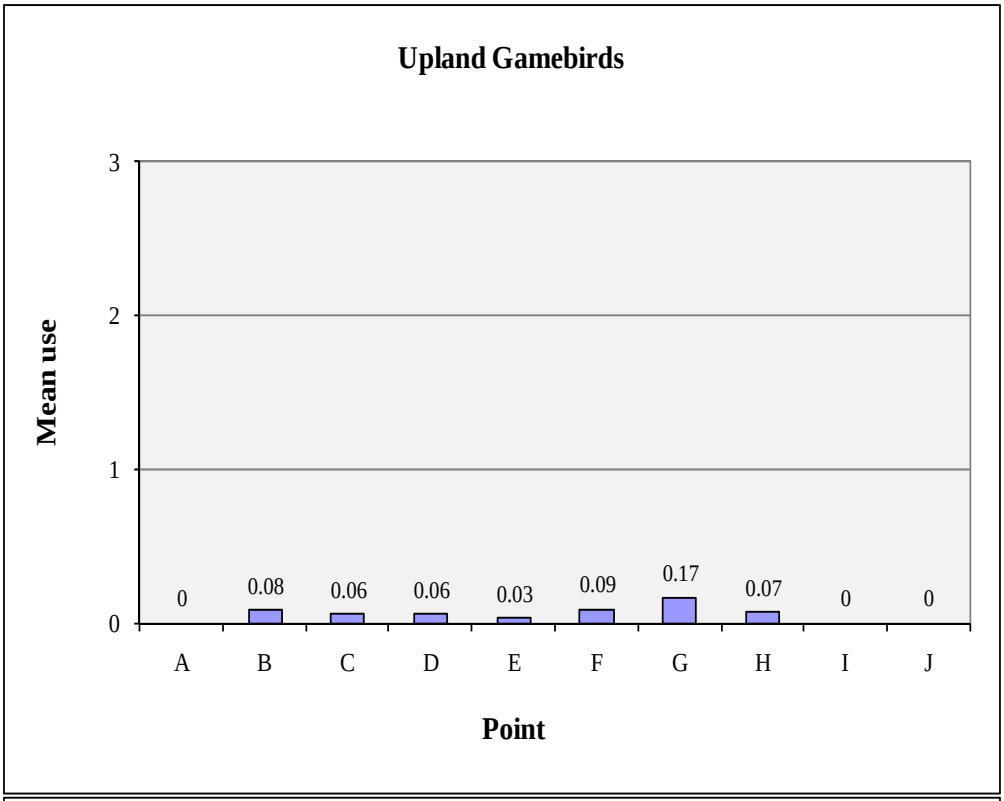


Figure 5 (*continued*). Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds and major bird types at the Whistling Ridge Wind Resource Area.



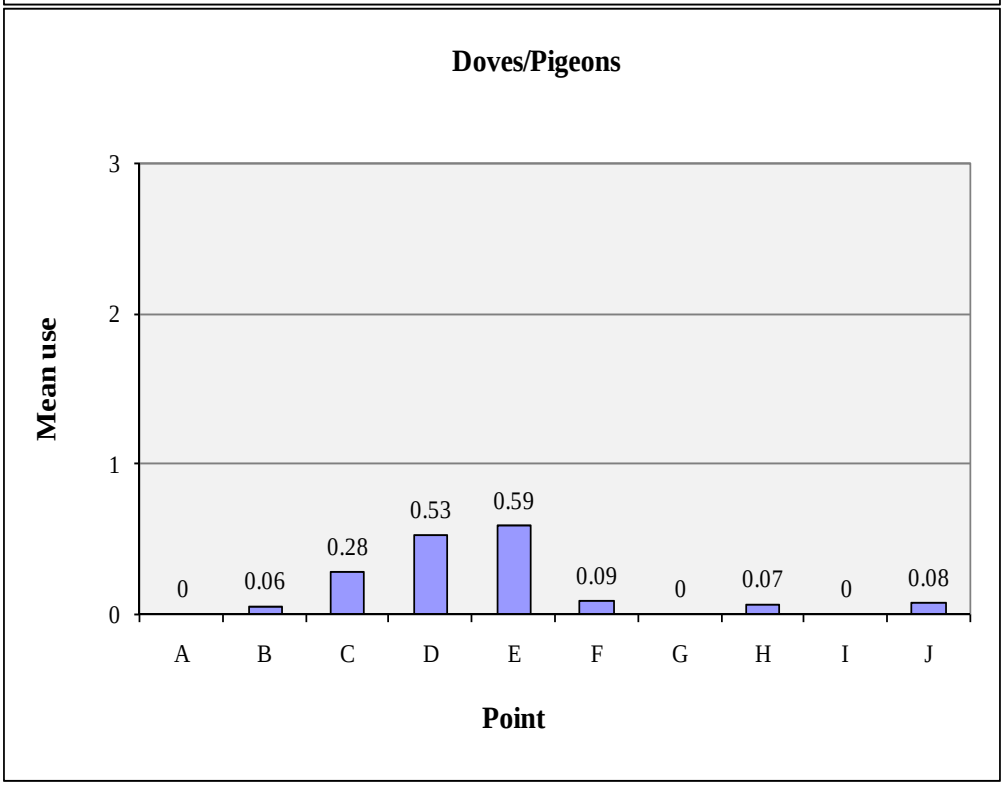
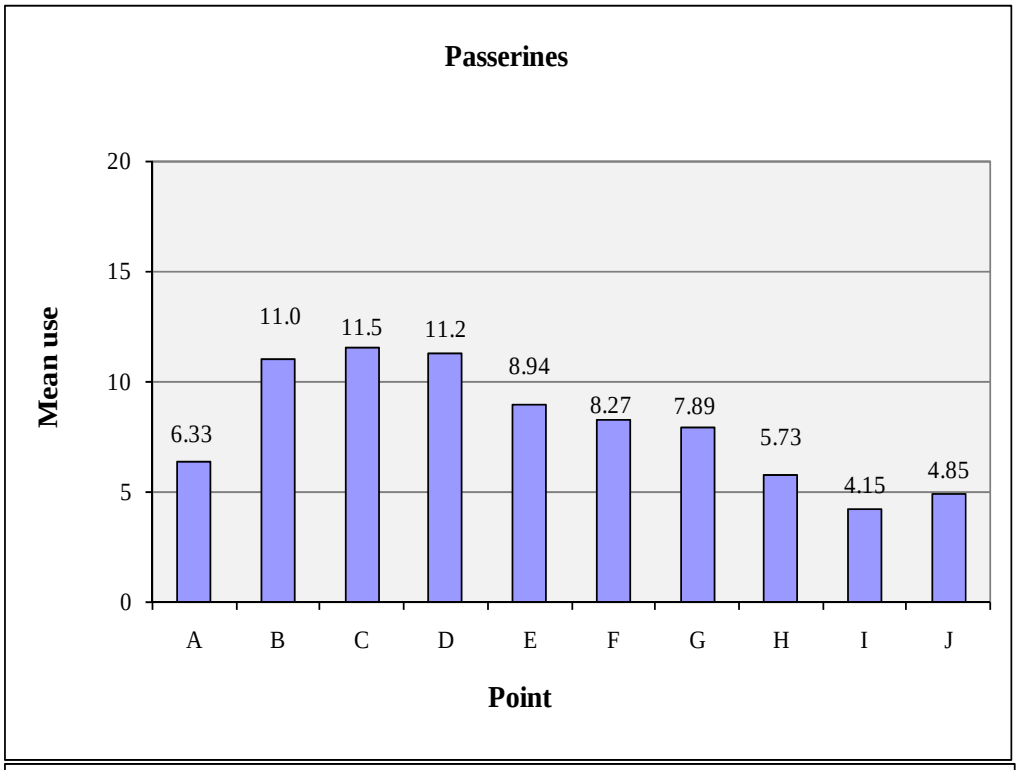


Figure 5 (continued). Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds and major bird types at the Whistling Ridge Wind Resource Area.



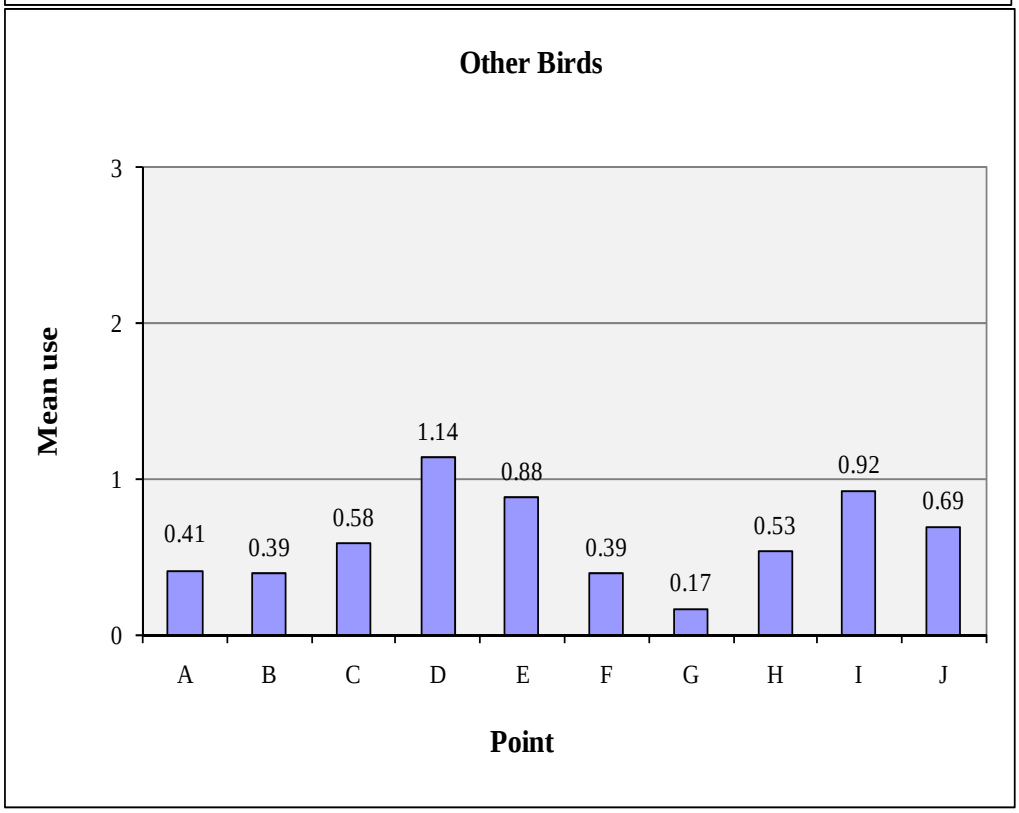


Figure 5 (*continued*). Mean use (number of birds/20-min survey) at each fixed-point bird use survey point for all birds and major bird types at the Whistling Ridge Wind Resource Area.

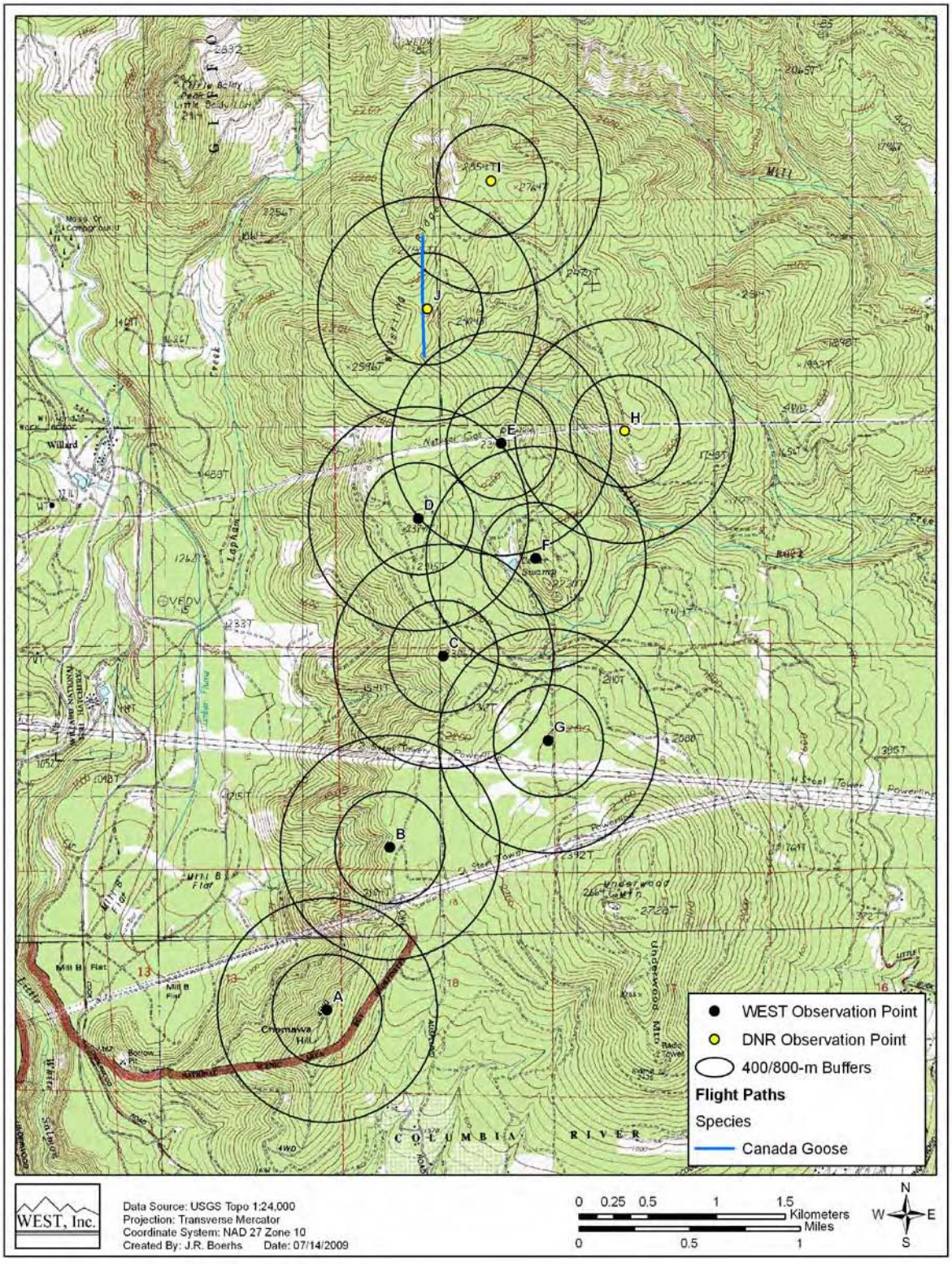


Figure 6a. Flight paths of waterfowl at the Whistling Ridge Wind Resource Area.

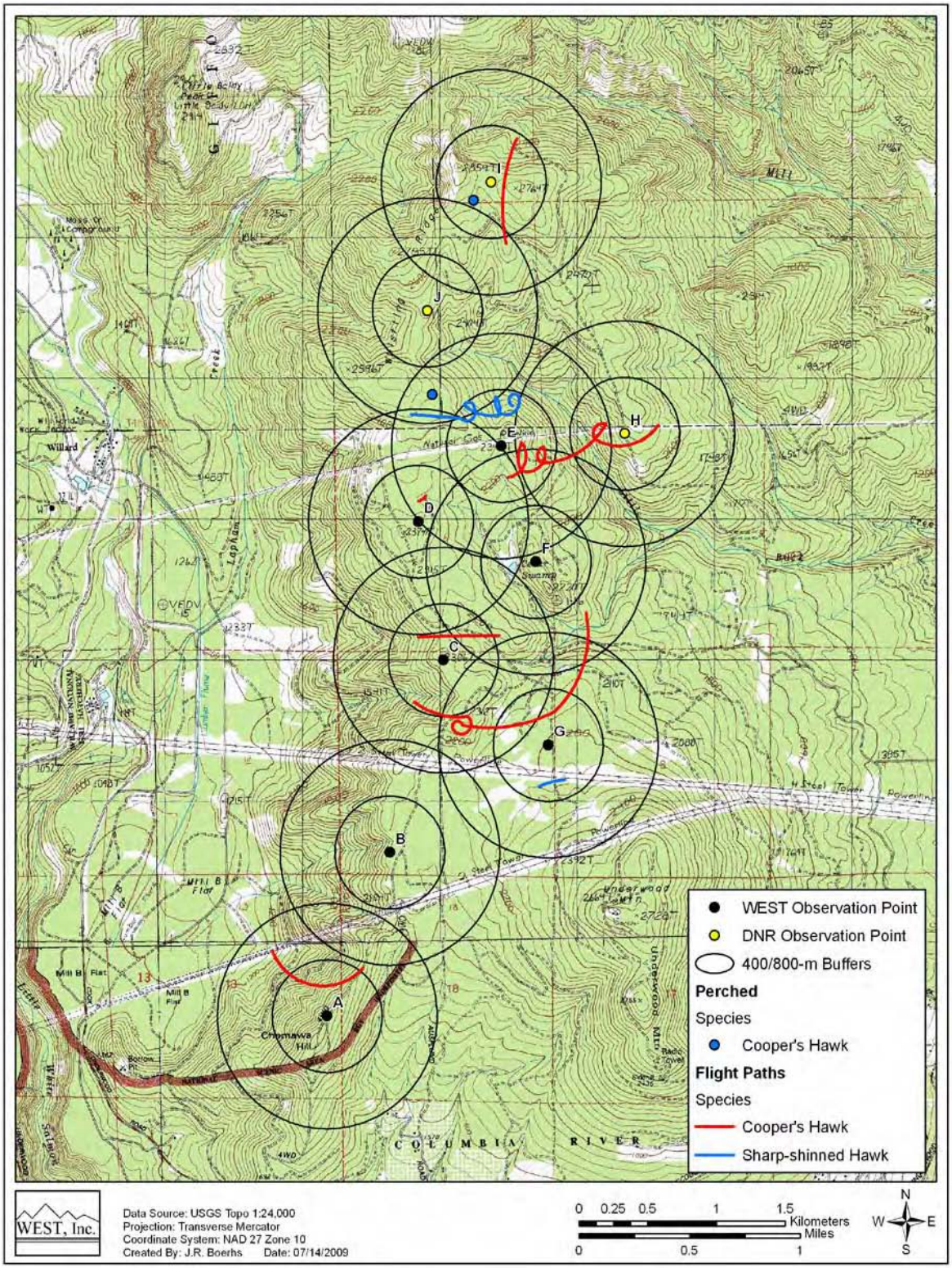


Figure 6b. Flight paths of accipiters at the Whistling Ridge Wind Resource Area.

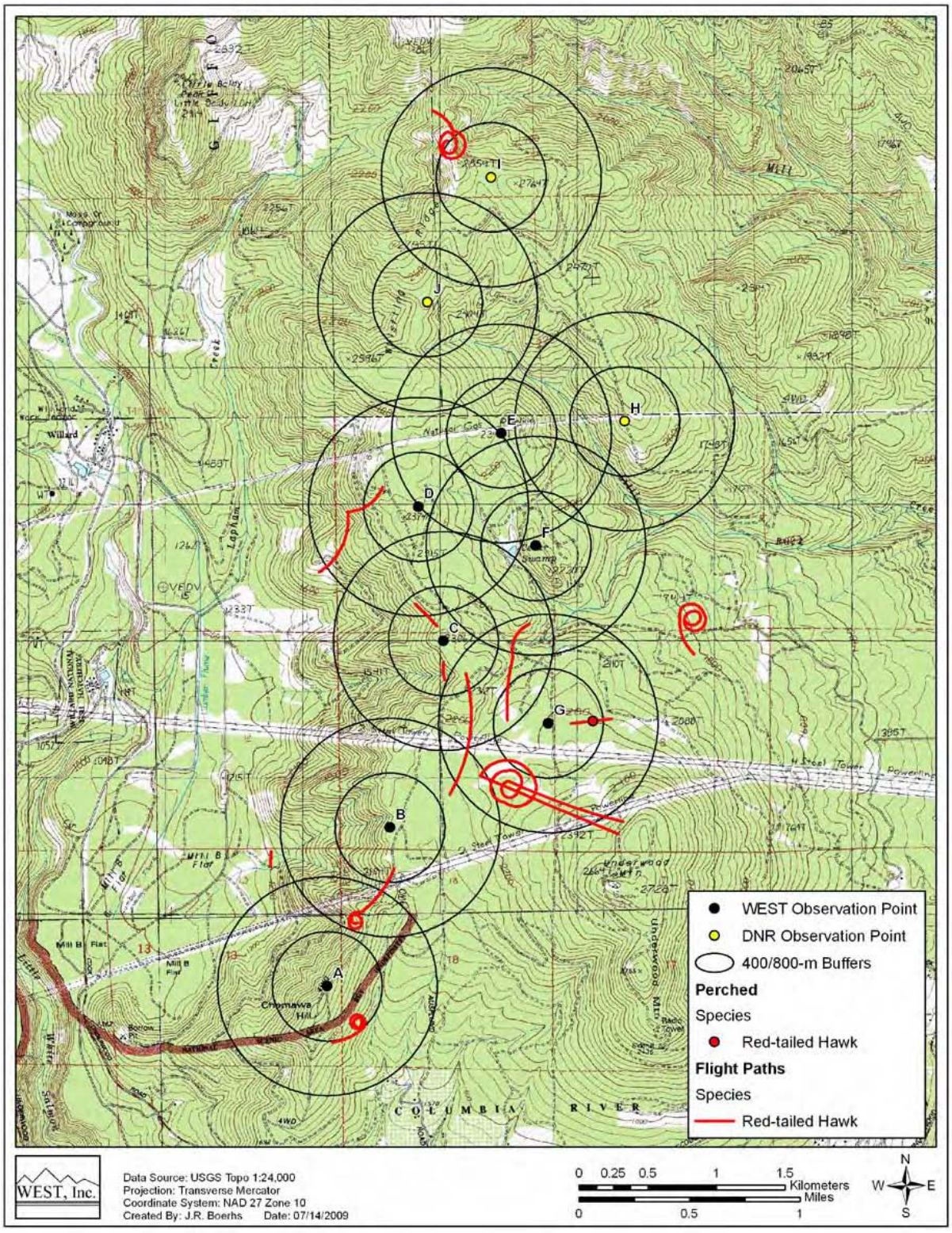


Figure 6c. Flight paths of buteos at the Whistling Ridge Wind Resource Area.

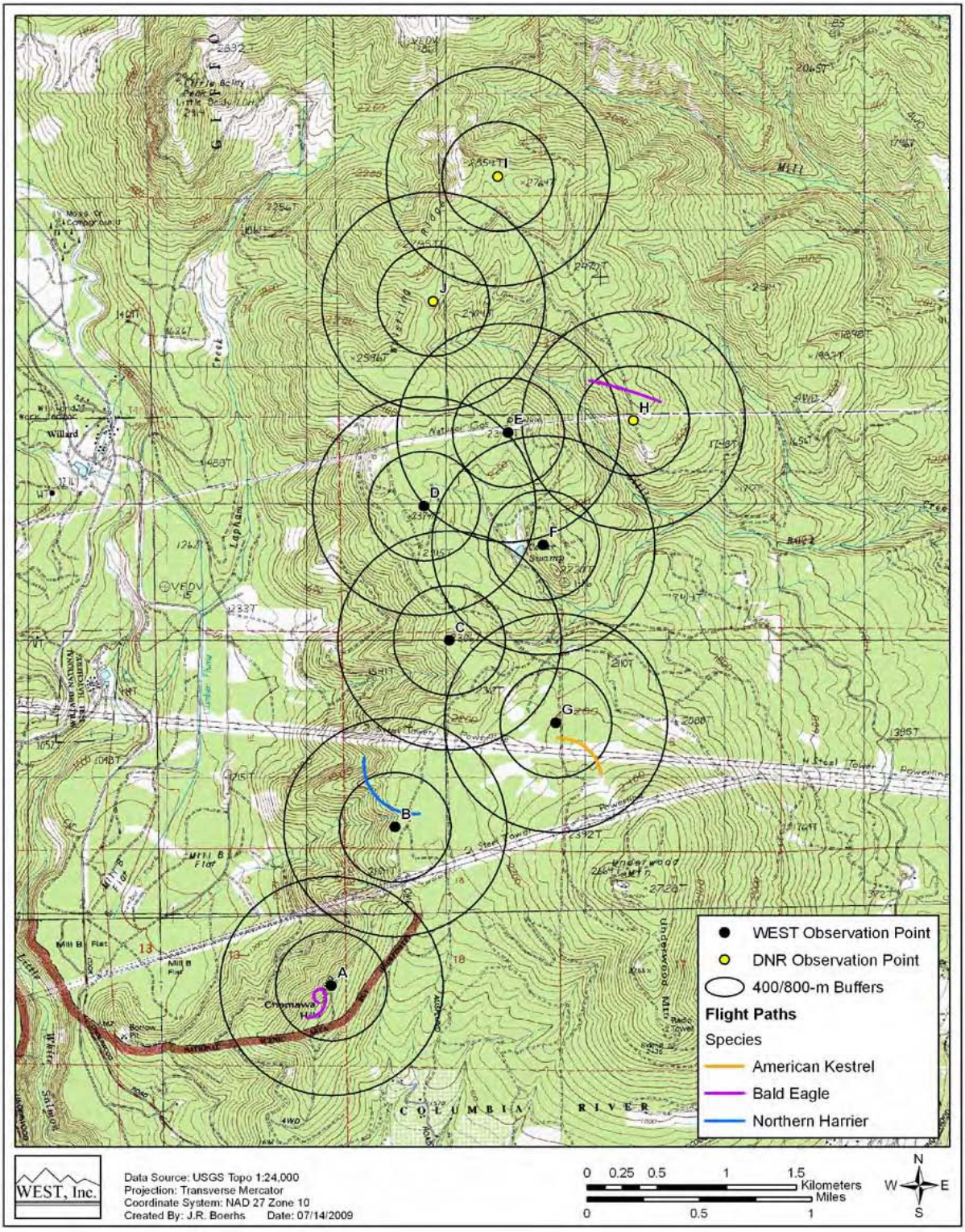


Figure 6d. Flight paths of other raptors at the Whistling Ridge Wind Resource Area.

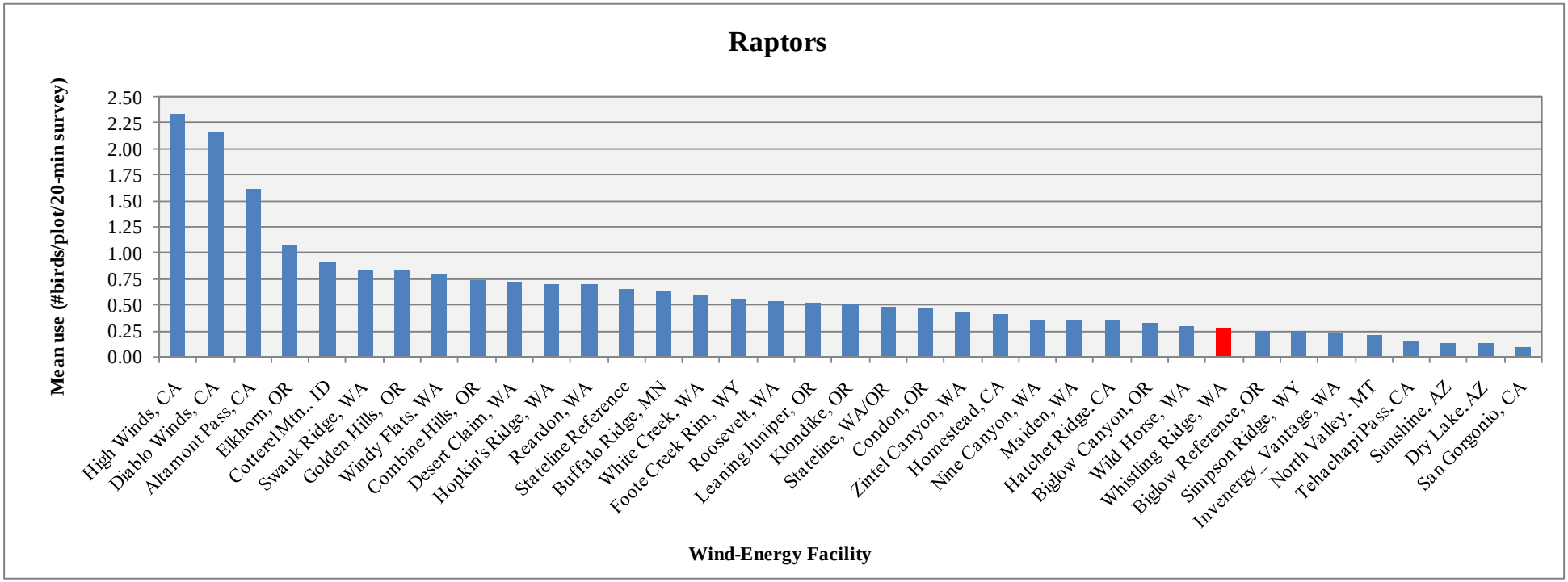
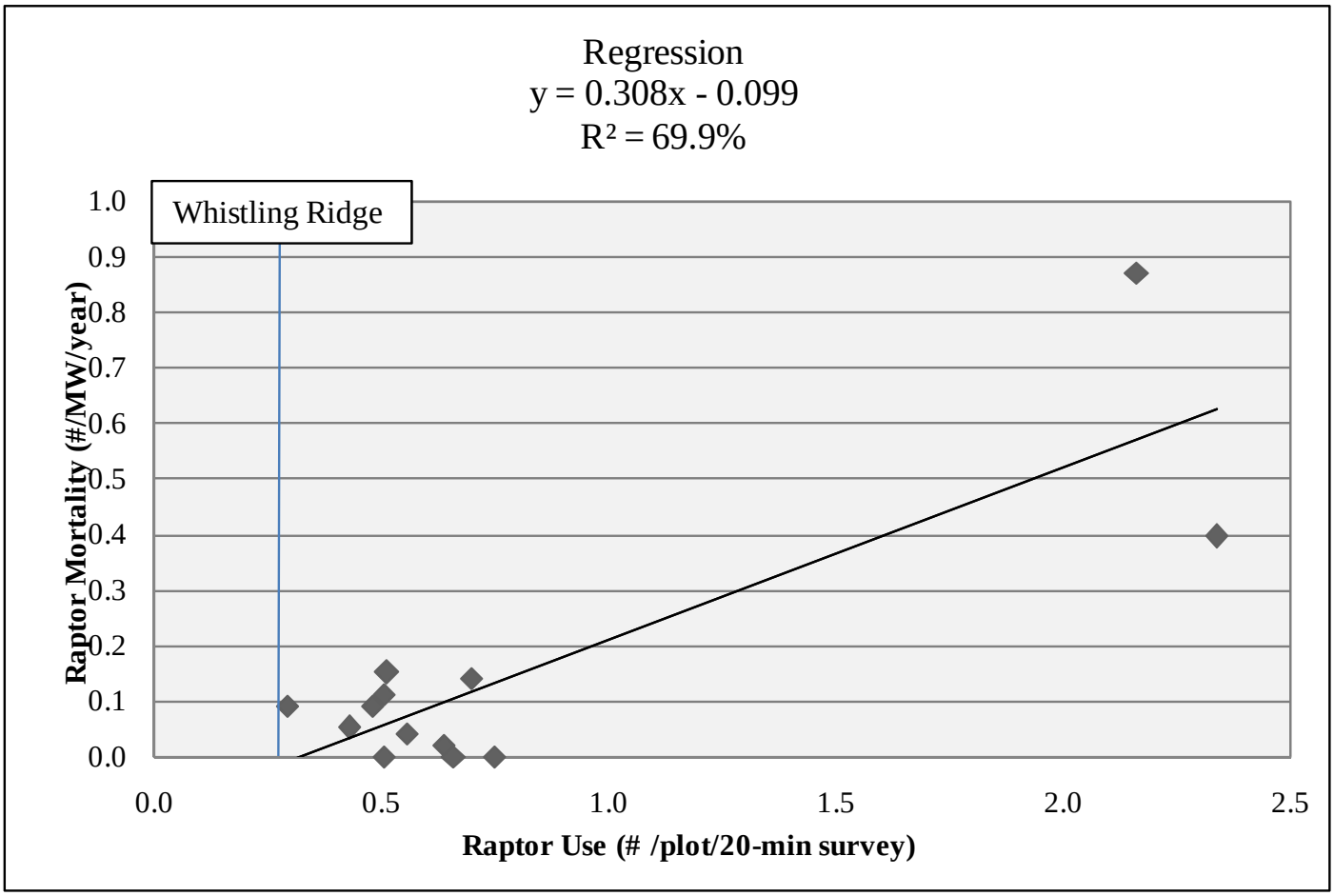


Figure 7. Comparison of annual raptor use between the Whistling Ridge Wind Resource Area and other US wind-energy facilities.

Data from the following sources:

Whistling Ridge, WA	This study.				
High Winds, CA	Kerlinger et al. 2005	Stateline Reference	URS et al. 2001	Maiden, WA	Erickson et al. 2002b
Diablo Winds, CA	WEST 2006a	Buffalo Ridge, MN	Erickson et al. 2002b	Hatchet Ridge, CA	Young et al. 2007b
Altamont Pass, CA	Erickson et al. 2002b	White Creek, WA	NWC and WEST 2005a	Biglow Canyon, OR	WEST 2005c
Elkhorn, OR	WEST 2005a	Foote Creek Rim, WY	Erickson et al. 2002b	Wild Horse, WA	Erickson et al. 2003a
Cotterel Mtn., ID	Cooper et al. 2004	Roosevelt, WA	NWC and WEST 2004	Biglow Reference, OR	WEST 2005c
Swauk Ridge, WA	Erickson et al. 2003b	Leaning Juniper, OR	NWC and WEST 2005b	Simpson Ridge, WY	Johnson et al. 2000b
Golden Hills, OR	Jeffrey et al. 2008	Klondike, OR	Johnson et al. 2002a	Invenergy_Vantage, WA	WEST 2007
Windy Flats, WA	Johnson et al. 2007	Stateline, WA/OR	Erickson et al. 2002b	North Valley, MT	WEST 2006b
Combine Hills, OR	Young et al. 2003c	Condon, OR	Erickson et al. 2002b	Tehachapi Pass, CA	Erickson et al. 2002b
Desert Claim, WA	Young et al. 2003b	Zintel Canyon, WA	Erickson et al. 2002a	Sunshine, AZ	WEST and the CPRS 2006
Hopkin's Ridge, WA	Young et al. 2003a	Homestead, CA	WEST et al. 2007	Dry Lake, AZ	Young et al. 2007c
Reardon, WA	WEST 2005b	Nine Canyon, WA	Erickson et al. 2001b	San Gorgonio, CA	Erickson et al. 2002b



Overall Raptor Use 0.28
Predicted Fatality Rate zero fatalities/MW/year
90.0% Prediction Interval (0, 0.25 fatalities/MW/year)

Figure 8. Regression analysis comparing raptor use estimates versus estimated raptor mortality.

Data from the following sources:

Study and Location	Raptor Use (birds/plot /20-min survey)	Source	Raptor Mortality (fatalities/MW/yr)	Source
Buffalo Ridge, MN	0.64	Erickson et al. 2002b	0.02	Erickson et al. 2002b
Combine Hills, OR	0.75	Young et al. 2003c	0.00	Young et al. 2005
Diablo Winds, CA	2.161	WEST 2006a	0.87	WEST 2006a
Foote Creek Rim, WY	0.55	Erickson et al. 2002b	0.04	Erickson et al. 2002b
High Winds, CA	2.34	Kerlinger et al. 2005	0.39	Kerlinger et al. 2006
Hopkins Ridge, WA	0.70	Young et al. 2003a	0.14	Young et al. 2007a
Klondike II, OR	0.50	Johnson 2004	0.11	NWC and WEST 2007
Klondike, OR	0.50	Johnson et al. 2002a	0.00	Johnson et al. 2003
Stateline, WA/OR	0.48	Erickson et al. 2002b	0.09	Erickson et al. 2002b
Vansycle, OR	0.66	WCIA and WEST 1997	0.00	Erickson et al. 2002b
Wild Horse, WA	0.29	Erickson et al. 2003a	0.09	Erickson et al. 2008
Zintel, WA	0.43	Erickson et al. 2002a	0.05	Erickson et al. 2002b
Bighorn, WA	0.51	Johnson and Erickson 2004	0.15	Kronner et al. 2008

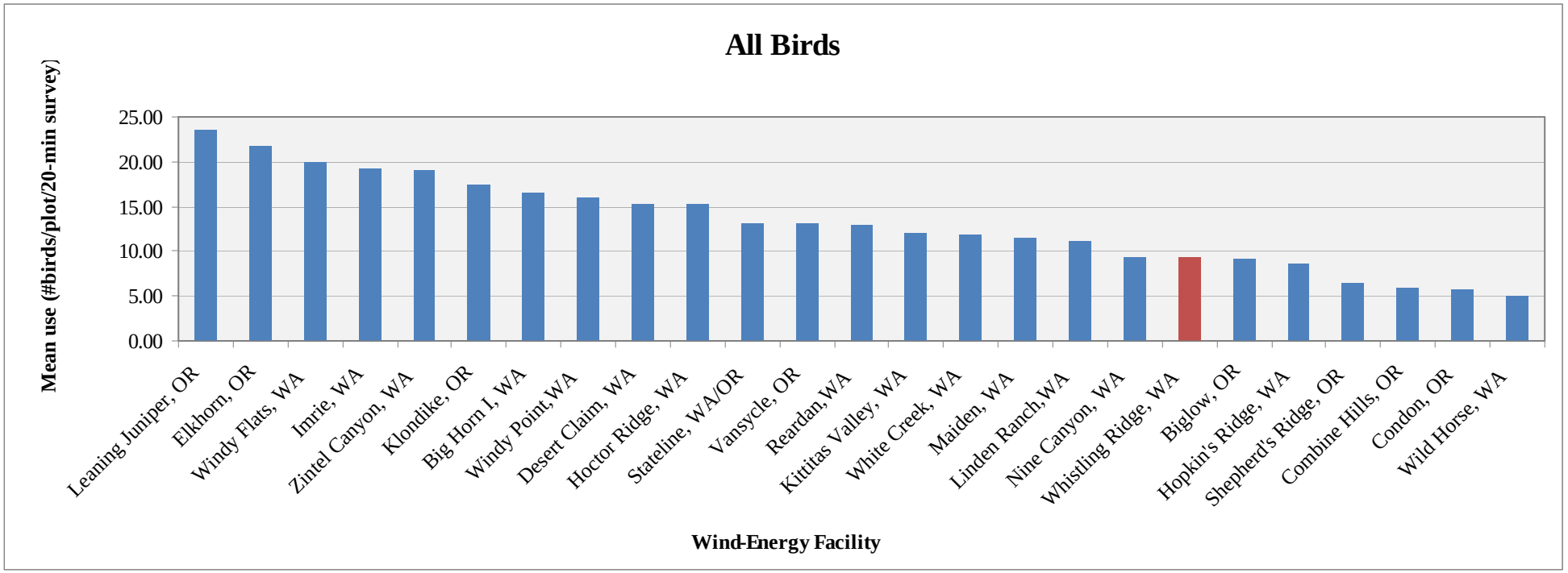


Figure 9. Comparison of mean overall bird use between the Whistling Ridge Wind Resource Area and other Pacific Northwest wind resource areas.

C-5

Final Report: Northern Spotted Owl, Northern Goshawk, Western Gray Squirrel Survey Results Conducted for the Saddleback Wind Energy Project. Submitted to CH2M HILL.

Turnstone Environmental Consultants, Inc. 2004

FINAL REPORT

NORTHERN SPOTTED OWL
NORTHERN GOSHAWK
WESTERN GRAY SQUIRREL
SURVEY RESULTS CONDUCTED FOR THE SADDLEBACK WIND ENERGY PROJECT





Submitted to:

CH2MHILL
Natural Resource Division

Submitted by:

Turnstone Environmental Consultants, Inc.
October 2004

INTRODUCTION **1**

NORTHERN SPOTTED OWL **1**

SUITABLE HABITAT 1
SURVEY LOCATIONS 2
SURVEY METHODS 2
SURVEY RESULTS 2

NORTHERN GOSHAWK **6**

SUITABLE HABITAT 6
SURVEY LOCATIONS 7
SURVEY METHODS 7
SURVEY RESULTS 7

WESTERN GRAY SQUIRREL **8**

SUITABLE HABITAT 8
SURVEY LOCATIONS 9
SURVEY METHODS 9
SURVEY RESULTS 9

RESULTS **9**

CONCLUSIONS **10**

REFERENCES **11**

Table 1: Northern spotted owl survey and results summary 2003-2004 4
Table 2: Northern spotted owl historical site observations 2003-2004 5
Table 3: Northern spotted owl historic site summary 1994- 2004 6
Table 4: Northern goshawk survey and results summary results 2004 8
Table 5: Western gray squirrel survey and results summary 2004 9

Appendix A: Maps
Appendix B: Northern spotted owl data forms
Appendix C: Northern spotted owl station utm's
Appendix D: Northern goshawk data forms
Appendix E: Western gray squirrel data forms

INTRODUCTION

PPM Energy, Inc. (PPM) with guidance from CH2MHILL retained the services of Turnstone Environmental Consultants Inc. (TECI) to perform wildlife studies as part of the proposed Saddleback Wind Energy Project. PPM performs extensive environmental impact studies evaluating existing land use as well as impacts on birds, bats, rare plants and waterways to determine whether a site is suitable for wind power generation. PPM is committed to minimize impacts on natural resources by selecting wind development sites that are designed to be as environmentally friendly to the land and communities as it is to the air. Wind energy, the least-cost renewable technology, is a remarkable, sustainable resource for electricity generation. Wind power is the fastest growing area of power generation in the world. PPM Energy Inc. is leading the market to make this green power source as dependable and affordable as any other form of energy.

TECI performed surveys for the northern spotted owl (Strix occidentalis caurina), northern goshawk (Accipiter gentilis), and western gray squirrel (Sciurus griseus) in consultation with CH2MHILL for the Saddleback Wind Energy Project. Throughout Oregon and the Pacific Northwest, TECI specializes in natural resource inventory, assessment and analysis. TECI is committed to providing the highest quality work product for our clients in the field of natural resource management - assisting land owners and managers in the decision making process. TECI is an Oregon based company founded in 1995 with offices in Portland and Corvallis. The TECI staff has extensive experience in a wide variety of wildlife and fisheries survey, inventory, rehabilitation and research projects, and has worked with federal, state and tribal governments as well as private landowners.

Northern Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) was listed in 1990 as a "threatened" species under the Endangered Species Act (ESA) of 1973 by both the U.S. Fish and Wildlife Service and the State of Washington. Both federal and state agencies determined that the northern spotted owl was likely to become an endangered species in the foreseeable future throughout all or a significant portion of its existing range. The physiographic range and habitat requirements of the northern spotted owl are located within the forestlands of the PPM Saddleback Wind Energy Project. As part of the process to avoid a "take" of any northern spotted owls under the ESA, PPM with guidance from CH2MHILL had surveys completed for northern spotted owls in and around suitable habitat prior to any management activity.

Suitable Habitat
In Washington, northern spotted owls inhabit the Eastern and Western Cascades, Western Lowlands and Olympic Peninsula Provinces. Within these regions, the northern spotted owl requires a multitude of habitat types for nesting, roosting, foraging and dispersal. The species seeks forests composed of a multi-layered, multi-species canopy with a high incidence of large trees with appropriate structure for nesting and roosting. Northern spotted owls generally rely on large home ranges and use large tracts of land containing older forest to meet their biological needs. Fragmented habitats may be used for dispersal and foraging. Spotted owls nest primarily in stick nests of northern goshawks, on clumps of mistletoe, in large tree cavities, on broken tops of large trees, on large branches or cavities in banks and rock faces.

Survey Locations

With the guidance of CH2MHILL, TECI conducted northern spotted owl surveys within and adjacent to properties managed by SDS Lumber Co. (SDS) and other willing adjacent landowners. Surveys were conducted in suitable habitat in four core project sections located in Township 3N, Range 10E, Sections 5, 6, 7, and 8. The provincial home range radius surrounding the core area appropriate for this physiographic location is 1.8 miles. Surveys were conducted in suitable habitat in the provincial home range radius in Township 3N, Range 10E, Sections 4, 9,10,17,19,20,21; Township 4N, Range 10E, Sections 28,29,30,31,32,33,34; Township 4N, Range 09E, Sections 25,35,36; Township 3N, Range 09E, Sections 1,2,11,12,13,24.

Survey Methods

Potential habitat was surveyed in 2003-2004 in accordance to the 1992 Revised Version of "Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls" endorsed by the U.S. Fish and Wildlife Service. TECI used the 1-year survey methodology, surveying the project area six times from March 24, 2003 to July 23, 2003 and used the 2-year survey methodology, surveying three times from March 31, 2004 to August 18, 2004. TECI surveyed again in 2004 to lengthen the time period in which management activities could occur in the area of potential impact before northern spotted owl surveys would again be required. TECI collected information on northern spotted owl historical sites and potential owl activity in proposed areas of future management projects. CH2MHILL and the Washington Department of Fish and Wildlife (WDFW) will use this survey information to assess occupancy and reproductive status of the northern spotted owl within areas of proposed management activities.

TECI biologists analyzed the project area using topographic maps and aerial photography to determine suitable habitat and potential spot calling station placement. Spot calling stations were place along ridges and away from streams to maximize coverage by enhancing sound transmission. Spot calling stations and survey routes were situated to achieve complete coverage of the area, preferably with coverage from more than one calling point. Stations were spaced approximately 1/4 to 1/2 mile apart where access was permitted and suitable habitat warranted. Most spot calling stations were surveyed at night when owls are more active and are thought to be more responsive to standard survey techniques (USDI 1992b). Some stations were called during daylight in remote/difficult to access areas. TECI biologist used ten-minute calling periods for each station. Voice hooting and "hoot flutes" were used to broadcast both male and female spotted owl vocalizations that included four note contact calls and agitated calls. TECI conducted surveys between March 15 and August 31 as stipulated by the protocol.

During the 2003/2004 survey season, TECI recorded all owl species responses in the field from each calling station during each site visit on the field data forms. Barred owls have been thought to displace spotted owls; therefore, special attention was given to any responses recorded in the survey area. Barred owl responses were recorded on the field data and mapped (locations are approximate) to provide additional information to help direct any future management decisions (map 6).

Survey Results

TECI conducted northern spotted owl surveys in and adjacent to SDS properties (maps 1-6). During the 2003 northern spotted owl survey season, TECI completed six site visits to protocol (survey dates are found in Table 2). During the 2004 northern spotted owl survey season, three site visits were completed to protocol. Calling stations were strategically set throughout the proposed area of impact with the inclusion of a 1.8-mile radius around the potential area of future management activities.

- In 2003, during the first two site visits, 64 calling stations were originally set and called. During the remaining four site visits, 63 calling stations were surveyed after consultation with the SDS foresters. (One calling station, B-17, was dropped due to a logging operation.) No northern spotted owl responses were recorded during any of the six site visits for 2003. Nine barred owl responses were recorded during the six site visits (map 6).

- In 2004, 64 calling stations were surveyed during the first site visits. During the remaining two site visits, 62 calling stations were surveyed. (Two calling stations were dropped, B-17 and B-19, due to logging operations.) No northern spotted owl responses were recorded during any of the three site visits for 2004. Three barred owl responses were recorded during the three site visits (map 6).

Two historical owl sites were surveyed to obtain information on the presence of northern spotted owls. TECI combined efforts with National Council for Air and Stream Improvement (NCASI) to investigate the status of northern spotted owls at the Moss Creek and Mill Creek sites.

- In 2003, three-day site visits were performed at the historical nest sites of both Moss Creek and Mill Creek with no northern spotted owl observations or responses. TECI continued to call the two historical nest sites in the evening six more times with no northern spotted owl responses. On May 5, 2003, a NCASI surveyor observed an unidentified *Strix* owl at dusk (barred or northern spotted owl observation). Five surveys were conducted after the *Strix* observation with no visual conformation or audible responses to confirm the *Strix* presence. Eight of the nine barred owl responses for 2003 occurred within 1.5 miles of the Mill Creek historical nest site. No barred owls were observed while conducting the Moss Creek nest status day surveys.

- In 2004, three site visits were performed at the historical nest sites of both Moss Creek and Mill Creek with no northern spotted owl observations or responses. Two of the three barred owl responses for 2004 occurred within 1.5 miles of the Mill Creek historical nest site. One of the three barred owl responses for 2004 occurred within 1.5 miles of the Moss Creek historical nest site.

With the consistent barred owl responses during the evening surveys so close to the historical nest sites, it appears that barred owls are using areas once inhabited by northern spotted owls.

The following tables summarize all survey site results for the project area including the 1.8 mile radius around the proposed project area of future management activities. Table 1 depicts the Survey Summary Results for 2003 - 2004 and Table 2 depicts the historical site information for Moss Creek and Mill Creek.

NORTHERN SPOTTED OWL
Survey Summary Results 2003-2004

Table 1: Northern spotted owl survey and results summary 2003-2004

	Visit #	Dates	# of Stations	Northern Spotted Owl Response	Barred Owl Response	Comments
2003	1	3/18/03 -3/24/03	64	None	2	Barred owl detected from station: A11/B17
	2	4/21/03- 4/24/03	64	None	2	Barred owl detected from station: A6/B6
	3	5/23/03- 5/26/03	63	None	1	Barred owl detected from station: A10. B-17 not surveyed (logging)
	4	6/18/03- 6/21/03	63	None	2	Barred owl detected from station: A9/A11. B-17 not surveyed (logging)
	5	6/29/03- 7/2/03	63	None	1	Barred owl detected from station: A6. B-17 not surveyed (logging)
	6	7/20/03- 7/23/03	63	None	1	Barred owl detected from station: A10. B-17 not surveyed (logging)
2004	1	3/31/04- 4/3/04	64	None	0	
	2	6/14/04- 6/17/04	62	None	1	Barred owl detected from station: A12. B-17 & B-19 not surveyed (logging)
	3	8/16/04- 8/18/04	62	None	2	Barred owl detected from station: A6 (incidental while camping)/A26. B-17 & B-19 not surveyed (logging)

NORTHERN SPOTTED OWL
Historical Site Observations Summary 2003 - 2004

Table 2: Northern spotted owl historical site observations 2003-2004

	Visit #	Date	Name of Station	Northern Spotted Owl Response	*Barred Owl Response
2003	1	3/24/03 Day	Mill Creek	None	None
		3/20/03 Day	Moss Creek	None	None
	2	4/22/03 Night	Mill Creek	None	None
		4/21/03 Night	Moss Creek	None	None
	3	5/24/03 Day	Mill Creek	None	None
		5/26/03 Day	Moss Creek	None	None
	4	6/20/03 Night	Mill Creek	None	None
		6/21/03 Night	Moss Creek	None	None
	5	7/1/03 Night	Mill Creek	None	None
		7/2/03 Night	Moss Creek	None	None
	6	7/22/03 Night	Mill Creek	None	None
		7/23/03 Night	Moss Creek	None	None
2004	1	4/2/2004Night	Mill Creek	None	None
		4/3/04 Night	Moss Creek	None	None
	2	6/17/04 Day	Mill Creek	None	None
		6/16/04 Night	Moss Creek	None	None
	3	8/16/04 Day	Mill Creek	None	None
		8/18/04 Night	Moss Creek	None	None

**TECI recorded no barred owl responses at the historical nest sites*

NORTHERN SPOTTED OWL

Historic Site Summary 1994 - 2004

Table 3: Northern spotted owl historic site summary 1994- 2004

Year	Mill Creek Results	Moss Creek Results
2004	Barred Owl Pair Observed (NCASI)	Barred Owl Pair with 1+ Juvenile Observed (NCASI)
2003	No Responses	Unknown Strix Observed (NCASI)
2002	Male Barred Owl Observed	Barred Owl Pair with 1 Juvenile Observed
2001	No Responses	Barred Owl Pair Observed
2000	Non-nesting Spotted Owl Pair Observed	Spotted Owl Pair with 1 Juvenile Observed
1999	Female Spotted Owl Observed	Spotted Owl Pair with 1 Juvenile Observed
1998	Non-nesting Spotted Owl Pair Observed with Female Barred Owl	Spotted Owl Pair with 2 Juveniles Observed
1997	Non-nesting Spotted Owl Pair Observed	No Responses Observed
1996	Spotted Owl Pair with 2 Juveniles Observed	Spotted Owl Pair with 3 Juveniles Observed
1995	No Responses	Male Spotted Owl Observed
1994	Spotted Owl Pair with 2 Juveniles Observed	N/A

Any inquiries on site-specific information should be directed to Tracy Flemming of NCASI (360.896.8013)

Northern Goshawk

The northern goshawk (*Accipiter gentilis*) is categorized as a "species of concern" by the U.S. Fish and Wildlife Service and as a "listing candidate" for sensitive, threatened or endangered species by the State of Washington Department of Fish and Wildlife. The physiographic range and habitat requirements of the northern goshawk are located within the forestlands of the PPM Saddleback Wind Energy Project.

Suitable Habitat

Goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest and Douglas fir. They are occasionally found nesting in coast redwood and mixed hardwood forest. Goshawk nest sites tend to be associated with patches of relatively larger, denser forest than the surrounding landscape; however, home ranges often consist of a wide range of forest age classes and conditions. Numerous habitat studies and modeling efforts have found nest sites to be associated with similar factors including proximity to water or meadow habitat, forest openings, level terrain or "benches" of gentle slope, northerly aspects and patches of larger, denser trees, but these factors

vary widely. (USDI 2002).

Survey Locations
With the guidance of CH2MHILL, TECI conducted northern goshawk surveys within and adjacent to properties managed by SDS and other willing adjacent landowners. Surveys were conducted in suitable habitat in four core project sections located in Township 4N, Range 10E, Sections 5, 6, 7, and 8. The provincial home range radius surrounding the core area appropriate for this physiographic location is 0.5 miles. Surveys were conducted in suitable habitat in the provincial home range radius in Township 3N, Range 09E, Sections 13, 24; Township 3N, Range 10E, Section 18.

Survey Methods
Potential habitat was surveyed in accordance to the 2002 "Survey Methodology for Northern Goshawks in the Pacific Southwest Region" developed by the United States Forest Service (USFS 2002). TECI biologists analyzed the project area using topographic maps and aerial photography to determine suitable habitat and potential station placement. TECI biologists established stations in the field at approximately 350 yards (0.2 miles) apart on roads and trails in suitable habitat within 0.5 miles of the proposed wind turbine location. Call stations were established to achieve complete coverage in all portions of the project area. At each station, calls were broadcast for 10 seconds; TECI biologists would then stop and listen for 30 seconds. This sequence was repeated four times at each station, broadcasting in four cardinal directions. Surveys started ½ hour before sunrise continued through the day and concluded ½ hour before sunset as specified by the protocol. During the 2004 survey season, TECI recorded all raptor species responses from every calling station during each site visit on the field data forms.

Survey Results
Turnstone Environmental Consultants Inc. conducted northern goshawk surveys in and adjacent to SDS properties (map 7), all calling stations were strategically set throughout the proposed area of impact with the inclusion of a 0.5-mile radius around the potential area of future management activities. TECI completed two site visits to protocol during the 2004 northern goshawk survey season (survey dates are found in Table 6). One hundred eighty five calling stations were surveyed for both protocol visits. No northern goshawk responses were recorded during any of the two site visits.

NORTHERN GOSHAWK
Survey and Results Summary 2004

Table 4: Northern goshawk survey and results summary results 2004

Visit #	# of Stations	Date	Northern Goshawk Response	Other Raptors Observed	Comments
1	47	6/15/04	None	COHA (1) near station 102. RTHA (1) near station 172	Western gray squirrel visuals at station 88 and near station 99
	36	6/16/04	None	RTHA(1) near station 9	
	17	6/17/04	None		
	85	6/18/04	None	RTHA(2) near station 199	RTHA pair was observed no nest ever located
2	103	8/29/04	None	RTHA(1) near station 222	
	82	8/30/04	None		

COHA = Cooper's hawk; RTHA = Red-tailed hawk

Western Gray Squirrel

The western gray squirrel (*Sciurus griseus)* is listed as a "threatened" species by the Washington State Department of Fish and Wildlife (WDFW). The physiographic range and habitat requirements of the western gray squirrel are located within the forestlands of the PPM Saddleback Wind Energy Project.

Suitable Habitat
Western gray squirrels are arboreal (adapted for living in trees) and, although they forage on the ground, they rarely stray far from trees. They use tree canopies for escape, cover and nesting. Western gray squirrels can move rapidly and cover long distances among tree canopies when canopy conditions permit. A contiguous tree canopy that allows arboreal travel for at least 198 feet (60 meters) around the nest is an important feature of western gray squirrel habitat (Ryan and Carey 1995a). Western gray squirrels are active throughout the day but are most active in the morning. Western gray squirrels are most active in August and September, when they are collecting and storing food for winter, and they are less visible in June and July (Ryan and Carey 1995a).

Currently in Washington, the western gray squirrel distribution has been reduced to three geographically isolated western gray squirrel populations in Washington: the ``Puget Trough" population, now centered in Thurston and Pierce counties in the Puget Sound region; the ``South Cascades" population in extreme eastern Skamania County and Klickitat and Yakima counties; and the ``North Cascades" population in Chelan and Okanogan counties.

In Washington, and elsewhere within the subspecies' range, the principal food is acorns, although the seeds of Douglas-fir and other conifers are also eaten (Dalquest 1948). While pine nuts and acorns are considered essential foods for storing body fat and conditioning western gray squirrels for winter, green vegetation, seeds and nuts of trees and shrubs, fleshy fruits, mushrooms and other foods are also consumed. Hypogeous fungi (underground fungi such as truffles) comprise a large portion of the western gray squirrel diet (WDW 1993; Carraway and Verts 1994; Ryan and Carey 1995a).

Survey Locations
With the guidance of CH2MHILL, TECI conducted general western gray squirrel surveys while conducting northern goshawk surveys within and adjacent to properties managed by SDS and other willing adjacent land owners. General surveys were conducted during station placement and surveys for the northern goshawk (see northern goshawk section for location description). Intensive surveys were performed in oak stands in Township 4N, Range 10E, Sections 28, 33, 28; Township 3N, Range 10E, Section 4.

Survey Methods
TECI conducted western gray squirrel surveys in and adjacent to SDS properties (maps 8-10). Surveys were modeled according to the WDFW report "Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance" (Haegen, Van Leuven, and Anderson 2004). TECI biologists performed a general search for western gray squirrels and nests while conducting northern goshawk station placement and surveys. During the general search, TECI's biologists identified two adult western gray squirrels. Intensive walk-through surveys using serpentine transects were conducted in oak and oak/conifer stands but no squirrels or nests were located.

Survey Results
Turnstone Environmental Consultants, Inc. conducted western gray squirrel surveys in and adjacent to SDS properties (map 7). TECI completed two general site visits and one intensive site visit to protocol during the 2004 western gray squirrel survey season. Two adult western gray squirrels were sighted on June 15th foraging during a goshawk general survey. An intensive search occurred for nest sites in the area where the western gray squirrels were observed. No nests were ever located in the area of the western gray squirrel observations or any other area where intensive surveys were conducted.

WESTERN GRAY SQUIRREL
Survey and Results Summary 2004

Table 5: Western gray squirrel survey and results summary 2004

Visit #	Date	Type Of Visit	Results
1	6/15/2004	General	Western gray squirrel visuals at station 88 and near station 99
1	6/16/2004	General	No squirrel or squirrel nest located
1	6/17/2004	General	No squirrel or squirrel nest located
1	6/18/2004	General	No squirrel or squirrel nest located
2	8/29/2004	General	No squirrel or squirrel nest located

2	8/30/2004	General	No squirrel or squirrel nest located
3	8/16/2004	Intensive	No squirrel or squirrel nest located
3	8/17/2004	Intensive	No squirrel or squirrel nest located

Conclusions

Northern Spotted Owl
During the 2003-2004 northern spotted owl breeding season, TECI conducted 9 site visits in the Saddleback Wind Energy Project area. TECI recorded no northern spotted owl observations or responses on any of the 9 site visits during the 2003-2004 field seasons. Based on the surveying parameters of the 1992 Revised Version of "Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls" endorsed by the U.S. Fish and Wildlife and the survey results documented by TECI in the 2 breeding seasons. PPM will not be required to conduct northern spotted owl surveys again until the March 15, 2007. NCASI will continue to monitor the Moss Creek and Mill Creek northern spotted owl historical sites.

Northern Goshawk
No northern goshawk responses or observations were recorded during the 2 site visits during the 2004 breeding season. The 2002 "Survey Methodology for Northern Goshawks in the Pacific Southwest Region" developed by the United States Forest Service (USFS 2002) recommends a two year survey effort. CH2MHILL has negotiated a 1-year survey effort with WDFW. Therefore, no surveys will be conducted in the 2005 northern goshawk breeding season.

Western Gray Squirrel
TECI proposed a 1-year search effort for western gray squirrel nests while conducting northern goshawk surveys. Intensive surveys in oak dominated forests were also conducted in areas of potential impact. No western gray squirrel nests were ever found while conducting these searches. However, while conducting the northern goshawk surveys 2 western gray squirrels were observed. The 2 western gray squirrels were documented in different locations; both were on the ground possibly foraging at the edge of clear-cuts (Map 9). Based on harvest maps provided by CH2MHILL, the first western gray squirrel observation is approximately 3,520 ft from the most easterly wind turbine stringer well outside of the home range of a western gray squirrel (.2 -.47 hectares WDFW "Status of the Western Gray Squirrel (Sciurus griseus) in Washington" July 1993). The second western gray squirrel observation was documented approximately 440ft north of the most easterly stringer. This stringer maybe in the observed western gray squirrel home range based on the .47 hectare home range suggested by WDFW. An intensive survey effort was conducted in and around the western gray squirrel visual with no nests observed.

References

Carraway, L., B. Verts. December 2, 1994. Verts. Sciurus griseus. Mammalian Species 474: 1-7

Dalquest, W.W. 1948. Mammals of Washington. Vol. 2. Univ. Kans., Mus. Nat. Hist., Lawrence. 444pp.

Ryan, L.A. and A.B. Carey. 1995a. Distribution and habitat of the western gray (Sciurus griseus) squirrel on Fort Lewis, Washington. Northwest Science 69: 204-216

U.S. Fish and Wildlife Service 1992b. Revised Version of Protocol For Surveying Proposed Management Activities That May Impact Northern Spotted. Unpubl. rpt. 20 pp.

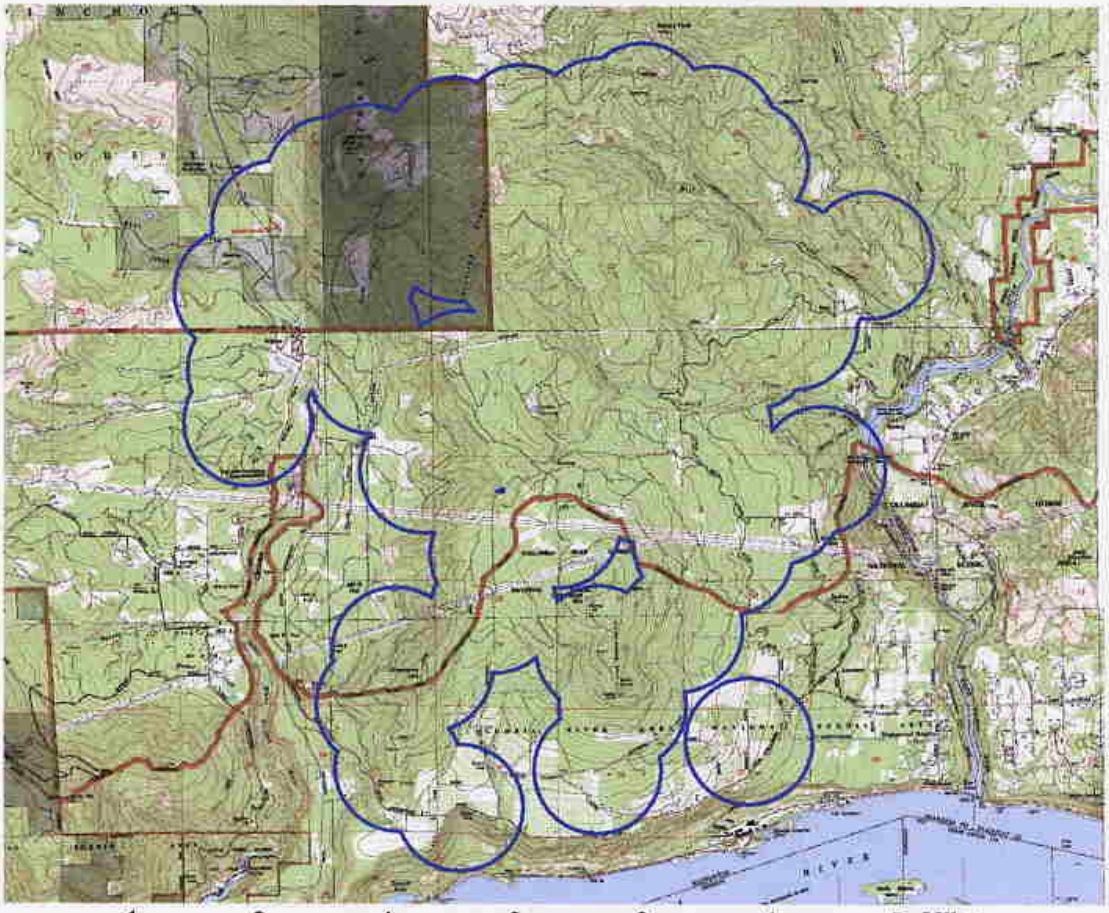
U.S FOREST SERVICE. 14 May 2002. Survey Methodology For Northern Goshawks In The Pacific Southwest Region.

United States Forest Service 2002. Survey Methodology for Northern Goshawks in the Pacific Southwest Region"

Vander Haegen, M., S. Van Leuven, and D. Anderson. 2004. Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance. Wildlife Research Report. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

APPENDIX A: MAPS

Saddleback Wind Power Project
Northern Spotted Owl
Calling Point Coverage



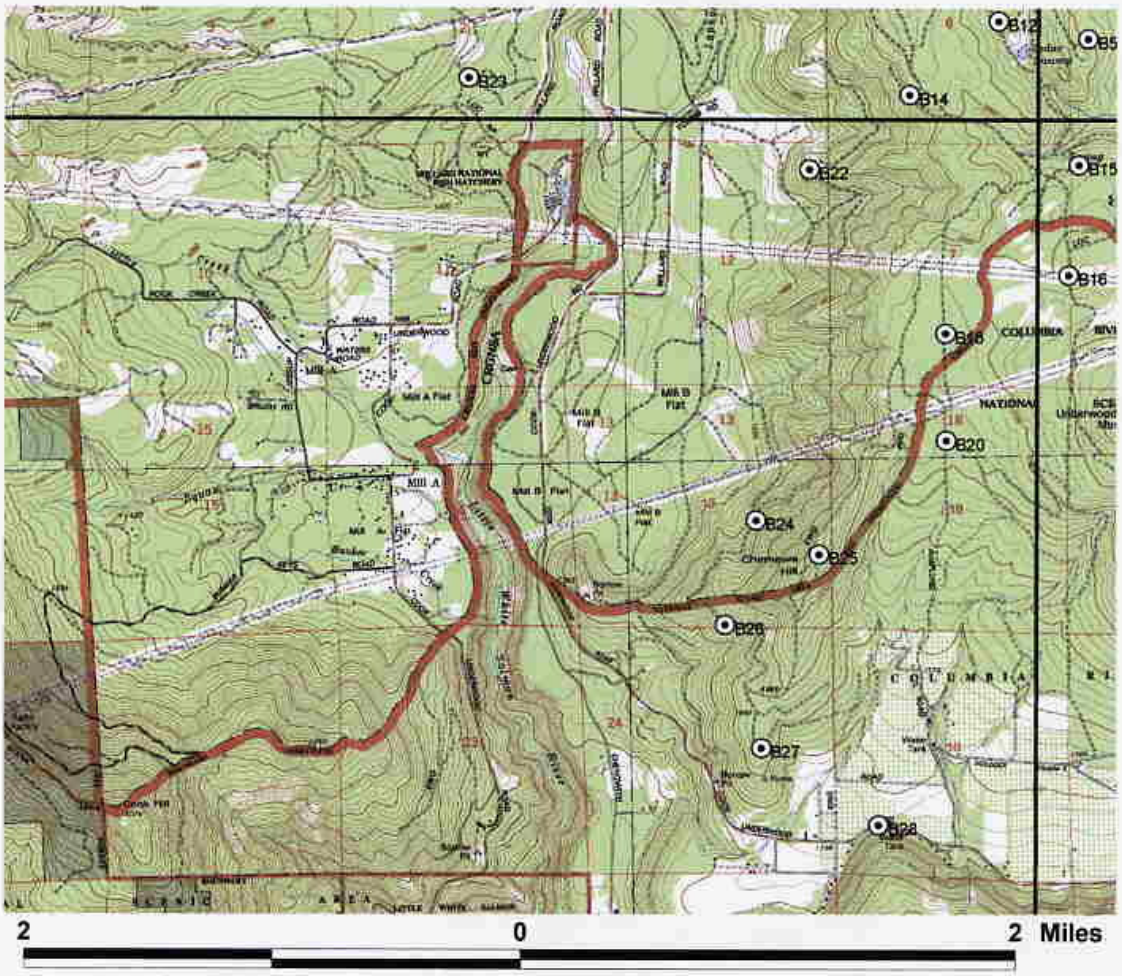
1 0 1 2 3 4 5 Miles

0.5 Mile Broadcast Area

TECI GIS LAB

Map 1

Saddleback Wind Power Project
Northern Spotted Owl Survey Stations
Southwest Quadrant



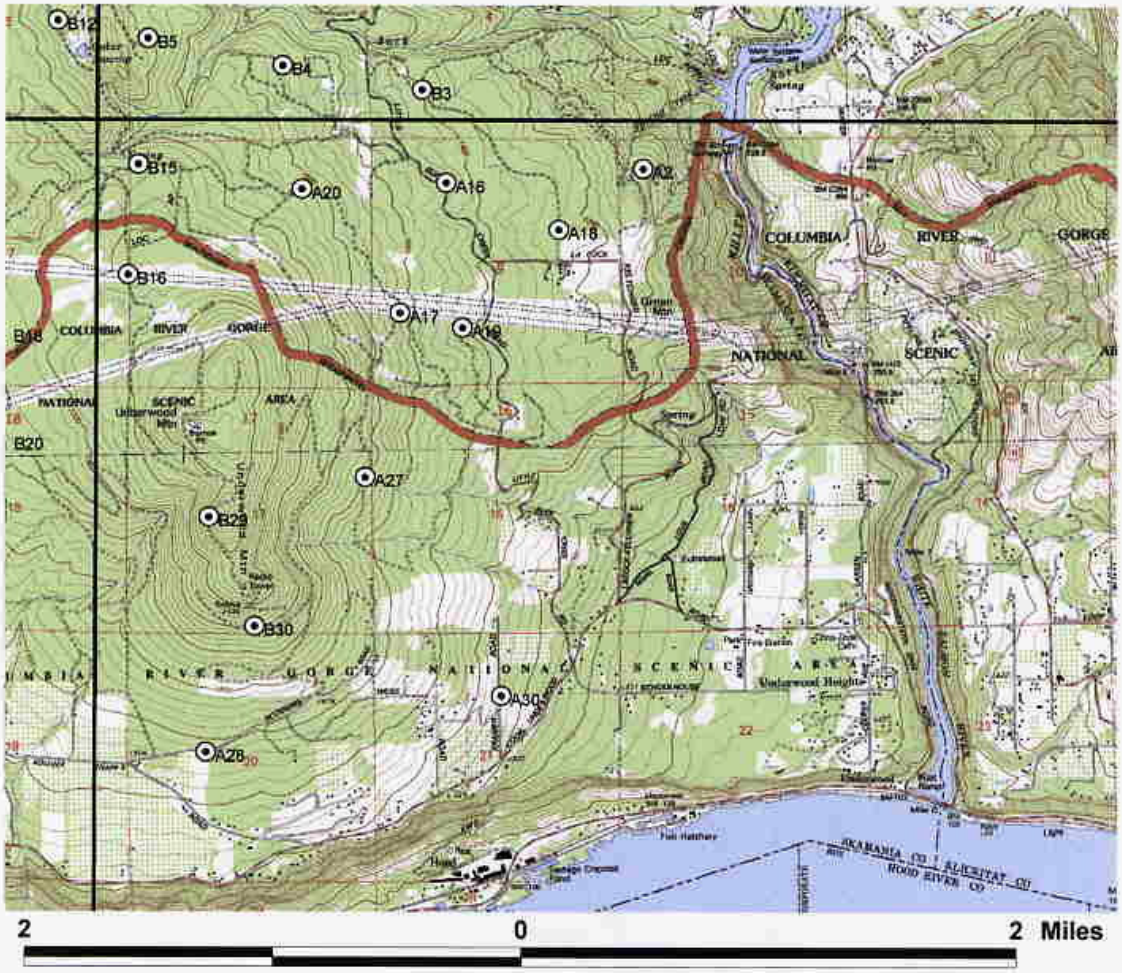
Calling Points

Quadrant Boundary

TECI GIS LAB

Map 2

Saddleback Wind Power Project
Northern Spotted Owl Survey Stations
Southeast Quadrant



2 0 2 Miles

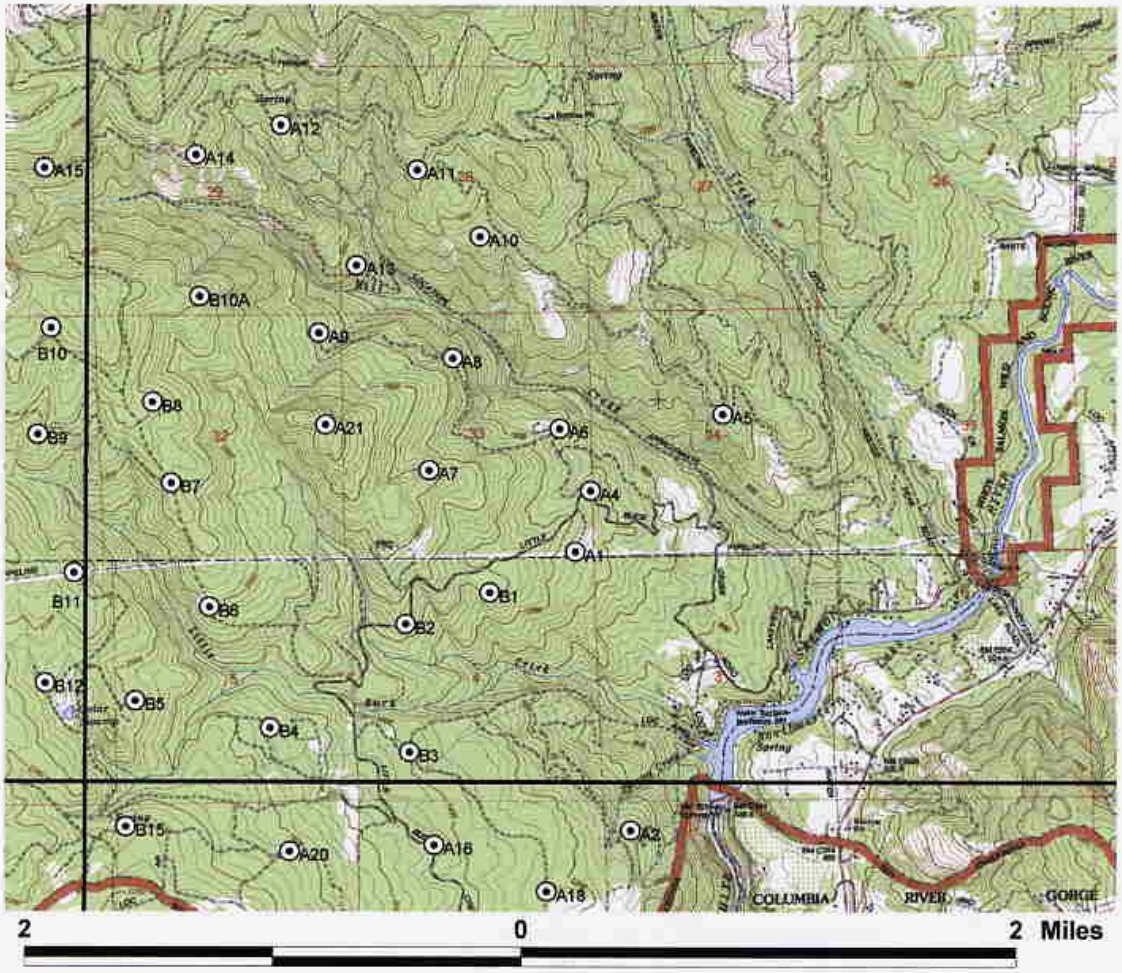
Calling Points

Quadrant Boundary

TECI GIS LAB

Map 3

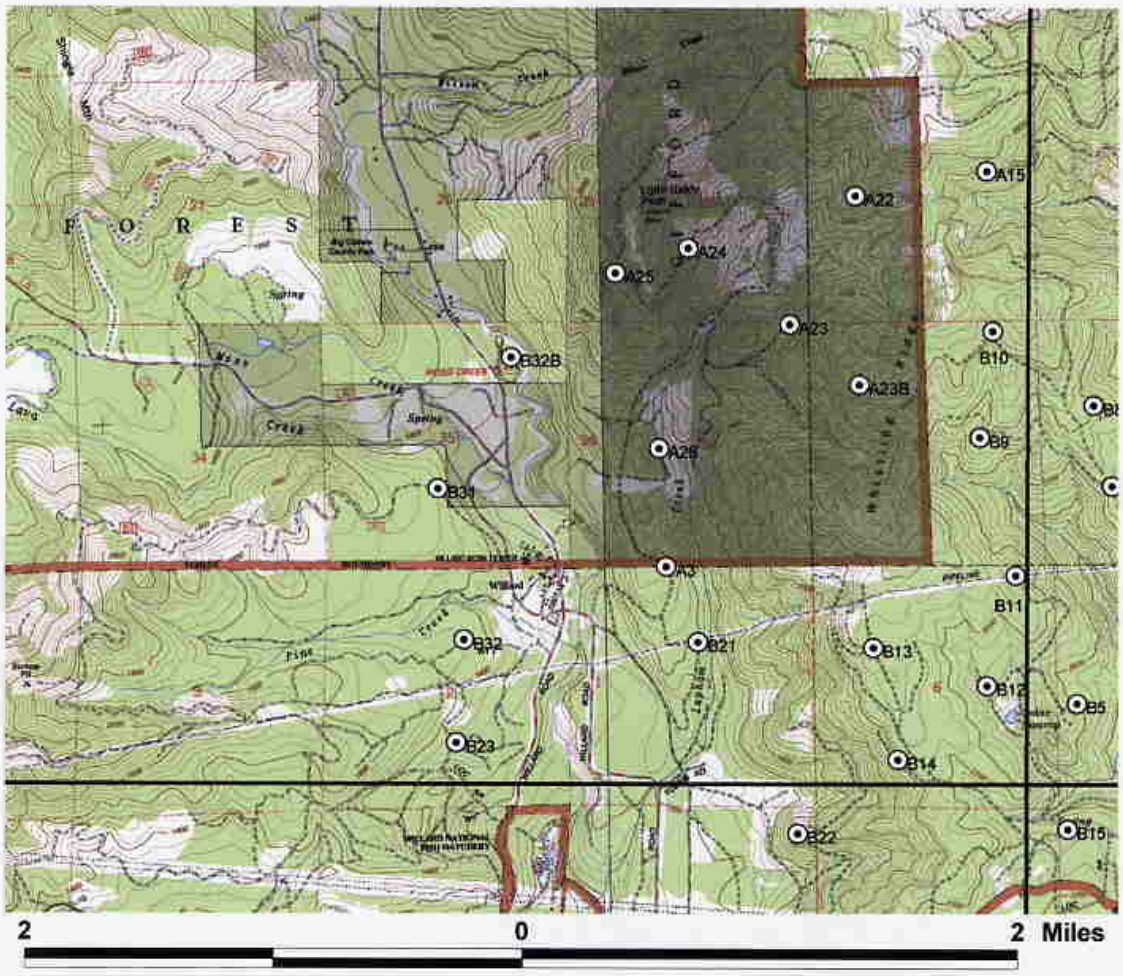
Saddleback Wind Power Project
Northern Spotted Owl Survey Stations
Northeast Quadrant



TECI GIS LAB

Map 4

Saddleback Wind Power Project
Northern Spotted Owl Survey Stations
Northwest Quadrant



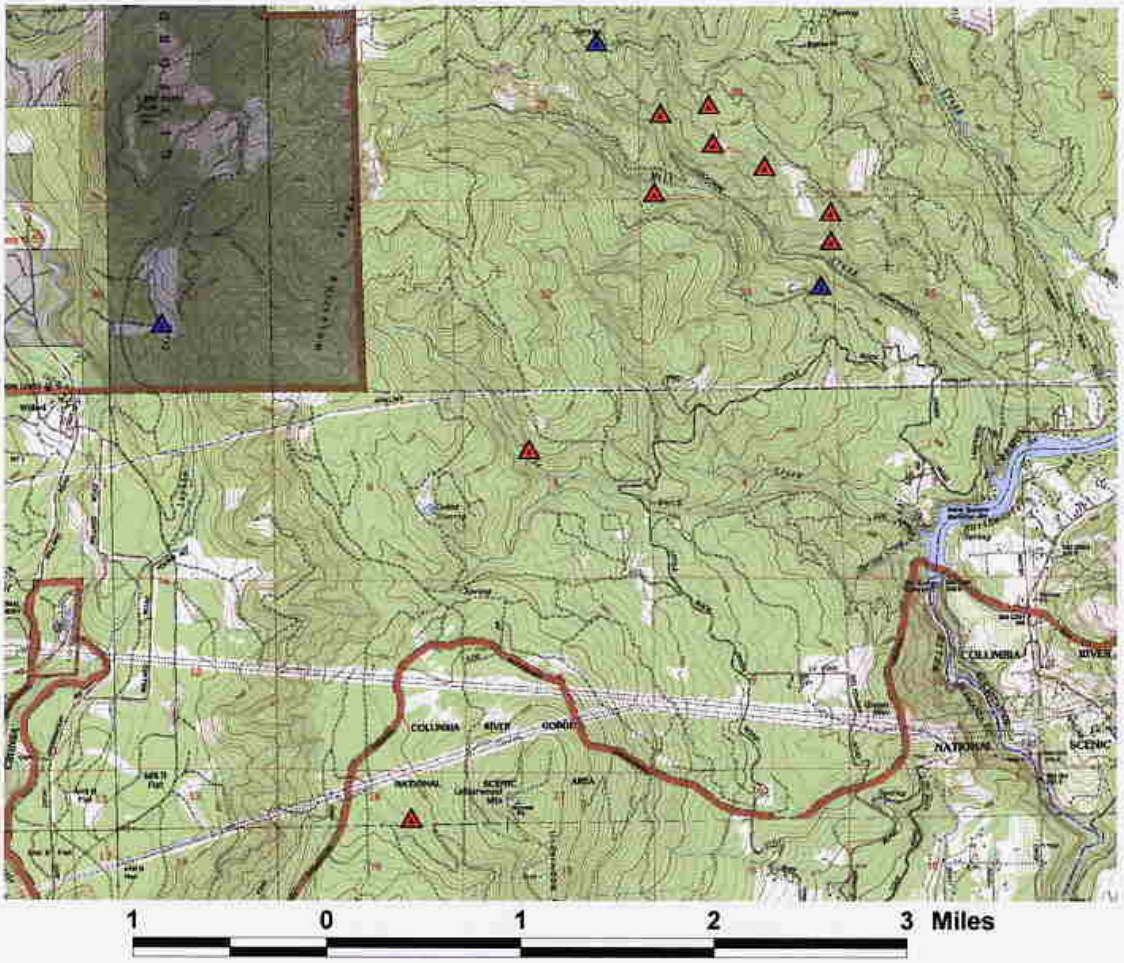
Calling Points

Quadrant Boundary

TECI GIS LAB

Map 5

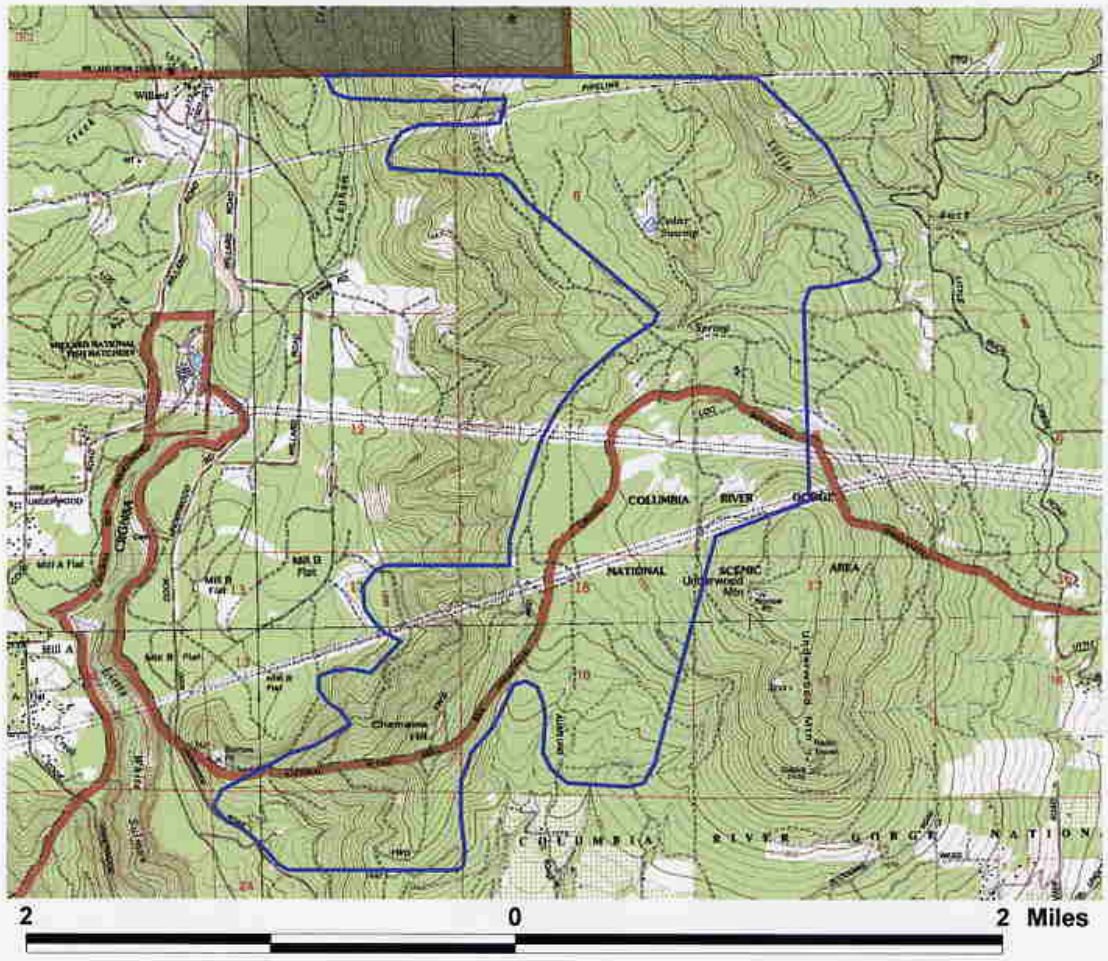
Saddleback Wind Power Project
Barred Owl Locations



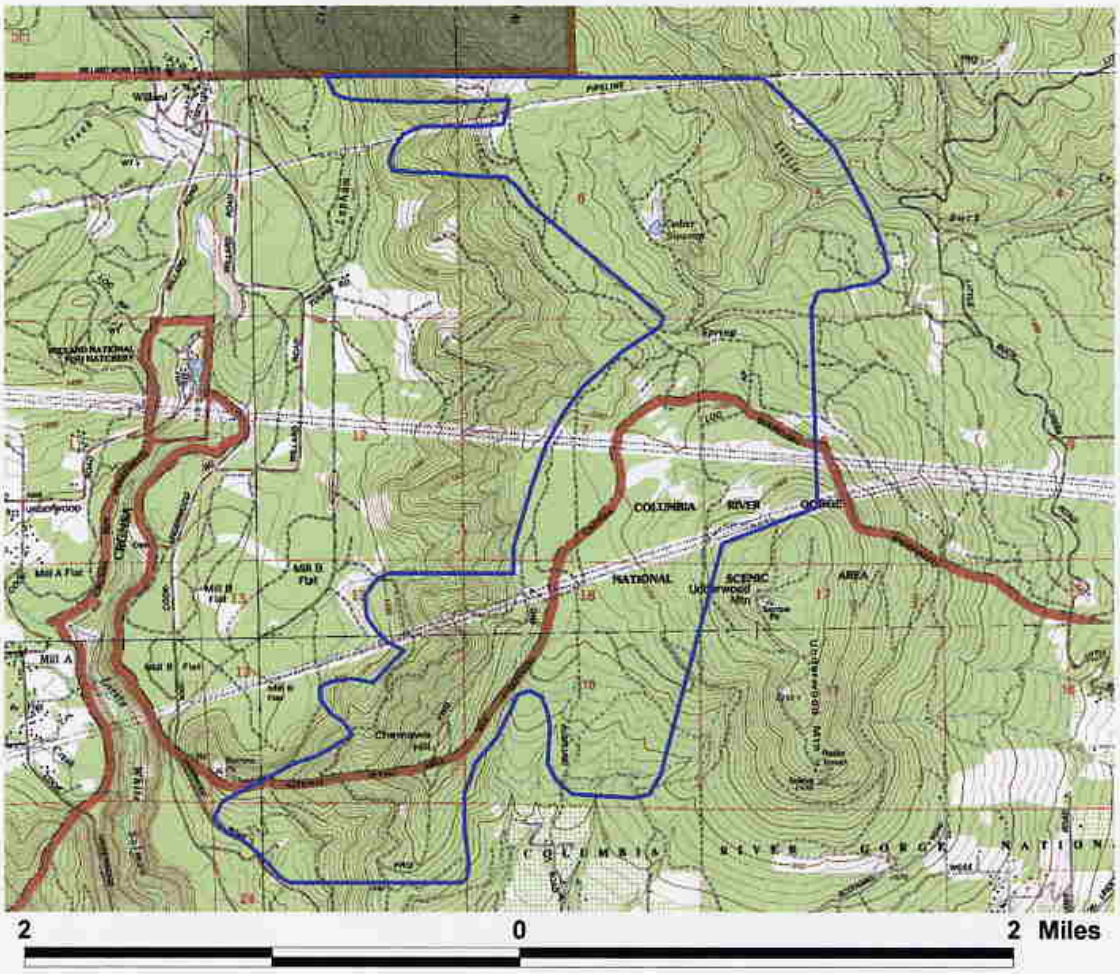
TECI GIS LAB

Map 6

Saddleback Wind Power Project
Northern Goshawk Survey Area



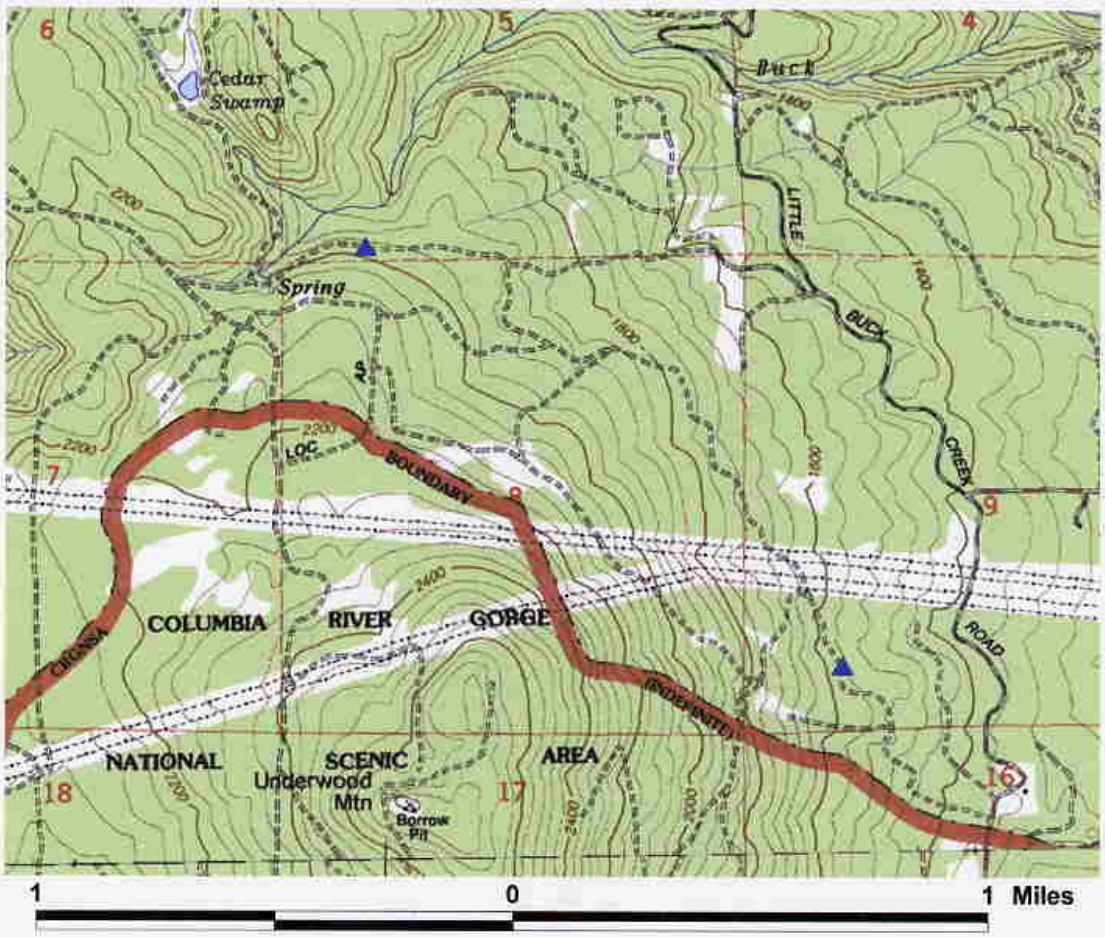
Saddleback Wind Power Project
Western Gray Squirrel
General Survey Area



TECI GIS LAB

Map 8

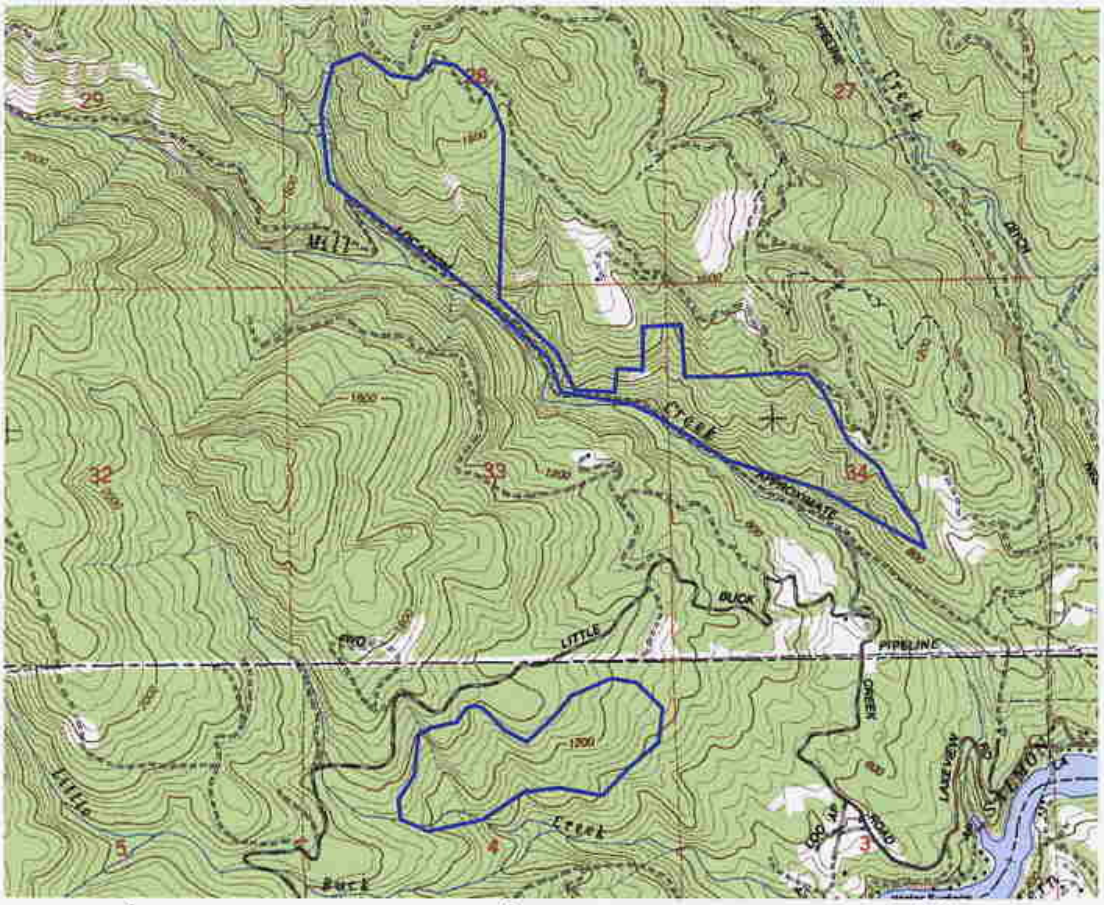
Saddleback Wind Power Project
Western Gray Squirrel Locations



TECI GIS LAB

Map 9

Saddleback Wind Power Project
Western Gray Squirrel
Intensive Survey Area



1 0 1 Miles

Survey Area

TECI GIS LAB

Map 10

APPENDIX B:
2004 NORTHERN SPOTTED OWL SURVEY DATA

APPENDIX C:
2004 NORTHERN SPOTTED OWL CALLING STATION LOCATIONS
NAD 1927 UTM

STATION NUMBER	X COORDINATE	Y COORDINATE
A01	612809.74626	5070718.96470
A02	613169.26479	5068897.20043
A03	607286.17970	5070634.17310
A04	612906.65094	5071118.69649
A05	613766.67994	5071621.38950
A06	612706.78504	5071524.48482
A07	611858.86912	5071251.94042
A08	612010.28268	5071984.78203
A09	611144.19713	5072148.30867
A10	612185.92240	5072778.18907
A11	611780.13407	5073214.26012
A12	610895.87890	5073504.97415
A13	611386.45882	5072590.43626
A14	610344.73355	5073311.16479
A15	609363.57370	5073226.37320
A16	611890.57048	5068802.04178
A17	611593.19971	5067951.56138
A18	612622.10258	5068498.72360
A19	611997.62396	5067856.40273
A20	610956.82626	5068760.40987
A21	611186.59293	5071548.71099
A22	608509.60124	5073062.84656
A23	608085.64328	5072220.98718
A23B	608539.88395	5071827.31193
A24	607425.48017	5072717.62365
A25	606953.06987	5072554.09701
A26	607237.72736	5071409.41052
A27	611368.28920	5066879.11689
A28	610338.67701	5065080.32383
A30	612252.54437	5065449.77291
B01	612252.54437	5070452.47684
B02	611707.45556	5070246.55440
B03	611731.68173	5069410.75156
B04	610829.25693	5069568.22166
B05	609957.11484	5069743.86139
B06	610435.58168	5070355.57216
B07	610187.26345	5071167.14883
B08	610066.13261	5071694.06800

STATION NUMBER	X COORDINATE	Y COORDINATE
B09	609321.17790	5071482.08902
B10	609405.96950	5072178.59139
B10A	610368.95972	5072384.51382
B11	609557.38305	5070579.66422
B12	609369.63024	5069858.93569
B13	608630.73208	5070107.25393
B14	608789.81169	5069375.00731
B15	609896.54942	5068920.17164
B16	609829.92746	5068199.44311
B18	609024.40733	5067817.88094
B20	609030.46387	5067115.32204
B21	607492.10214	5070143.59318
B22	608140.15216	5068889.88893
B23	605923.45768	5069483.43007
B24	607794.92925	5066594.45940
B25	608206.77412	5066370.36734
B26	607595.06335	5065910.07012
B27	607831.26850	5065104.55000
B28	608594.39283	5064601.85699
B29	610356.84663	5066618.68557
B30	610653.61721	5065904.01358
B31	605802.32684	5071142.92266
B32	605971.91002	5070155.70626
B32B	606274.73714	5072002.95166

APPENDIX D:
NORTHERN GOSHAWK DATA FORMS

APPENDIX E:
WESTERN GRAY SQUIRREL DATA FORMS

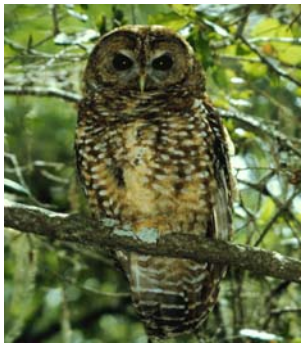
C-6

Final Report: Results of Northern Spotted Owl, Northern Goshawk, Western Gray Squirrel Surveys Conducted for the Saddleback Wind Energy Project. Prepared for SDS Lumber.

Turnstone Environmental Consultants, Inc. 2008

2008 Final Report

Results of Northern Spotted Owl, Western Gray Squirrel and Northern Goshawk Surveys Conducted for the Saddleback Wind Energy Project


Prepared for:

SDS Lumber Company

Prepared by:

Turnstone Environmental Consultants, Inc.
10902 NW Skyline Blvd
Portland, Oregon 97231

March, 2009

Table of Contents

1. PROJECT OVERVIEW 1

2. NORTHERN SPOTTED OWL 1

2.1. SUITABLE HABITAT 2
2.2. SURVEY LOCATIONS 2
2.3. SURVEY METHODS 4

3. WESTERN GRAY SQUIRREL 5

3.1. SUITABLE HABITAT 6
3.2. SURVEY LOCATIONS 7
3.3. SURVEY METHODS 8

4. NORTHERN GOSHAWK 8

4.1. SUITABLE HABITAT 8
4.2. SURVEY LOCATIONS 9
4.3. SURVEY METHODS 10

5. SURVEY RESULTS 11

5.1. NORTHERN SPOTTED OWL 11
5.2. ALTERATIONS TO THE NORTHERN SPOTTED OWL SURVEY AREA 13
5.3. WESTERN GRAY SQUIRREL 14
5.4. ALTERATIONS TO THE WESTERN GRAY SQUIRREL SURVEY AREA 15
5.5. NORTHERN GOSHAWK 15
5.6. ALTERATIONS TO THE NORTHERN GOSHAWK SURVEY AREA 17

6. CONCLUSION 17

6.1. NORTHERN SPOTTED OWL 17
6.2. WESTERN GRAY SQUIRREL 18
6.3. NORTHERN GOSHAWK 18

7. REFERENCES 19

APPENDIX A – MAPS ..... ERROR! BOOKMARK NOT DEFINED.

APPENDIX B - NSO SURVEY FORMS..... ERROR! BOOKMARK NOT DEFINED.

APPENDIX C - NORTHERN GOSHAWK SURVEY FORMS ERROR! BOOKMARK NOT DEFINED.

APPENDIX D - WESTERN GRAY SQUIRREL SURVEY FORMSERROR! BOOKMARK NOT DEFINED.

1. PROJECT OVERVIEW

SDS Lumber Company (SDS) retained the services of Turnstone Environmental Consultants, Inc. (Turnstone) to perform Northern spotted owl (spotted owl), Western gray squirrel (gray squirrel) and Northern goshawk (goshawk) surveys in potential habitat for the Saddleback Wind Energy Project, located in Skamania County, Washington. Survey information will be used to assess the presence, occupancy and reproductive status of spotted owl, gray squirrel and goshawk individuals and populations within areas of proposed management activities.

The physiographic range of spotted owl, gray squirrel and goshawk populations are potentially located within the forestlands of the Saddleback Wind Energy Project. As part of the process to avoid "take" of any state or federally listed species, landowners must conduct surveys to determine the presence of any potentially listed species, prior to conducting any management activities.

Wildlife surveys were conducted using the best information available at the time, following strict adherence to protocol guidelines and habitat requirements to obtain full compliance with agency requirements. All potential habitat and buffers were determined based on the proposed location of the proposed wind turbine locations. In late October of 2008, the final proposed turbine alignment was released and the locations of the turbines were slightly altered from their original location. Following the analysis of the new alignment, Turnstone biologists determined that a few areas that were surveyed for spotted owls, goshawks and gray squirrels in 2008, now did not require surveys, while other areas now required additional survey effort. The survey implications caused by the adjustments to the turbine locations, will be discussed in further detail in the results sections of this document.

2. NORTHERN SPOTTED OWL

Under the federal Endangered Species Act of 1973, the Northern spotted owl (*Strix occidentalis caurina*) was listed in 1990 as "threatened" by the United States Fish and Wildlife Service. The Washington Fish and Wildlife commission listed the Northern

spotted owl as a state endangered species in 1988 (Buchanan and Swedeen, 2004). Both federal and state agencies determined that the spotted owl is likely to become an endangered species in the foreseeable future throughout all or a significant portion of its existing range. The northern spotted owl's range extends from Washington State to Northern California. A recently revised species recovery plan is in effect for the northern spotted owl (USFWS 2008).

2.1. Suitable Habitat

In Washington, spotted owls inhabit the Eastern and Western Cascades, Western Lowlands, and Olympic Peninsula Provinces. Within these regions, the spotted owl has specific habitat requirements for nesting, roosting, foraging and dispersal. The species utilizes forests with multi-layered canopies and a high incidence of large trees for nesting and roosting. Fragmented habitats may be used for dispersal and foraging. Spotted owls nest primarily in large tree cavities and on broken tops of large trees. Spotted owls have also been reported as nesting on clumps of mistletoe, on large branches, in abandoned stick nests of Northern goshawks and in cavities of embankments and rock faces (LaHaye 1999).

For the purposes of this project, potentially suitable spotted owl habitat was determined to be coniferous stands with average tree DBH greater than 12 inches and canopy closure of at least 60% or greater. Cut areas or young coniferous plantations that did not meet the minimum DBH or canopy closure parameters were excluded from the survey effort. The resulting designated survey areas would contain nesting roosting, foraging and, dispersal habitat.

2.2. Survey Locations

Turnstone conducted spotted owl surveys within and adjacent to properties managed by SDS and cooperating adjacent landowners. Surveys were conducted in all potentially suitable habitat within the 1.8 mile provincial home range radius of the proposed project area. To determine the potential spotted owl survey areas, the proposed turbine alignments were buffered out to a 1.8 mile radius. This created a large polygon of

potential survey area that included 14,901 acres of land area. This polygon did not contain a contiguous area of potentially suitable spotted owl habitat. Suitable habitat within the overall polygon resembled a patchwork of stands that would require survey.

The delineated potential survey area polygon intersected 2 owl activity centers where historic spotted owl individuals once resided. A designated spotted owl activity center in this area of Washington is equal to a circle with a 1.8 mile radius. The spotted owl activity centers are located on public land north of the project area. The nest cores of these activity centers reside on public land managed by the Washington Department of Natural Resources (WDNR) and the U.S. Forest Service (USFS). Typically spotted owl activity centers will have their status changed to historic after three consecutive years of not being occupied by spotted owls. Currently the state of Washington has a moratorium on changing the status of a known spotted owl activity center to a historic status. The activity center areas intersect (1.8 mile radius provincial range), the northern reach of the delineated potential survey area polygon. The Mill Creek activity center (MSNO# 0991) was located and designated in 1992 and was last considered to have spotted owls present in 2000. The Moss Creek activity center (MSNO#1003) was located and established in 1994 and was last considered to have spotted owls present in 2002. Table 4, in the results section of this document, represents the survey summaries for these activity centers for 1994 thru 2008. These two activity centers are adjacent to one another and overlap by approximately 15%. Due to the adjacency of these spotted owl activity centers, it was decided to survey potential suitable habitat within the activity centers in addition to the survey area determined by 1.8 mile buffer of the proposed turbine alignments. This added an additional 7,222 acres of area that was included in the overall potential survey area. Within this 7,222 acres of area there was a patchwork mix of potentially suitable spotted owl habitat and non-habitat

Table 1. Township and Range information for northern spotted owl survey areas.

Legal Descriptions for Spotted Owl Survey Areas		
Township	**Range**	**Section**
3N	9E	1,2,11,12,12,14,23,24,25
3N	10E	4-6,7-9,16-18,19,20,30

4N	9E	23,24,25,26,27,34,35,36
4N	10E	19-22, 27-30,31-34

2.3. Survey Methods

Potential northern spotted owl habitat was surveyed in 2008 in accordance with the 1992, revised version of "Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls". This survey protocol is endorsed by the U.S. Fish and Wildlife Service. Under this protocol, Turnstone initiated the 2-year survey effort in early May of 2008. Under the two year survey methodology, a minimum of 3 visits must be performed for 2 consecutive years in order to determine presence/absence of the spotted owl.

Prior to initiating field surveys, Turnstone biologists analyzed the project area using topographic maps, aerial photography and stand classification data to determine suitable habitat for potential broadcast calling station placement. When possible, broadcast calling stations were placed along ridges and away from streams to maximize coverage by enhancing sound transmission. Broadcast calling stations and survey routes were situated to achieve complete coverage of the potential survey area, preferably with coverage from more than one calling point. Stations were spaced approximately ¼ to ½ mile apart where access was possible and permitted and suitable habitat was present. All broadcast calling stations were surveyed at night when owls are more active and are thought to be more responsive to standard survey techniques (USDI 1992). Per protocol guidelines, Turnstone biologists used ten-minute calling periods at each designated broadcast calling station. Voice hooting, amplified PA systems and "hoot flutes" were used to broadcast both male and female spotted owl vocalizations that included four-note contact calls and various agitated calls. Turnstone conducted surveys between March 15th and August 31st, 2008, as stipulated by the protocol.

During the first round of spot calling, an additional day visit was made to each of the two spotted owl activity centers adjacent to the main project (Mill Crk, and Moss Crk.). The day visits conducted by Turnstone staff were made in addition to the 3 required survey

visits per the protocol guidelines. The intent of these day visits was to further verify if spotted owls were occupying the historic spotted owl nest cores. Turnstone biologists hiked into the historic nest cores and hiked intuitive meandering survey transects, broadcasting spotted owl vocalizations with an amplified PA system while listening for responses.

The Mill Creek and Moss Creek nest cores are currently being surveyed as part of a long term demography study conducted by the Washington Department of Natural Resources on lands within the Klickitat Habitat Conservation Plan Planning Unit. The study was initiated in 2001 and was slated to run for 5 years. In 2007, a new 3 year contract was initiated to extend the survey effort for another 3 years. The fieldwork for the project is carried out by staff from the National Council for Air and Stream Improvement (NCASI), and follows a different standardized survey protocol. Each year NCASI performs a minimum of 6 day/night survey visits to the monitored owl cores. Survey summary details of the survey results for each of these spotted owl cores can be reviewed in Table 4 of this document.

During the 2008 survey season, Turnstone recorded all owl species responses from each calling station during each site visit. Turnstone biologists also recorded all sightings of or responses by potential spotted owl predators to include: barred owls, great horned owls, northern goshawks and other raptor species. The presence of any of these species may affect northern spotted owl responses.

3. Western Gray Squirrel

The western gray squirrel (*Sciurus griseus*) was listed as a “threatened” species by the Washington Fish and Wildlife Commission in 1993. In November of 2007, the State of Washington adopted a species recovery plan for the Western Gray Squirrel which is currently in effect.

In January of 2001, a petition was filed with the United States Fish and Wildlife Service to list the Washington State population of the western gray squirrel as a distinct

population segment (DPS) in an effort to secure protection for the species under the Endangered Species Act of 1973 (ESA). The petition underwent a 12 month period of review and a ruling was announced May 30, 2003. This ruling stated the petition action was not warranted because the Washington population of the Western Gray Squirrel is not a DPS therefore, no protection under the ESA would be granted (Federal Register, 2003). There is currently no federal protection for the western gray squirrel.

The physiographic range and habitat requirements of the western gray squirrel are located within the forestlands of the Saddleback Wind Energy Project.

3.1. Suitable Habitat

Western gray squirrels are arboreal (adapted for living in trees) and, although they forage on the ground, they rarely stray far from trees. They use tree canopies for escape, cover and nesting. Western gray squirrels can move rapidly and cover long distances among tree canopies when canopy conditions permit. A contiguous tree canopy that allows arboreal travel for at least 198 feet (60 meters) around the nest is an important feature of western gray squirrel habitat (Ryan and Carey 1995a). Western gray squirrels are active throughout the day but are most active in the morning. Western gray squirrels are most active in August and September, when they are collecting and storing food for winter, and they are less visible in June and July (Ryan and Carey 1995a).

Currently in Washington, the western gray squirrel distribution has been reduced to three geographically isolated western gray squirrel populations in Washington: the “Puget Trough” population, now centered in Thurston and Pierce counties in the Puget Sound region; the “South Cascades” population in extreme eastern Skamania County and Klickitat and Yakima counties; and the “North Cascades” population in Chelan and Okanogan counties.

In Washington, and elsewhere within the subspecies’ range, the principal food is acorns, although the seeds of Douglas-fir and other conifers are also eaten (Dalquest 1948). While pine nuts and acorns are considered essential foods for storing body fat and conditioning western gray squirrels for winter, green vegetation, seeds and nuts of trees

and shrubs, fleshy fruits, mushrooms and other foods are also consumed. Hypogeous fungi (underground fungi such as truffles) comprise a large portion of the western gray squirrel diet (WDW 1993; Carraway and Verts 1994; Ryan and Carey 1995a).

For the purposes of this project, potentially suitable western gray squirrel potential habitat was defined as any coniferous, deciduous or mixed stands of trees that contained trees with an average diameter at breast height (DBH) of at least 10 inches or greater

3.2. Survey Locations

Turnstone conducted western gray squirrel nest surveys on approximately 738 acres of potentially suitable habitat within the project area. The survey methodology was determined with consultation with a WDFW staff biologist. Within the project area, potential gray squirrel survey areas were determined by using GIS analysis and ground-truthing. The GIS analysis was used to determine areas of potentially suitable squirrel habitat prior to conducting field visits and the ground-truthing was used to validate and finalize the initial GIS analysis.

Western gray squirrel nest surveys were required in any areas where project activities would remove potential western gray squirrel habitat or possibly impact habitat due to structural modification, including stand thinning. Surveys would be required on all habitat that would be altered and continue 400 feet into unaltered habitat. To determine the areas to be surveyed, the proposed energy project infrastructure (primarily proposed wind turbines), was buffered out 150 feet (150 foot radius) to establish a work zone. Then an additional 500 feet of buffer was added, to encompass any areas that may need to be altered due to obstructions (tall trees) within wind corridors of the proposed turbines. Finally an additional 400 feet was buffered onto this distance to satisfy the guideline to survey 400 feet into unaltered habitat. Adding all buffers together, totaled 1,050 foot radius of area to be surveyed. The overall area delineated out by using this buffering process was equal to 1,420 acres. Within this area 738 acres was determined to be potentially suitable western gray squirrel habitat. The remaining 682 acres was determined to be non-habitat for the western gray squirrel.

The survey area was broken up into smaller discrete units to facilitate an efficient survey effort by Turnstone biologists. The discrete units were referred to as polygons and each got a unique identifier. A map of the western gray squirrel survey area polygons is located in Appendix A.

3.3. Survey Methods

Surveys were conducted according to the guidelines in the WDFW report, "Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance" (Haegen, Van Leuven, and Anderson 2004). Turnstone biologists performed a general search for western gray squirrels nests and western gray squirrel individuals in the fall of 2008.

Walk-through surveys using meandering transects were conducted in all conifer, deciduous, and mixed composition stands within the designated survey area that met the minimum DBH threshold of 10 inches. Surveyors were looking for squirrel nests and squirrel individuals of any species but focusing their attention on evidence of the western gray squirrel. Transects were oriented to parallel the topographic features of the survey polygons when possible. All transect were laid out systematically to ensure that they were evenly spaced and located close enough together so that no habitat areas were excluded from the survey.

4. NORTHERN GOSHAWK

The northern goshawk *(Accipiter gentiles)* is classified as a "species of concern" by the U.S. Fish and Wildlife Service and as a "listed candidate" for sensitive, threatened or endangered species by the Washington Fish and Wildlife Commission. Physiographic range and habitat requirements of the northern goshawk can be found within the forest lands of the Saddleback Wind Energy Project.

4.1. Suitable Habitat

Northern goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest and Douglas fir. Occasionally, goshawks nest in

coastal redwood and mixed hardwood forests. Goshawk nest sites are associated with patches of forest that are larger and denser than the surrounding landscape. However, home ranges often consist of a wide range of forest age classes and conditions. Numerous habitat studies and modeling efforts have found nest sites to be associated with similar factors, including proximity to water or meadow habitat, forest openings, level terrain or "benches" of gentle slope, northerly aspects and patches of larger, denser trees, but these factors vary widely (Woodbridge 2006).

4.2. Survey Locations

During the 2008 northern goshawk survey window, Turnstone conducted northern goshawk surveys within properties managed by SDS Lumber Co. These surveys covered approximately 1,100 acres of potential goshawk habitat. The potential survey area for the northern goshawk was determined by protocol parameters, consultation with biologists from the Washington Department of Fish and Wildlife and GIS analysis. Survey protocol methodology was outlined in the United States Forest Service document, "*Northern Goshawk Inventory and Monitoring Technical Guide, July 2006."* Table 2 depicts the legal descriptions of the where the goshawk survey areas occurred.

Table 2. Township and Range information for northern goshawk survey areas.

Legal Descriptions for Goshawk Survey Areas		
Township	**Range**	**Section**
4N	9E	1, 36
4N	10E	31,32
3N	9E	12,13,24
3N	10E	5,6,7,8,18

It was determined that the 'Broadcast Acoustical Survey" methodology outlined in this protocol would best suit the needs of the project. This approach requires a one or a two year survey effort determined by the characteristics of the site and the project. Due to the size of the goshawk survey area and the potential level of initial disturbance, a 2 year

survey effort will be used for the original 1,100 acres of potential goshawk habitat. The survey effort for goshawks will be complete after the 2009 surveys are complete.

To determine the area that would require goshawk surveys, a GIS analysis was executed using protocol parameters and available data. The proposed wind energy project infrastructure was buffered out 150 feet to establish a work area that would likely be permanently disturbed. Then an additional 2,624 feet, per protocol recommendations, was added to this initial buffer to establish an area that was considered the potential northern goshawk survey area. Within this area, GIS data was analyzed to identify stands of conifers that may contain suitable habitat structure based on an age class of greater than 25 years and average tree DBH of at least 12 inches. The resulting suitable habitat areas, or polygons, were then overlaid on current aerial photography (2006), to verify that the stands were still intact. This exercise created an initial potential survey area of 3,013 acres of land area. Of this area 1,093 acres was determined to be forested and contain the habitat characteristics needed to support goshawks. Initial calling points and survey transects were then established in GIS to adequately cover the 1,093 acres of potential goshawk habitat that would require survey. During the first goshawk survey field visit additional refinements were made to the goshawk survey areas based on ground-truthing of the potential habitat that was delineated out in GIS.

4.3. Survey Methods

The “broadcast acoustical” survey methodology requires 2 visits to the survey area in a season. The first site visit occurs in the ‘nestling period’, alarm and wail calls are broadcast at the designated calling points. During the second site visit in the ‘fledgling period’, wail and begging calls are broadcast. At each station, goshawk calls were broadcast with a portable amplified PA system for ten seconds. Turnstone biologists pause for thirty seconds to listen for goshawk responses, immediately following the broadcast calls. The sequence of broadcasting and listening for responses was repeated four times at each station, directed toward each of the four cardinal directions. During foot travel between broadcast points, the surveyor is staying alert and listening for

potential goshawk calls and looking for potential goshawk nests. The surveyor is also documenting observations of other raptors species.

Survey periods begin ½ hour before sunrise and conclude ½ hour before sunset, as specified by protocol. If there was a goshawk detected in the project area, then a search for an active nest would ensue, following the 'intensive search' protocol. Locating an active nest is recommended immediately following any goshawk detections; however, reviewing results from several surveys and stations can be advantageous for locating active nests. Turnstone also recorded all other incidental raptor species observed during site visit on the field data forms, which are included in *Appendix C*.

5. Survey Results

5.1. Northern Spotted Owl

Turnstone conducted the first year of spotted owl surveys with a minimum of three visits per calling station on SDS property and some adjacent property (*Appendix A).* Two spotted owl nest cores located public lands (WDNR, USFS) to the north of the project area were also surveyed. The Mill Creek (MSNO#: 0991) and Moss Creek (MSNO#: 1003) cores are located in Township 4N and Range 10E section 28 and Township 4N and Range 9E section 35, respectively. A total of 80 calling stations were established and surveyed with no northern spotted owl responses or observations. Responses from single barred owls and barred owl pairs were recorded during the three site visits from several different calling stations. The following table summarizes all of the Turnstone survey site results for the project area for the 2008 survey season. A map depicting the locations of the calling stations and locations of other owl observations is available for review in Appendix A of this document.

Table 3. Survey Summary Results for 2008.

Visit #	Dates	# of Stations	Northern Spotted Owl Response	Comments
1	21-May	12	None	No owl responses
1	22-May	20	None	No owl responses
1	24-May	18	None	Barred owls (2) one adult male, one adult female; near Stations #45 & #82
1	25-May	22	None	Barred owls (2) likely pair; near Stations #74 & #86
1	26-May	8	None	No owl responses
2	10-Jun	22	None	Barred owls (2) Male and unk. sex Barred owl; likely a pair, near Stations #74 & #86
2	11-Jun	20	None	No owl responses
2	15-Jun	17	None	No owl responses
2	16-Jun	21	None	Barred owl (1) Unk. Adult Barred owl from Stations #44 & #45
3	27-Jul	15	None	No owl responses
3	28-Jul	20	None	Barred owl (1) Male adult Barred owl detected from Station #82
3	29-Jul	24	None	No owl responses
3	30-Jul	22	None	No owl responses

Table 3 outlines the results of the northern spotted owl surveys at each of the two historic nest cores that intersect the project area. Results in the table were derived from combining data collected by the WDFW, NCASI demography study and Turnstone. The data shows no spotted owls were detected in the Mill Creek core since the 2000 breeding season. The Moss Creek core has not had a spotted owl detected since the 2002 breeding season. Both cores show an increased presence of barred owls detected while conducting the surveys for spotted owls in these areas.

Table 4. NSO Activity Center Survey Details and Results

Year	Mill Creek NSO Core Survey Results		Moss Creek NSO Core Survey Results	
	STOC	**STVA**	**STOC**	**STVA**
2008	No response	Present	No response	Present
2007	No response	Present	No response	Male observed
2006	No response	Present	No response	Male observed
2005	No response	Present	No response	Pair observed
2004	No response	Pair observed	No response	Pair with juvenile observed
2003	No response	None observed	No response	Pair observed
2002	No response	Male observed	Male	Pair with juvenile observed
2001	No response	None observed	No response	Pair observed
2000	Non-nesting pair observed	None observed	Reproducing pair with 1 juvenile	None observed
1999	Female observed	None observed	Reproducing pair with 1 juvenile	None observed
1998	Non-nesting pair observed	Female observed	Reproducing pair with 2 juveniles	None observed
1997	Non-nesting pair observed	None observed	No response	None observed
1996	Reproducing pair with 2 juveniles	N/A	Reproducing pair with 3 juveniles	N/A
1995	No response	N/A	Reproducing pair	N/A
1994	Reproducing pair with 2 juveniles	N/A	Reproducing pair	N/A

5.2. Alterations to the Northern Spotted Owl Survey Area

The final turbine alignment was released in late October of 2008 did not effect the survey coverage for the areas that were surveyed for spotted owls during the 2008 survey season. Micro-sighting adjustments were made to the north of the project area. Stations

were already set and surveyed due to the two activity centers at the northern reach of the project area.

5.3. Western Gray Squirrel

Three field visits were made the western gray squirrel survey areas by a total of three different biologists over a 12 day period. These visits together constituted a complete round of surveys to cover all potential habitat within the survey polygons. During the round of surveys, efforts were made to determine if western gray squirrels were currently using or had historically used any potential habitat within the potential survey area by conducting systematic nest search surveys. The potential survey area was determined using guidelines provided by WDFW staff biologists and GIS analysis. Western gray squirrel surveys were required on any potential western gray squirrel habitat that would be altered by the proposed energy project and include surveys a minimum of 400 feet into adjacent undisturbed potentially suitable squirrel habitat (per WDFW protocol guidelines).

All 26 survey polygons (appendix A) were examined and a formal nest search for western gray squirrel nest structures was performed using guidelines outlined by the protocol, *Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines, WDFW 2004*. During these visits, no western gray squirrels or western gray squirrel nest structures were observed.

Table 5. Western Gray Squirrel Survey Areas and Results

Survey Polygon Visited	Date	Surveyor	Notes
A1, A3, A7	10/14/2008	D. Sahl	No nests or WGS observed
A4, A5, A10	10/14/2008	J.Kolozar	No nests or WGS observed
A2, A6, A9	10/14/2008	J.Kolozar	No nests or WGS observed
A12, A13	10/15/2008	D.Sahl	No nests or WGS observed
A14	10/15/2008	D. Bolen	No nests or WGS observed
A15	10/15/2008	J. Kolozar	No nests or WGS observed
A11, A17, A18	10/15/2008	D. Sahl, D. Bolen, J. Kolozar	No nests or WGS observed
B1-B8	11/18/2008	D.Sahl, D. Bolen	No nests or WGS observed
C1	10/9/2008	D. Sahl	No nests or WGS observed

5.4. Alterations to the Western Gray Squirrel Survey Area

The final turbine alignment that was released in late October of 2008 did not affect the survey coverage for the areas that were surveyed for western gray squirrels during the 2008 survey season. The changes made in the final turbine alignment did create additional western gray squirrel survey areas. The survey window to conduct western gray squirrels was still open when the new areas were determined and an additional field visit was conducted and the new areas were surveyed.

5.5. Northern Goshawk

Turnstone conducted protocol northern goshawk surveys on SDS properties during the 2008 goshawk survey window. The survey protocol methodology used was the "broadcast acoustical" methodology, outlined in the protocol; "*Northern Goshawk*

Inventory and Monitoring Technical Guide, USFS, July 2006." Calling stations were strategically placed throughout the potential survey area, which was all suitable habitat within 2,624 feet of the designated work areas. Turnstone completed two protocol site visits to 136 calling stations during the 2008 goshawk survey season. One site visit was conducted during the nestling period and the second during the fledgling period as suggested in the protocol. No northern goshawk responses were documented during either of the two site visits. Survey dates and other incidental raptor observations are summarized in Table 6. Maps of the areas surveyed for northern goshawks are available for review in Appendix A. Copies of the field data sheets are available for review in Appendix C.

Table 6. Northern goshawk survey results summary 2008.

Visit #	# of Stations	Date	N. Goshawk Response	Other Raptors Observed
1	14	6/23	None	OSPR (1) near station 46 RTHA (1) near station 46
1	21	6/24	None	RTHA (1) near station 36
1	22	6/25	None	
1	25	6/26	None	
1	25	6/27	None	
1	11	7/15	None	TUVU (1) near station 62
1	15	7/16	None	COHA (1) near station 26
1	3	7/28	None	
2	7	7/28	None	
2	14	7/30	None	RTHA (1) near station 67
2	22	7/31	None	TUVU (1) near station 95 TUVU (1) near station 78
2	16	8/01	None	
2	23	8/04	None	RTHA (1) near station 22
2	25	8/05	None	SSHA (1) near station 9 TUVU (8) near station 12
2	19	8/06	None	
2	10	8/07	None	

COHA = Cooper's hawk *(Accipiter cooperii)*
OSPR = Osprey *(Pandion haliaetus)*
RTHA = Red-tailed hawk *(Buteo jamaicensis)*
SSHA = Sharp-shinned hawk *(Accipter striatus)*
TUVU = Turkey vulture *(Cathartes aura)*

5.6. Alterations to the Northern Goshawk Survey Area

The final turbine alignment that was released in late October of 2008, did affect the survey coverage for the areas that were surveyed for northern goshawks during the 2008 survey season. The changes made in the final turbine alignment created an additional 367 acres of potential survey area. The survey window to conduct northern goshawks was closed when the new survey areas were determined. These new survey areas will be included in the overall survey effort. The new survey area acreage may be reduced, if ground-truthing efforts in 2009 determine that some areas are composed of non-habitat. Due to the additional survey areas being determined after the close of the 2008 goshawk survey window, and the small size of the areas, a one year survey effort will be initiated in 2009, to the newly designated survey area. The survey methodology used will be the "Intensive Search Survey" protocol as outlined in the United States Forest Service document, "*Northern Goshawk Inventory and Monitoring Technical Guide, July 2006."* Under this protocol methodology, the new survey areas will only need to receive a single year of goshawk surveys in order to determine goshawk presence.

Maps of the original and adjusted northern goshawk survey areas can be reviewed in appendix A of this document.

6. CONCLUSION

6.1. Northern Spotted Owl

During the 2008 Northern spotted owl survey season, Turnstone conducted three site visits in each of the designated spotted owl calling points and an additional day visit to two separate nest cores where spotted owls once resided. This survey effort covered potentially suitable northern spotted owl habitat within the approximately 22,123 acre survey area. A total of 80 calling stations were established and surveyed. Turnstone recorded no Northern spotted owl observations or responses during any of these visits. Under the direction of SDS, Turnstone will utilize the calling stations established in 2008 and continue to survey potential habitat within the project area in 2009 in order to ensure proper adherence to the US Fish and Wildlife northern spotted owl survey protocol.

6.2. Western Gray Squirrel

During the 2008 western gray squirrel survey season, Turnstone biologists conducted nest searches to 26 different polygons of potential western gray squirrel habitat. These polygons totaled 738 acres of potentially suitable western gray squirrel habitat. All visits were conducted within the guidelines outlined the appropriate survey protocol. Turnstone biologists did not observe any Western gray squirrels or their nest structures during any of these visits.

Acorn crops from oak trees are an important food source for western gray squirrels. It should be noted that very few oak trees were observed in the project area. The few that were observed within the western gray squirrel survey area boundaries were small (less than 20 feet tall), stunted, and growing in openings on exposed rocky slopes in shallow soils.

6.3. Northern Goshawk

During the 2008 northern goshawk survey season, turnstone conducted surveys at 138 calling points covering 1,100 acres of potentially suitable goshawk habitat. No northern goshawk responses or observations were recorded during the two site visits during the 2008 breeding season. The 2006 "Northern Goshawk Inventory and Monitoring Technical Guide" developed for the United States Forest Service (USFS) recommends a two year survey effort for assessing the occupancy and reproductive status northern goshawks when surveying large tracts of land with the "broadcast acoustical" survey methodology. Under the direction of SDS, Turnstone will conduct surveys in two visits at the same calling stations that were established in 2008 in 2009. Additional survey areas that were added after the close of the 2008 goshawk survey season, will be surveyed in 2009, with a one or two year effort depending on project parameters and consultation with WDFW.

7. REFERENCES

Buchanan, Joseph and Swedeen, Paula. 2005. Final Briefing Report to the Washington State Forest Practices Board Regarding Spotted Owl Status and Forest Practice Rules. Washington Department of Fish and Wildlife, Olympia, Washington. USA.

Carraway, L. N., and B. J. Verts, 1994. *Mammalian Species*, No. 474, Sciurus griseus Dec. 2, 1994, pp. 1-7 American Society of Mammalogists

Cross, S. P., 1969. Behavioral aspects of western gray squirrel ecology. Tucson, AZ: University of Arizona. 168 p. Ph.D. dissertation.

Dalquest, W. W., 1948. Mammals of Washington. University of Kansas Publications, Museum of Natural History, 2:1 – 444.

Federal Register, 2003. Endangered and Threatened Wildlife and Plants; Status Review and 12-Month Finding for a Petition to List The Washington Population of the Western Gray Squirrel. 68 Federal Register 111 (10 June 2003), pp. 34628 - 34640.

Luoma, D.L. 1991. Annual changes in seasonal production of hypogeous sporocarps in Oregon Douglas-fir forests. In: Ruggiero, L.F.; Aubry, K.B.; Carey, A.B.; Huff, M.H., tech. coords. Wildlife and vegetation of unmanaged Douglas-fir forests. Gen. Tech. Rep. PNW-GTR-285. Portland, OR: U.S. Department of Agriculture, Forest Service. Pacific Northwest Research Station: 83-90.

Ryan, L. A. and Carey 1995a Ryan, L. A.; Carey, A.B. 1995b. Distribution and Habitat of the Western Gray Squirrel (*Sciurus griseus*) on Fort Lewis, Washington. Northwest Science 69(3):204-216

U.S. Fish and Wildlife Service (USFWS) 2008. Final Recovery Plan for the Northern Spotted Owl, *Strix occidentalis caurina*. U.S. Fish and Wildlife Service, Portland, Oregon. xii + 142 pp.

U.S. Fish and Wildlife Service (USFWS) 1992. Recovery Plan for the Northern Spotted Owl. United States Fish and Wildlife Service.

U.S. Department of the Interior (USDI) 1992. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls. United States Fish and Wildlife Service. 16 pp.

Washington Department of Wildlife (WDW) 1993. Status of the Western Gray Squirrel (*Sciurus griseus*) in Washington. Olympia, WA: Wash. Dept. of Wildlife. Final status report. 36 p.

Woodbridge, B.; Hargis, C.D. 2006. Northern goshawk inventory and monitoring technical guide. Gen. Tech. Rep. WO-71. Washington, DC: U.S. Department of Agriculture, Forest Service. 80 p.

Vander Haegen, M., S. Van Leuven, and D. Anderson. 2004. Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance. Wildlife Research Report. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Appendix A – Maps

Saddleback Mt. Project Area

2008 Owl Survey Results

Calling Round 1

- 2008 Owl Detections
- 2008 Owl Detections
- NSO Calling Points

ROADS

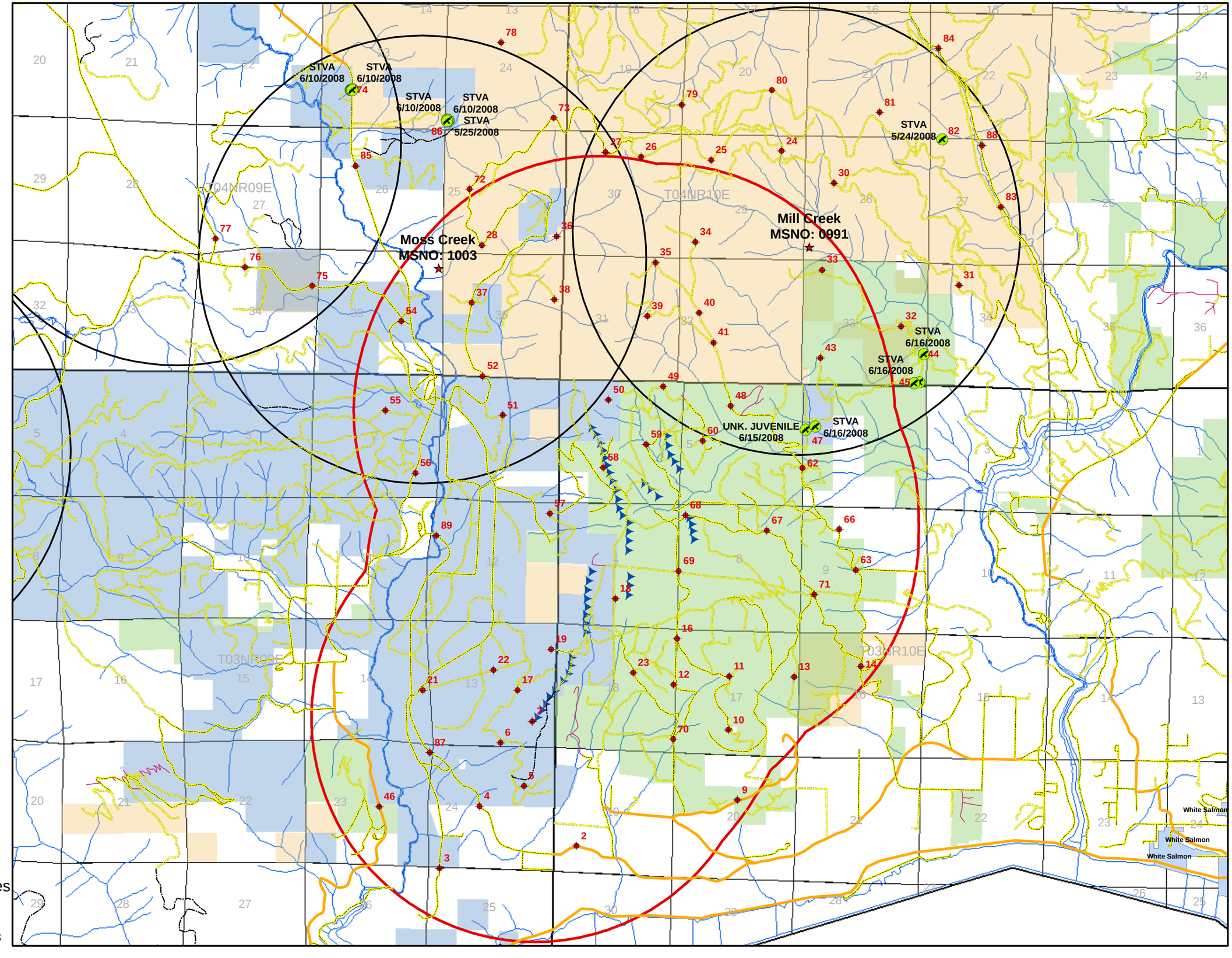
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- Historic NSO Nests
- Project NSO Survey Area (1.8 mile buffer)
- NSO Circle
- TOWER_LOCATIONS
- SDS Ownership
- BLC Ownership
- DNR Ownership

N

1:45,000

0 0.4 0.8 1.6 Miles

Map Created 8/25/2008



Saddleback Mt. Project Area

2008 Owl Survey Results

Calling Round 2

- 2008 Owl Detections
- NSO Calling Points

ROADS

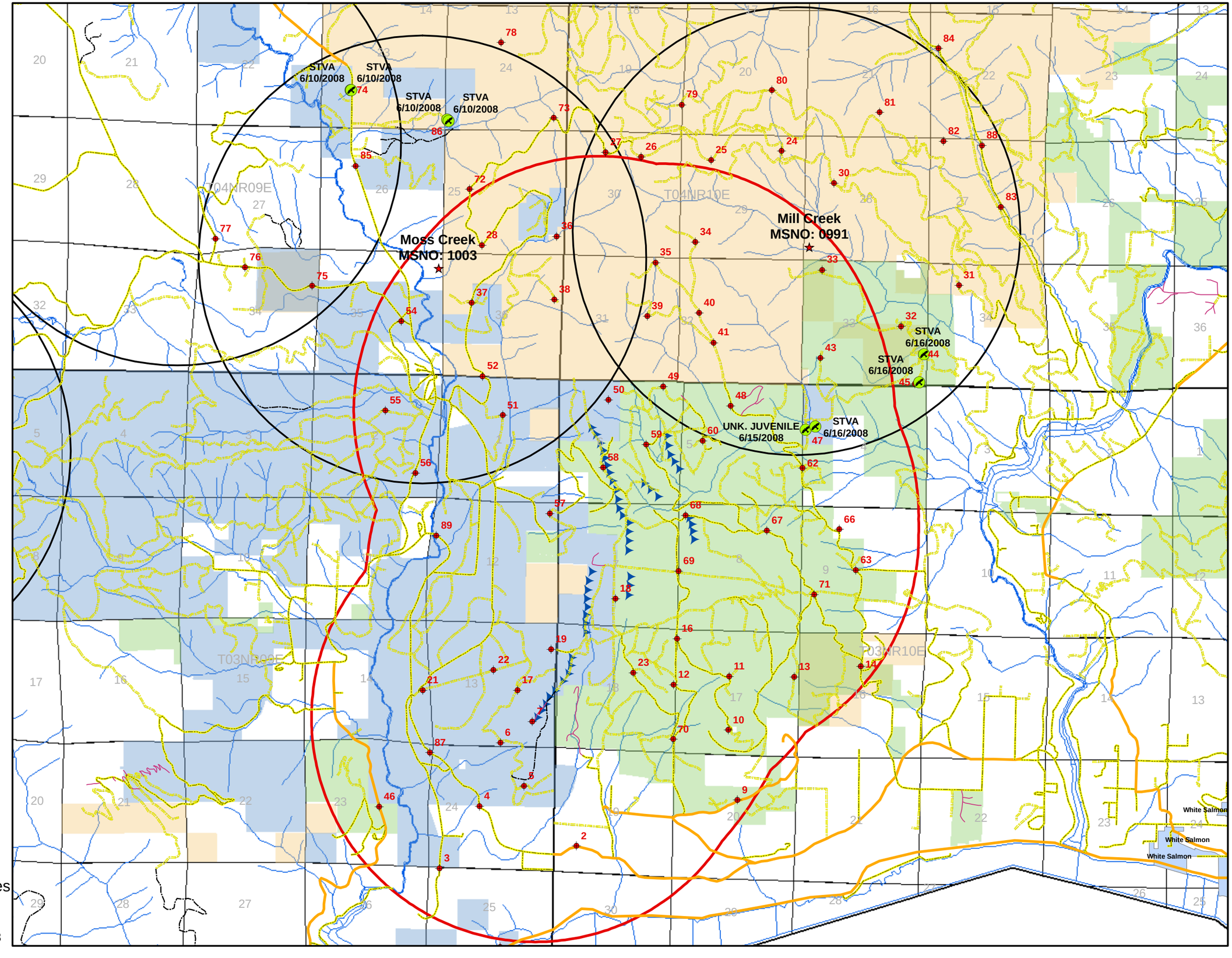
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- Historic NSO Nests
- Project NSO Survey Area (1.8 mile buffer)
- NSO Circle
- TOWER_LOCATIONS
- SDS Ownership
- BLC Ownership
- DNR Ownership

N

1:45,000

0 0.4 0.8 1.6 Miles

Map Created 8/25/2008



Saddleback Mt. Project Area

2008 Owl Survey Results

Calling Round 3

2008 Owl Detections

NSO Calling Points

ROADS

Other

HWY

DIRT

ROCK

TRAIL-4WD

Historic NSO Nests

Project NSO Survey Area (1.8 mile buffer)

NSO Circle

TOWER_LOCATIONS

SDS Ownership

BLC Ownership

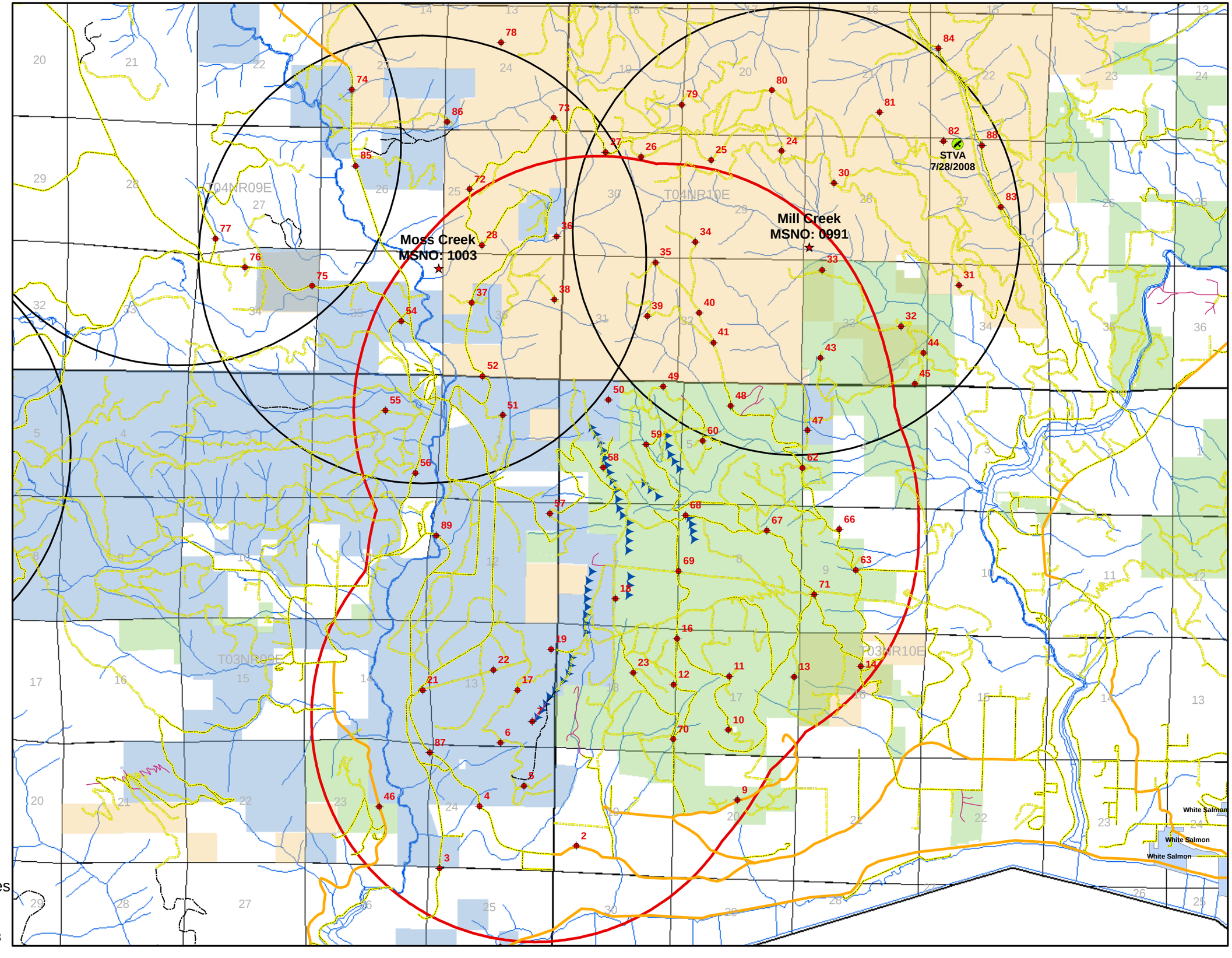
DNR Ownership

N

1:45,000

0 0.4 0.8 1.6 Miles

Map Created 8/25/2008



Saddleback Mt. Project Area

2008 Northern Goshawk Survey Areas Overview Map

Final Proposed Turbine Alignment

Original Proposed Turbine Alignment

Northern Goshawk Survey Points

New Goshawk Survey Areas (not surveyed in 2008)

Original Goshawk Survey Areas

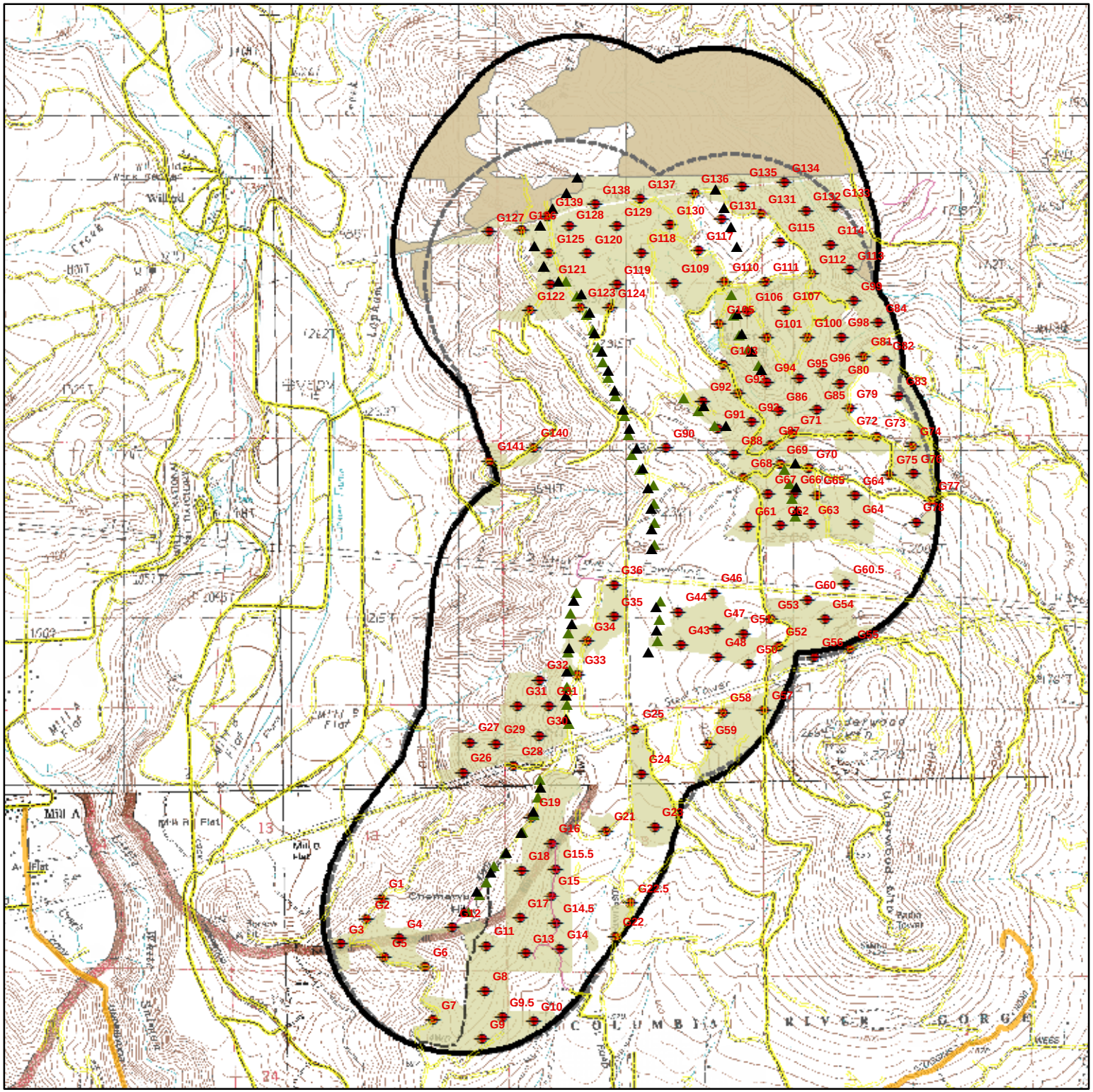
Roads

- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD

0 1,375 2,750 5,500 Feet

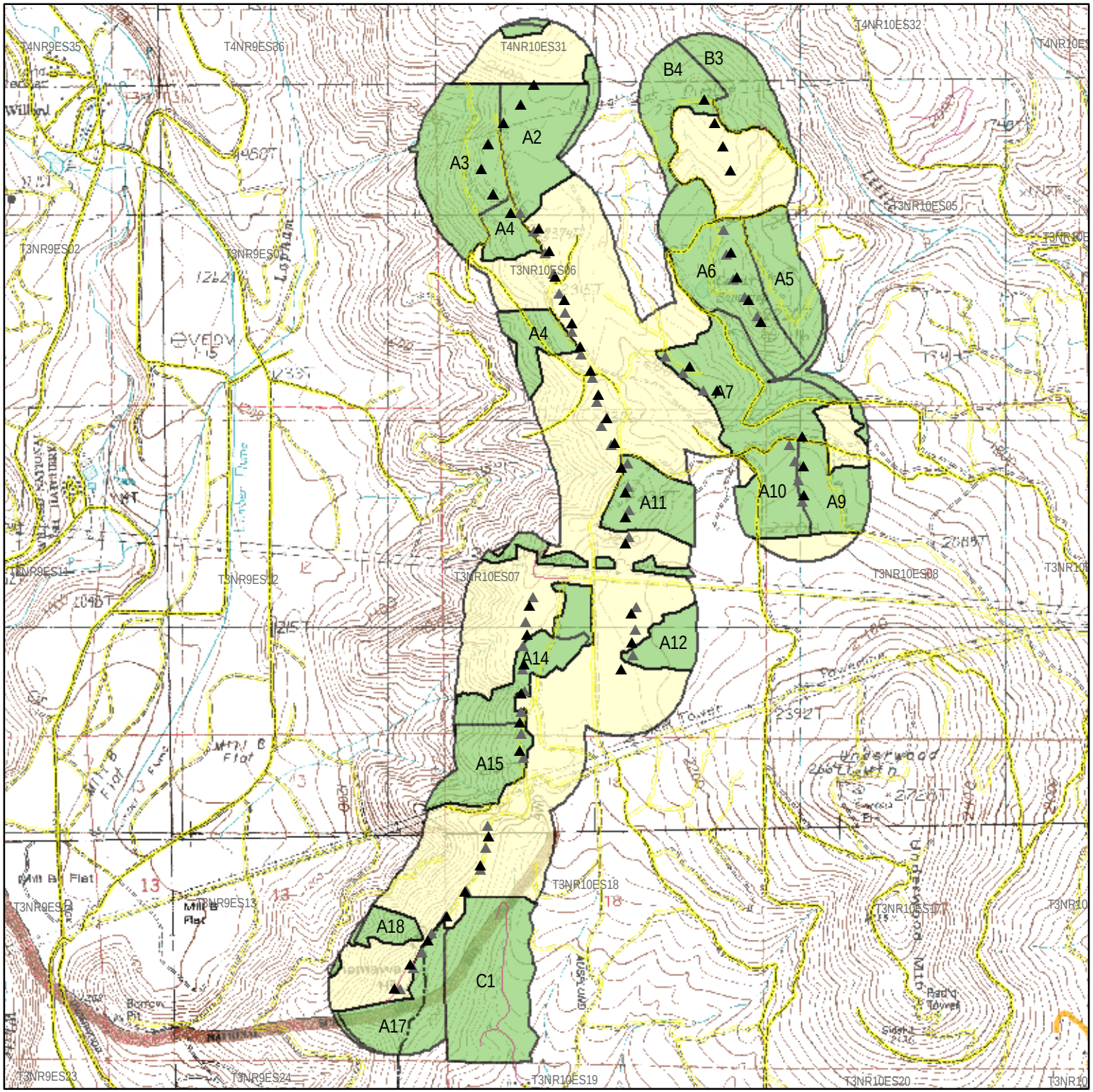
TURNSTONE ENVIRONMENTAL CONSULTANTS

Map Created 12/4/2008



Saddleback Mt. Project Area

2008 Western Gray Squirrel Survey Areas Overview Map



Final Proposed Turbine Locations

Original Proposed Turbine Locations

WGS Survey Areas

Non-habitat or Clearcut Areas

Roads

- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD

0 1,100 2,200 4,400 Feet

TURNSTONE ENVIRONMENTAL CONSULTANTS

Map Created 11/21/2008

APPENDIX B - NSO SURVEY FORMS

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Lumber **Owl Site(s):** _____ **Visit #** 1

Project Area: Saddleback Mt. Project **Crew:** DANA N. McCoskey **Month:** 05 **Day:** 21, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
2		2202	2212	3	DR	N														
4		2214	2224	3	DR	N														
3		2227	2237	3	DR	N														
87		2239	2249	3	DR	N														
21		2252	2302	3	DR	N														
22		2304	2314	3	DR	N														
19		2318	2328	3	DR	N														
17		2332	2342	3	DR	N														
6		2345	2355	3	DR	N														
5		0009	0019	3	DR	N														
46		0031	0041	3	DR	N														
8		0056	0106	3	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 1

Project Area: Saddleback Mt. Project **Crew:** DANA N. McCOSKEY **Month:** 05 **Day:** 22, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
14		2031	2041	3	CL	N														
64		2048	2058	3	CL	N														
63		2101	2111	3	CL	N														
66		2112	2122	3	CL	N														
62		2124	2134	3	CL	N														
47		2137	2147	3	CL	N														
49		2152	2202	3	CL	N														
41		2205	2215	3	CL	N														
40		2217	2227	3	CL	N														
35		2231	2241	3	CL	N														
39		2245	2255	3	CL	N														
71		2321	2331	3	CL	N														
13		2333	2343	3	CL	N														
67		2347	2357	3	CL	N														
68		2359	0009	3	PC	N														
58		0012	0022	2	PC	N														
50		0026	0036	0	DR	N														
23		0049	0059	0	DR	N														
70		0102	0112	0	DR	N														
18		0123	0133	0	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Lumber **Owl Site(s):** _____ **Visit #** 1

Project Area: Saddleback Mt. Project **Crew:** Dana N. McCloskey **Month:** 05 **Day:** 22, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
7		0141	0151	Ø	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER — **Owl Site(s):** — — **Visit #** 1

Project Area: SADDLEBACK MT. PROJECT — **Crew:** D. SAHL — **Month:** 05 **Day:** 24, **2008**

Tape Voice **Flute** **Other:** _____ — **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
43	X	2130	2140	1	PC	N														
45		2212	2242	1	PC	B	F	A	STVA	4/A	2220	2242	270	30	4N	10E	33	SE		
44		2252	2303	1	PC	N														
87		2330	2341	1	PC	N														
88		2345	2356	1	PC	N														
83		2358	0009	1	PC	N														
31		0020	0031	2	PC	N														
82		0052	0115	1	PC	V	M	A	STVA	4/A	0100	0115	290	80	4N	10E	27	NW		
81		0130	0141	1	PC	N														
30		0147	0156	1	PC	N														
24		0203	0214	1	PC	N														
25		0220	0231	1	PC	N														
26		0235	0246	1	PC	N														
27		0249	0259	1	PC	N														
73		0304	0314	1	PC	N														
78		0336	0346	2	PC	N														
79		0407	0417	1	PC	N														
90		0437	0447	1	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments: 43, Short Hike due to Ruts/ would be Accessible by ATV.

45: Bird Came in Silent and flew off and dissapeared for ~ 5min. then Returned + vocalized, Bird that returned may have been a different bird due to inability to sex bird before it dissapeared.

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 1

Project Area: Saddleback Mt. Project **Crew:** D. SAHL **Month:** 05 **Day:** 25, 2008

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
49		2010	2020	0	PC	N														
60		2023	2033	0	PC	N														
59		2039	2049	0	PC	N														
69		2109	2119	2	PC	N														
10		2141	2151	2	PC	N														
11		2155	2205	2	PC	N														
16		2210	2220	0	PC	N														
12		2223	2233	0	PC	N														
9		2242	2252	0	PC	N														
57		2322	2332	0	PC	N														
74		2354	0009	0	PC	B	M	A	STVA	A/B	0003	0009	360	20	4N	9E	23	SW		
74		2354	0009	0	PC	B	F	A	STVA	A/B	0006	0009	360	20	4N	9E	23	SW		
86		0024	0034	0	PC	B	M	A	STVA	A/B	0031	0034	20	10	4N	9E	24	SW		
86		0024	0034	0	PC	B	F	A	STVA	B	0030	0034	20	10	4N	9E	24	SW		
76		0100	0110	0	PC	N														
75		0125	0135	0	PC	N														
54		0138	0148	0	PC	N														
95		0151	0201	1	DR	N														
56		0209	0219	1	DR	N														
52		0223	0233	1	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments: 74: Birds appear to be apair, very vocal + agitated
86: Likely Same Birds as #74

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 1

Project Area: Saddleback Mt. Project **Crew:** D. SAHL **Month:** 05 **Day:** 25, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
37		0239	0249	1	DR	N														
36		0253	0303	1	DR	N														
28		0310	0320	0	DR	N														
72		0323	0333	0	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. **Sex:** M = male, F = female, U = unknown. **Age:** A = adult. S = subadult, J = juvenile **Species. Codes:** STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), Stan = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 1

Project Area: SADDLEBACK MT. PROJECT **Crew:** D. SAHL **Month:** 05 **Day:** 26, **2008**

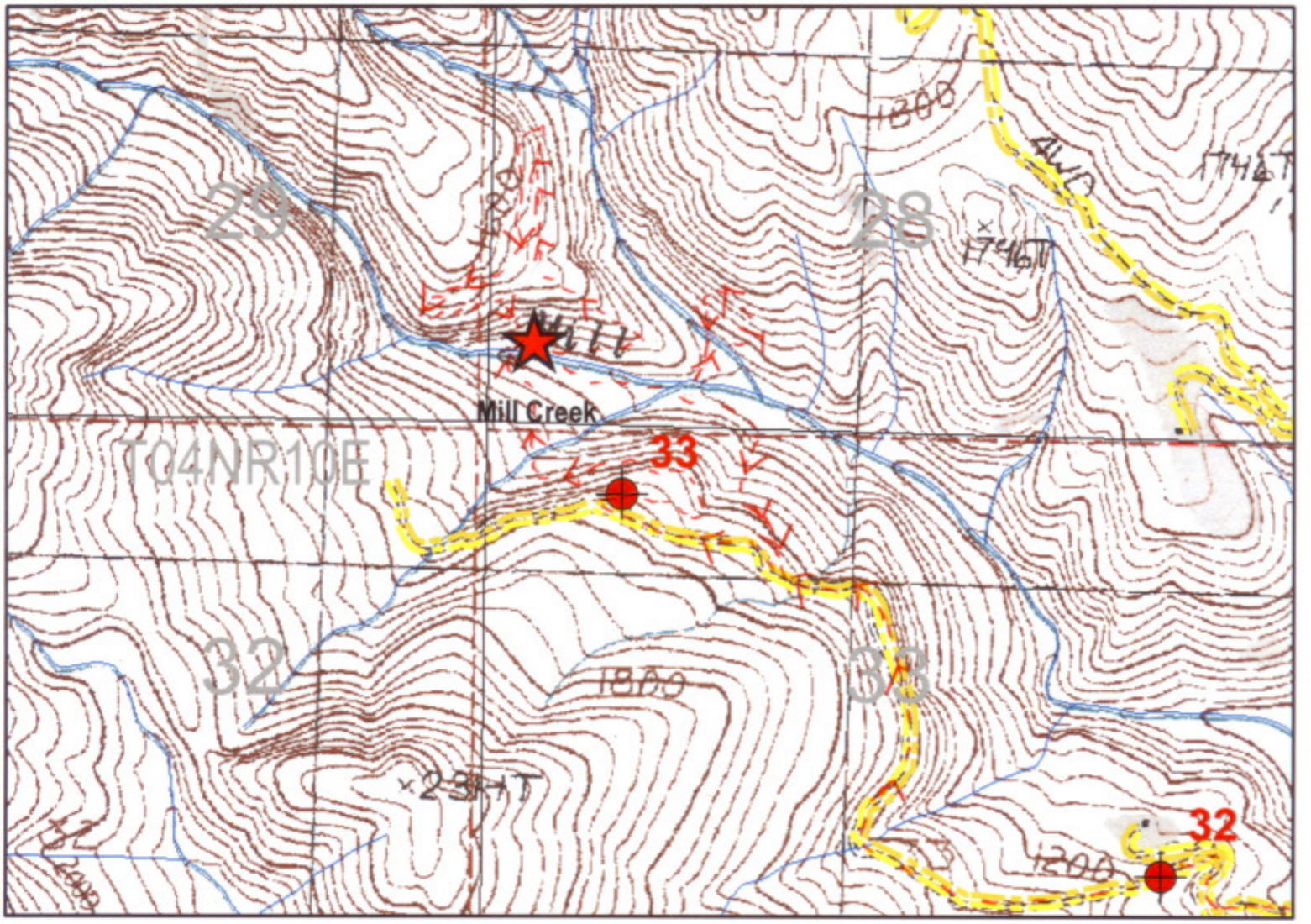
Tape Voice **Flute** **Other:** _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
33		2001	2011	1	DR	N														
32		2022	2052	1	DR	N														
34		2121	2131	1	DR	N														
55		2209	2219	2	DR	N														
77		2232	2242	2	DR	N														
89		2254	2304	2	DR	N														
51		2315	2325	2	DR	N														
39		2349	2359	1	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments: STA. 33/32 Requires Hiking Due to Decom. Road (Road is Accessable by ATV).
39: RD to 39 may need more clearing due to some hanging small DBH TREES.



TWN: 4N RNG: 10E Sec: 28 1/4 Sec: — 1/16 Sec: — Date: 5/24/2006 Obs: D. SAHL

Resp T: — Start T: 1335 End T: 1623 Wind: 0 Weather: PC Time(D/N): D Visit Type: OC Resp Type: N

Mice out: — # Mice taken: —
Adults/Sub: Males (spp.):_____ Females (spp.):_____ Pair Status:_____ Sex Unk: ____ # Juveniles:____
#Fledglings:_____ Nest: Status____ NestLoc ___ Num ____

Male: Obs Type: _____ Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color:_____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Female: Obs Type: _____ Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color:_____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y1: Obs Type: _____ Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color:_____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y2: Obs Type: _____ Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color:_____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Observation Location UTM (nad83) Xcoord:_____ Ycoord:_____

Please Provide Notes & Description of Events on Reverse

N
1:12,000

0 375 750 1,500 Feet

- SDS NSO Calling Points
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD

TURNSTONE

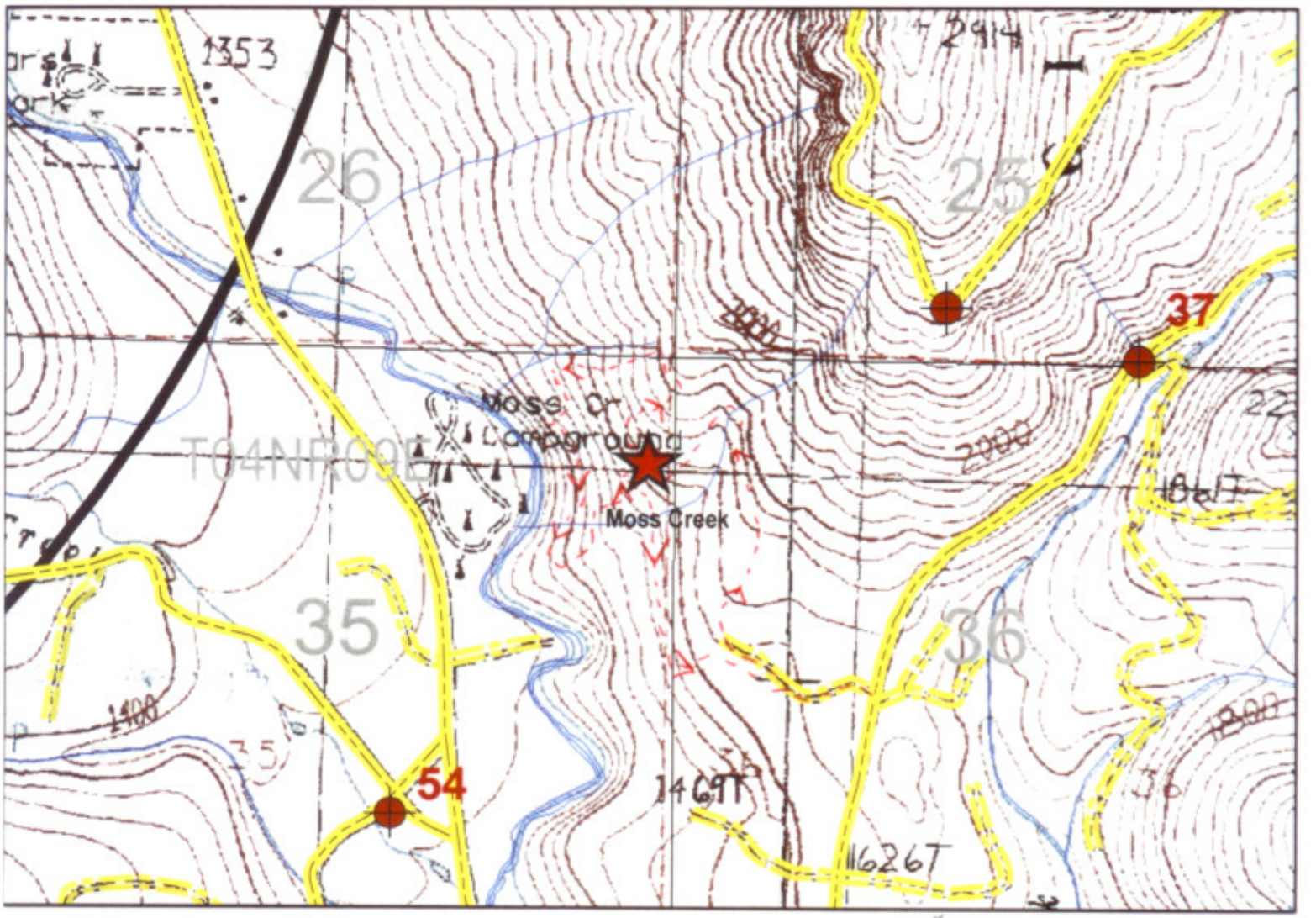
From field notes:

5/24/2008 Mill Creek NSO core Observer D. Sahl

1335: started hike into historic Mill creek core down overgrown SDS road. Road becomes undriveable quickly. Would be able to travel with 4 wheeler. Started broadcast calling with PA from the beginning of hike.

1427: dropped of roadbed to meander towards old nest tree/nest tree area. Meandered around stand looking for quality nesting habitat. Found several possible nest trees (large snags), cavities, continued to broadcast with PA and hoot flute, no NSO response.

1623: returned to trailhead (start of old road), no response from any species of owl.



TWN: 4N RNG: 9E Sec: 35 1/4 Sec: — 1/16 Sec: — Date: 5/25/2006 Obs: D. SAHL

Resp T: — Start T: 1230 End T: 1450 Wind: 1 Weather: CL Time(D/N): D Visit Type: DC Resp Type: N

Mice out: — # Mice taken: —

Adults/Sub: Males (spp.): ____ Females (spp.): ____ Pair Status: ____ Sex Unk: ____ # Juveniles: ____

#Fledglings: ____ Nest: Status ____ NestLoc ____ Num ____

Male: Obs Type: ____ Age: ____ Tip Color: ____ Tip Shape: ____

USFWS #: ____ Leg(R/L): ____ Weights: ____

Color Band - Primary Color: ____ Leg (R/L): ____ Pat: ____ Sec. Color: ____ Tab: ____

Female: Obs Type: ____ Age: ____ Tip Color: ____ Tip Shape: ____

USFWS #: ____ Leg(R/L): ____ Weights: ____

Color Band - Primary Color: ____ Leg (R/L): ____ Pat: ____ Sec. Color: ____ Tab: ____

Y1: Obs Type: ____ Age: ____ Tip Color: ____ Tip Shape: ____

USFWS #: ____ Leg(R/L): ____ Weights: ____

Color Band - Primary Color: ____ Leg (R/L): ____ Pat: ____ Sec. Color: ____ Tab: ____

Y2: Obs Type: ____ Age: ____ Tip Color: ____ Tip Shape: ____

USFWS #: ____ Leg(R/L): ____ Weights: ____

Color Band - Primary Color: ____ Leg (R/L): ____ Pat: ____ Sec. Color: ____ Tab: ____

Observation Location UTM (nad83) Xcoord: ____ **Ycoord:** ____

Please Provide Notes & Description of Events on Reverse

SEE COMMENTS ON REVERSE

N

1:12,000

0 360 720 1,440 Feet

SDS NSO Calling Points

Other

HWY

DIRT

ROCK

TRAIL-4WD

= Route HIKED

TURNSTONE

From field notes:

5/25/2008 Moss Creek NSO core Observer D. Sahl

1230: started hike into historic Moss Creek core down overgrown road off of the mainline road. Was broadcasting with a PA while hiking in a meandering fashion looking for potential NSO nesting habitat/structures Little nesting habitat until you get near the historic nest tree area. Several nice large trees and one great broken topped remnant that may have been an old nest tree. Should be noted that a USFS campground is just downslope and on the other side of the creek from the historic nest tree area. Campground had campers in it at the time of the survey.

1435: PA battery died

1450: returned to trailhead (start of old road), no response from any species of owls.

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SPS Lumber **Owl Site(s):** _____ **Visit #** 2

Project Area: Saddleback Mt. Prospect **Crew:** D. SAHL **Month:** 06 **Day:** 10, **2008**

Tape **Voice** **Flute** **Other:** _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph), 2 = Light breeze (4-7 mph), 3 = Gentle breeze (8-12 mph), 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
96	N	2005	2021	1	OC	B	U*	A	STVA	W	2008	2021	360	20	4N	9E	24	SW		
" "		2005	2021	1	OC	B	M	A	STVA	B	2019	2021	070	30	4N	9E	24	SW		
74		2036	2046	0	OC	B	U*	A	STVA	W	2041	2046	220	40	4N	9E	23	SW		
" "		2036	2046	0	OC	B	M	A	STVA	B	2045	2046	240	50	4N	9E	23	SW		
54		2055	2105	0	OC	N														
75		2108	2118	1	OC	N														
76		2120	2130	1	OC	N														
77		2133	2143	1	OC	N														
95		2148	2158	2	OC	N														
55		2205	2215	3	OC	N														
56		2219	2229	1	OC	N														
89		2233	2243	2	OC	N														
57		2255	2305	1	OC	N														
52		2321	2331	0	OC	N														
38		2340	2350	1	OC	N														
37		2354	0004	1	OC	N														
36		0007	0017	3	OC	N														
28		0022	0032	3	OC	N														
72		0036	0046	2	OC	N														
93		0051	0101	3	OC															

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments: Unk Bird #2
#96/74 Likely female/whistle only/ Probably some Birds @ both pts (likely a STVA pair)
#55 is in a large Clearcut/little to no Habitat NEAR Station.

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 2

Project Area: SADDLE BACK MT. PROJECT **Crew:** D. SAHL **Month:** Oct **Day:** 10, 2008

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph), **2** = Light breeze (4-7 mph), **3** = Gentle breeze (8-12 mph), **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
27		0106	0116	2	OC	N														
26		0116	0126	2	OC	N														
79		0131	0141	2	OC	N														
78		0150	0200	3-4	OC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 2

Project Area: SADDLE BACK NAT. PROJECT **Crew:** D. SAHL **Month:** 06 **Day:** 11, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph), 2 = Light breeze (4-7 mph), 3 = Gentle breeze (8-12 mph), 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
21		2040	2050	2-3	PC	N														
22		2052	2102	2	PC	N														
17		2108	2118	1	PC	N														
6		2123	2133	1	PC	N														
5		2139	2149	2-4	PC	N														
3		2206	2216	1	PC	N														
47		2219	2229	2	PC	N														
4		2231	2241	1	PC	N														
2		2243	2253	2	PC	N														
9		2303	2313	2-3	PC	N														
70		2316	2326	1-2	PC	N														
23		2332	2342	1	PC	N														
19		2353	0003	3	PC	N														
7		0014	0024	3-	PC	N														
18		0105	0115	3	PC	N														
69		0124	0134	2	PC	N														
16		0137	0147	1	CL	N														
11		0150	0200	3	CL	N														
10		0204	0214	3-4	CL	N														
12		0222	0232	2	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, **JB** = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments: #21 POOR habitat / Power line Row
#7 Poor habitat / Entire Ridge Has Been Clearcut / very windy
* WIND WAS Gusty at times but not Usually Sustained at over a winde Code of 3

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SBS Lumber **Owl Site(s):** _____ **Visit #** 2

Project Area: Saddle Back Mt. Project **Crew:** D. Sahl **Month:** 06 **Day:** 15, **2008**

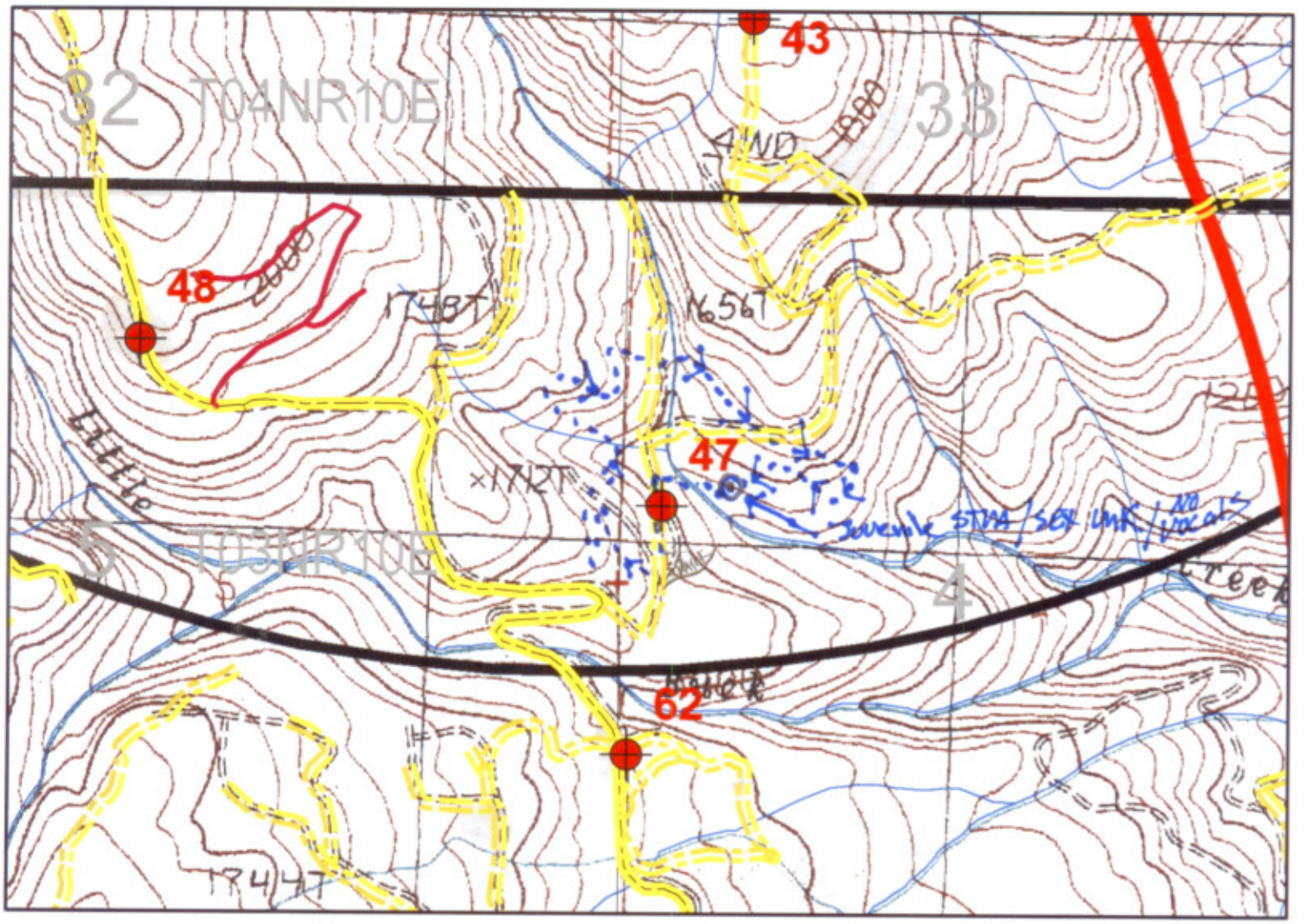
Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph), 2 = Light breeze (4-7 mph), 3 = Gentle breeze (8-12 mph), 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
14		2100	2110	1	CL	N														
63		2114	2124	0	CL	N														
66		2128	2136	1	CL	N														
62		2143	2153	1	CL	N														
47		2200	2215	1	CL	A	U	J	YK	JB	2203	2215	270	150	3N	10E	4	NW		
* 49.5		2223	2233	2	CL	N														
49		2236	2246	3	CL	N														
41		2250	2300	3	CL	N														
40		2303	2313	2	CL	N														
34		2309	2319	2	CL	N														
35	Y	2336	2346	2	CL	N														
39		0004	0014	3	CL	N														
71		0032	0044	1	CL	N														
13		0050	0100	2	CL	N														
67		0109	0119	2	CL	N														
60		0123	0133	2-3	CL	N														
46		0201	0211	3	CL	N														
51		0226	0236	3	CL	N														
8		0303	0313	3+	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments: Almost a full moon on a Clear Night / Great Survey Conditions
47: Begging JUV. / unknown spp. / Could not locate in Dark / sounded stationary / may not have fledged yet / will Revisit tomorrow during daylight and attempt to Relocate and ID. (STVA Juvenile Contact on 6/16)
49.5: Extra sta. Due to Fly over over of large Bird while driving by, no Response / likely same Bird as #47, likely a Juvenile out of some spp.



TWN: 3N **RNG:** 10E **Sec:** 4 **1/4 Sec:** NW **1/16 Sec:** SW **Date:** 06/16/08 **Obs:** D. SAHL

Resp T: 1910 *Start T:* 1635 *End T:* 1830 *Wind:* 1 *Weather:* CL *Time(D/N):* D *Visit Type:* follow-up *Resp Type:* B

 # Mice out: Ø *# Mice taken:* 1

 # Adults/Sub: Males (spp.): _____ *Females (spp.):* _____ *Pair Status:* _____ *Sex Unk:* ____ *# Juveniles:* 1 STVA

#Fledglings: _____ *Nest: Status* ____ *NestLoc* ___ *Num* ____

Male: Obs Type: _____ *Age:* _____ *Tip Color:* _____ *Tip Shape:* _____

USFWS #: _____ *Leg(R/L):* _____ *Weights:* _____

Color Band - Primary Color: _____ *Leg (R/L):* _____ *Pat:* _____ *Sec. Color:* _____ *Tab:* _____

Female: Obs Type: _____ *Age:* _____ *Tip Color:* _____ *Tip Shape:* _____

USFWS #: _____ *Leg(R/L):* _____ *Weights:* _____

Color Band - Primary Color: _____ *Leg (R/L):* _____ *Pat:* _____ *Sec. Color:* _____ *Tab:* _____

Y1: Obs Type: B *Age:* ? *Tip Color:* _____ *Tip Shape:* SQUARE

USFWS #: NO BAND *Leg(R/L):* _____ *Weights:* _____

Color Band - Primary Color: _____ *Leg (R/L):* _____ *Pat:* _____ *Sec. Color:* _____ *Tab:* _____

Y2: Obs Type: _____ *Age:* _____ *Tip Color:* _____ *Tip Shape:* _____

USFWS #: _____ *Leg(R/L):* _____ *Weights:* _____

Color Band - Primary Color: _____ *Leg (R/L):* _____ *Pat:* _____ *Sec. Color:* _____ *Tab:* _____

Observation Location UTM (nad83) Xcoord: 611440 **Ycoord:** 3971821

Please Provide Notes & Description of Events on Reverse

N

1:12,000

0 385 770 1,540 Feet

- SDS NSO Calling Points
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD

TURNSTONE

6/16/2008 Day follow-up of CNK Juvenile @ Station # 47 DGS

1635 Went back to Sta# 47 and Hiked around stand Broadcasting + observing in area that CNK. Juvenile was heard begging the night before.

1810 Located Juvenile STVA, Bird was very skittish and would not vocalize. Bird would fly from tree to tree when I would approach. followed the Bird around for ~20 minutes Continue to broadcast and attempt to look for a leg band or another STVA or the STRIX.

1830 Left Site, Young STVA was a very Good flier and Can likely hunt on it's own. Unable to Determine Sex of bird Due to it not vocalizing at all. No Bands observed. Pair of adult STVA's have been observed/documented ~0.95 miles to the NE of where this Juvenile STVA was observed.

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Lumber **Owl Site(s):** _____ **Visit #** 2

Project Area: Saddle back Mt. Project **Crew:** D. SAHL **Month:** 06 **Day:** 16, **2008**

Tape Voice **Flute** **Other:** _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
32	X	2005	2015	Ø	CL	N														
33	ATV	2055	2105	Ø	CL	N														
44	ATV	2115	2135	Ø	CL	B	U	A	STVA	A/CO*	2124	2124	350	40	4N	10E	33	SE		
45	ATV	2137	2155	Ø	CL	A	U	A	STVA	A/8	2133	2133	070	200	4N	10E	33	SE		
43	ATV	2206	2216	Ø	CL	N														
47		2225	2235	Ø	CL	N														
59		2301	2311	2	CL	N														
60		2314	2324	2	CL	N														
49		2330	2340	2	CL	N														
50		0011	0021	3	CL	N														
58		0033	0043	3	CL	N														
81		0138	0148	2	CL	N														
30		0152	0202	3	CL	N														
24		0205	0215	2	CL	N														
80		0225	0235	2-3	CL	N														
25		0241	0251	3+	CL	N														
82		0311	0321	1	CL	N														
31		0342	0352	1	CL	N														
83		0402	0412	Ø	CL	N														
88		0414	0424	Ø	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments: 44: Only got 2 brief agitated screams then a STVA FLEW thru and down Road/Unable to Relocate or get the bird to Respond again.
45: Likely the same bird as #44/to brief to get a positive determination on sex of Bird.
80: Bobcat observed on RD. Just before Sta. #80
83/88/84: CREEK IS fairly loud by these PTS.

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SPS Lumber **Owl Site(s):** _____ **Visit #** 2

Project Area: Saddleback Mt. Project **Crew:** D. SAHL **Month:** 06 **Day:** 16, **2008**

Tape Voice **Flute** Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
SH		0426	0436	Ø	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Lumber **Owl Site(s):** _____ **Visit #** 3

Project Area: Saddleback Mt. Project **Crew:** DANA N. MCCOSKEY **Month:** 07 **Day:** 27, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph), 2 = Light breeze (4-7 mph), 3 = Gentle breeze (8-12 mph), 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
34		2100	2110	2	CL	N														
40		2112	2122	2	CL	N														
35	X	2132	2142	1	CL	N														
41		2145	2155	1	CL	N														
39		2158	2208	0	CL	N														
48		2212	2222	0	CL	N														
47		2226	2236	0	CL	N														
62		2238	2248	0	CL	N														
66		2251	2301	0	CL	N														
63		2304	2314	0	CL	N														
14		2317	2327	0	CL	N														
64		2350	0000	1	CL	N														
(*) 10		0010	0020	1	CL	N														
9		0021	0031	D	CL	N														
8		0043	0053	1	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments:

(*) 10 = called at gate

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 3

Project Area: Saddleback Mt. Project **Crew:** DANA MCCOSKEY **Month:** 07 **Day:** 28, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph), **2** = Light breeze (4-7 mph), **3** = Gentle breeze (8-12 mph), **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
31		2011	2021	1	CL	N														
82		2032	2042	0	CL	A	M	A	STVA	8	2041	2042	110	600						
81		2054	2104	0	CL	N														
30		2112	2122	1	CL	N														
24		2128	2138	1	CL	N														
80		2148	2158	2	CL	N														
25		2207	2217	1	CL	N														
79		2227	2237	0	CL	N														
78		2252	2302	3	CL	N														
26		2314	2324	2	CL	N														
27		2327	2337	0	CL	N														
73		2341	2351	1	CL	N														
72		2354	0004	2	CL	N														
28		0006	0016	2	CL	N														
36		0020	0030	2	CL	N														
1:37		0031	0041	2	CL	N														
52		0052	0102	1	CL	N														
51		0108	0118	0	CL	N														
56		0122	0132	1	CL	N														
46		0143	0153	0	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Lumber **Owl Site(s):** _____ **Visit #** 3

Project Area: Saddleback Mt. Project **Crew:** DANA N. MCCOSKEY **Month:** 07 **Day:** 29, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph), 2 = Light breeze (4-7 mph), 3 = Gentle breeze (8-12 mph), 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
38	X	2002	2012	1	OC	N														
74		2047	2057	1	OC	N														
86		2105	2115	1	RN	N														
85		2127	2137	1	DR	N														
54		2140	2150	1	DR	N														
75		2156	2206	1	DR	N														
76		2207	2217	1	DR	N														
77		2223	2233	1	RN	N														
(*)55		2241	2251	2	DR	N														
57		2256	2306	1	DR	N														
87		2311	2321	1	RN	N														
4		2323	2333	1	DR	N														
2		2336	2346	1	RN	N														
70		2350	0000	1	DR	N														
12		0003	0013	1	RN	N														
16		0014	0024	1	RN	N														
11	X	0028	0038	2	DR	N														
69		0043	0053	1	DR	N														
68		0056	0106	1	OC	N														
23		0109	0119	1	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments:

(*)55 = called on main road (not private drive)

(*)38 = old nest core hike

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Lumber **Owl Site(s):** _____ **Visit #** 3

Project Area: Saddle back Mt. Project **Crew:** DANA N. MCCOSKEY **Month:** 07 **Day:** 29, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph), **2** = Light breeze (4-7 mph), **3** = Gentle breeze (8-12 mph), **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
3		0132	0142	1	DR	N														
21		0156	0206	1	DR	N														
22		0208	0218	1	DR	N														
89		0232	0242	2	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Lumber **Owl Site(s):** _____ **Visit #** 3

Project Area: Saddleback Mt. project **Crew:** DANA N. MCCOSKEY **Month:** 07 **Day:** 30, 2008

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph), **2** = Light breeze (4-7 mph), **3** = Gentle breeze (8-12 mph), **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
33	X	2001	2011	0	CL	N														
32	X	2032	2042	0	CL	N														
44		2051	2101	0	CL	N														
45		2106	2116	0	CL	N														
43		2135	2145	0	CL	N														
84		2218	2228	1	CL	N														
88		2231	2241	0	CL	N														
83		2242	2252	0	CL	N														
71		2313	2323	1	CL	N														
13		2327	2337	0	CL	N														
67		2343	2353	2	CL	N														
49		0004	0014	2	CL	N														
59		0016	0026	2	CL	N														
60		0034	0044	2	CL	N														
58		0055	0105	2	CL	N														
50	X	0111	0121	2	CL	N														
17		0153	0203	1	CL	N														
6		0206	0216	1	CL	N														
7		0220	0230	1	CL	N														
5		0233	0243	1	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS LUMBER **Owl Site(s):** _____ **Visit #** 3

Project Area: Saddleback Mt. project **Crew:** DANA N. MCCOSKEY **Month:** 07 **Day:** 30, **2008**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph), **2** = Light breeze (4-7 mph), **3** = Gentle breeze (8-12 mph), **4+** =Unsuitable (13+ mph)

Weather Codes: **CL** = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
19	X	0301	0311	2	CL	N														
19		0319	0328	2	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = other non-*Strix* owls

Comments:

APPENDIX C - NORTHERN GOSHAWK SURVEY FORMS

Survey Time: Start 1407 End 1742
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 75 End 60

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS / Hood River **Crew:** WCB **Month:** June **Day:** 23, **2008** **Visit #** 1

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover (midpoint of survey):** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; (6 = 81-100%)

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

		Sta. Time		Wind	Weather	Cloud	Detection	Detection	sex	age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	Code	Cover	Code	Location			Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
060808-1									U	A	OSPR	1149	1150	110	20	3N	10E	8	SW	0609710	5026535
060808-2									U	A	RTHA	1216	1217	60	50	3N	10E	8	SW	0609816	5027177
	GH6	1409	1411	2	PC	4															
	G44	1430	1434	2	PC	4															
	G43	1445	1449	2	PC	4															
	GH7	1505	1509	2	PC	4															
	G48	1517	1521	2	PC	4															
	G50	1530	1534	2	PC	4															
	G51	1545	1549	2	OC	6															
	G52	1557	1601	2	OC	6															
	G56	1620	1624	2	OC	6															
	G55	1636	1640	2	OC	6															
	6605	1648	1700	2	OC	6															
	G54	1713	1717	2	OC	6															
	G60	1725	1729	2	OC	6															
	G53	1739	1743	2	OC	6															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military forma
Comments:

Period: (Nestling) / Fledgling **Calls Used:** (Alarm) / Wail / Begging

Survey Year: (1st) 2nd

Survey Time: Start 0753 End 1604
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 55 End 80

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS / Hood River **Crew:** WLB **Month:** June **Day:** 24 **, 2008 Visit #** 1

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover (midpoint of survey):** 1 = <5%; (2 = 5-20%); 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G1	0753	0757	2	CL	0															
	G2	0804	0808	2	CL	0															
	G3	0817	0821	2	CL	0															
	G4	0838	0842	2	CL	0															
	G5	0857	0901	2	CL	0															
	G6	0914	0918	2	CL	0															
	G7	0928	0932	2	CL	0															
	G33	1023	1027	2	CL	20															
	G34	1038	1042	2	CL	20															
	G35	1055	1059	2	CL	20															
	G36	1116	1120	3	CL	20															
1 of 2									U	A	RTHA	1115	1140	356	150m	3N	9E	7	SW	5m NE of G32	
	G32	1156	1200	2	CL	20															
	G31	1219	1223	2	CL	20															
	G30	1238	1242	2	CL	0															
	G31	1300	1304	2	CL	0															
	G29	1327	1331	2	CL	20															
	G27	1345	1349	1	CL	10															
	G26	1407	1411	3	CL	10															
	G28	1436	1440	2	CL	5															
	G25	1526	1530	3	CL	5															
	G24	1600	1604	2	CL	0															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Period: (Nestling) / Fledgling **Calls Used:** (Alarm) / Wail / Begging

Survey Year: (1st) 2nd

Survey Time: Start 0801 End 1653
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 54 End 71

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS / Hood River **Crew:** WLB **Month:** June **Day:** 25 **, 2008 Visit #** 1

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover (midpoint of survey):** 1 = <5%; (2 = 5-20%), 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	sex	age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G22	0801	0805	1	PC	40															
	G22.5	0814	0818	1	CL	0															
	G21	0846	0850	1	CL	10															
	G23	0911	0915	1	CL	0															
	G19	0958	1002	1	CL	0															
	G12	1029	1033	3	PC	30															
	G11	1050	1054	1	CL	0															
	G8	1120	1124	1	CL	0															
	G9.5	1137	1141	1	CL	0															
	G10	1156	1200	1	CL	0															
	G9	1220	1224	1	CL	10															
	G18	1333	1337	2	PC	30															
	G16	1355	1359	3	PC	50															
	G15.5	1412	1416	2	PC	50															
	G15	1429	1433	3	PC	50															
	G14.5	1442	1446	3	PC	50															
	G14	1455	1459	2	PC	50															
	G13	1510	1514	2	PC	50															
	G17	1529	1533	2	PC	40															
	G6.1	1623	1627	3	PC	30															
	G6.7	1636	1640	4	CL	10															
	G6.8	1649	1653	4	CL	10															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format
Comments:

Period: (Nesting) / Fledgling **Calls Used:** (Alarm) / Wail / Begging

Survey Year: (1st) 2nd

Survey Time: Start 0857 End 1634
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 52 End 64

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS / Head River **Crew:** WCB **Month:** June **Day:** 26, **2008** **Visit #** 1

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover (midpoint of survey):** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; (5 = 61-80%) 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

		Sta. Time		Wind	Weather	Cloud	Detection	Detection	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	Code	Cover	Code	Location			Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G132	0857	0901	2	PC	50															
	G133	0914	0928	4	PC	60															
	G114	0948	0952	2	PC	60															
	G113	1009	1013	1	CL	10															
	G99	1033	1037	2	PC	40															
	G112	1058	1102	4	PC	40															
	G115	1115	1119	4	PC	60															
	G131	1155	1159	4	PC	80															
	G134	1239	1243	2	PC	80															
	G135	1301	1305	2	PC	70															
	G136	1317	1321	3	PC	70															
	G137	1335	1339	2	PC	80															
	G138	1347	1351	2	PC	70															
	G129	1405	1409	2	PC	40															
	G118	1424	1428	2	PC	50															
	G120	1442	1446	2	PC	60															
	G117	1501	1505	2	PC	90															
	G116	1513	1517	3	PC	90															
	G93	1529	1533	3	PC	90															
	G87	1541	1545	3	PC	90															
	G71	1550	1554	3	PC	90															
	G72	1601	1605	3	PC	90															
	G73	1610	1614	3	PC	90															
	G75	1620	1624	4	PC	90															
	G77	1630	1634	4	PC	90															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Period: (Nesting) / Fledgling **Calls Used:** (Alarm) / Wail / Begging

Survey Year: (1st) 2nd

Survey Time: Start 0740 End 1709
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 63 End 80

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SOS / Hood River **Crew:** WCB **Month:** June **Day:** 27, **2008** **Visit #** 1

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover (midpoint of survey):** (1 = <5%); 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G79	0740	0744	1	CL	1															
	G85	0801	0805	1	CL	1															
	G86	0821	0825	1	CL	1															
	G94	0845	0849	1	CL	1															
	G95	0905	0909	1	CL	1															
	G96	0925	0929	1	CL	1															
	G80	0943	0947	1	CL	1															
	G98	1008	1012	1	CL	1															
	G84	1034	1038	1	CL	1															
	G81	1107	1111	2	CL	1															
	G82	1118	1122	1	CL	1															
	G83	1135	1139	1	CL	1															
	G74	1206	1210	2	CL	1															
	G91	1244	1248	2	CL	1															
	G92	1301	1305	1	CL	1															
	G103	1319	1323	2	CL	1															
	G92.1	1345	1349	1	CL	1															
	G111	1445	1449	1	CL	1															
	G107	1506	1510	1	CL	1															
	G107.5	1540	1544	2	CL	1															
	G100	1554	1558	2	CL	1															
	G101	1610	1614	2	CL	1															
	G102	1622	1626	2	CL	1															
	G69	1655	1659	2	CL	1															
	G70	1705	1709	2	CL	1															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Period: (Nesting) / Fledgling **Calls Used:** (Alarm) / Wail / Begging

Survey Year: (1st) 2nd

Survey Time: Start 1551 End 1921
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 80 End 74

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River 1505 **Crew:** W.Beard **Month:** 7 **Day:** 15, **2008** **Visit #** 1

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: ____ **Cloud Cover (midpoint of survey):** 1 = <5%; 2 = 5-20%; 3 = 21-40%; (4 = 41-60%); 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G66	1547	1551	2	CL	1															
	G62	1601	1605	2	CL	1															
071508-1				2	CL	1			U	U	TUVU	1603	1604	156	50	3N	10E	8	NW	0609925	5069560
	G63	1616	1620	2	PC	1															
	G64.1	1633	1637	2	PC	2															
	G64	1647	1651	2	PC	2															
	G65	1704	1708	3	PC	3															
	G105	1745	1749	3	PC	3															
071508-2	1			3	PC	3			U	A	RTHA	1747	1749	80	50	3N	10E	5	SW	0609561	5067 77
	G105.5	1802	1806	2	PC	3															
	G109	1821	1825	2	PC	3															
	G76	1901	1905	2	PC	2															
	G78	1917	1921	2	PC	2															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.
Comments:

Period: (Nestling) / Fledgling Calls Used: (Alarm) / Wail / Begging

Survey Year: (1st) 2nd

Survey Time: Start 0900 End 1453
Intensive Nest Search Time: Start ___ End ___
Temperature (°F): Begin 72 End 84

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River / SOS Crew: W. Beard Month: 7 Day: 16, 2008 Visit # 1

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: ___ Cloud Cover (midpoint of survey): (1 = <5%); 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	90	0856	0900	2	CL	1															
	95	0919	0923	2	CL	1															
	124	0956	1000	2	CL	1															
	119	1008	1012	3	CL	1															
	120	1022	1026	2	CL	1															
	123	1036	1040	2	CL	1															
	139	1054	1058	2	CL	1															
	125	1115	1119	1	CL	1															
	126	1145	1149	2	CL	1															
071208-01				2	CL	1			U	J	COHA	1154	1202	186	30	3N	10E	6	NW	607 8[illegible]	5070039
	122	1210	1214	2	CL	1															
	[illegible]	1226	1230	3	CL	1															
	122	1241	1245	3	CL	1															
	127	1341	1345	3	CL	1															
	140	1436	1440	2	CL	1															
	141	1449	1453	3	CL	1															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.
Comments:

Period: (Nestling) / Fledgling Calls Used: (Alarm) / Wail / Begging

Survey Year: (1st) 2nd

Survey Time: Start 1021 End 1313
Intensive Nest Search Time: Start – End –
Temperature (°F): Begin 58 End 74

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River / SDS **Crew:** W. Beard **Month:** 7 **Day:** 28, **2008** **Visit #** 1/2

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover (midpoint of survey):** (1 = <5%;) 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	GS7	1021	1025	2	CL	1															
	GS9	1050	1054	2	CL	1															
	GS8	1110	1114	2	CL	1															
	G48	1132	1136	2	CL	1															
	G43	1152	1156	2	CL	1															
	G44	1208	1212	2	CL	1															
	G4.e	1223	1227	2	CL	1															
	G47	1240	1244	2	CL	1															
	GS1	1254	1258	2	CL	1															
	GS0	1309	1313	3	CL	1															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Period: (Nesting) / (Fledgling) **Calls Used:** (Alarm) / (Wail) / (Begging)

Survey Year: (1st) 2nd

Survey Time: Start 1436 End 1739
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 64 End 62

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River ISDS **Crew:** W Beard **Month:** 7 **Day:** 30, **2008** **Visit #** 2

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: — **Cloud Cover (midpoint of survey):** (1 = <5%), 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G56	1436	1440	3	CL	1															
	G55	1449	1453	4	CL	1															
	G54	1506	1510	3	CL	1															
	G60.5	1518	1522	3	CL	1															
	G60	1530	1534	4	CL	1															
	G53	1544	1548	3	CL	1															
	G58	1559	1603	2	CL	1															
	G68	1620	1624	4	CL	1															
	G61	1636	1640	2	CL	1															
	G62	1648	1652	2	CL	1															
	G63	1700	1704	2	CL	1															
	G66	1712	1716	2	CL	1															
	G67	1722	1726	2	CL	1															
073 0801				2	CL	1			U	A	RTHA	1724	1724	80	30	3N	10E	7	NE	0609456	5068754
	G69	1735	1739	2	CL	1															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Period: Nestling (Fledgling) **Calls Used:** Alarm (Wail) (Begging)

Survey Year: (1st) 2nd

Survey Time: Start 0739 End 1407
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 52 End 74

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River/SDS **Crew:** WBeard **Month:** 7 **Day:** 31, **2008** **Visit #** 2

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: — **Cloud Cover (midpoint of survey):** (1 = <5%) 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G79	0739	0743	1	CL	1															
	G83	0801	0805	1	CL	1															
	G82	0816	0820	1	CL	1															
	G81	0829	0833	2	CL	1															
	G84	0852	0856	1	CL	1															
	G99	0914	0918	1	CL	1															
	G98	0937	0941	1	CL	1															
	G96	1002	1006	2	CL	1															
	G95	1017	1021	1	CL	1															
073108 01				1	CL	1			U	U	TUVU	1018	1019	220	70	3N	10E	5	SW	606045	5 694496
	G94	1043	1047	3	CL	1															
	G86	1116	1120	1	CL	1															
	G85	1126	1130	2	CL	1															
	G80	1142	1146	2	CL	1															
	G78	1212	1216	3	CL	1															
073108 02				3	CL	1			U	U	TUVU	1213	1213	340	100	3N	10E	8	NE	604045	5006 7588
	G77	1226	1230	3	CL	1															
	G76	1240	1244	2	CL	1															
	G74	1251	1255	3	CL	1															
	G75	1307	1311	3	CL	1															
	G70	1334	1338	2	CL	1															
	G65	1333	1337	2	CL	1															
	G64	1351	1355	2	CL	1															
	G64	1403	1407	2	CL	1															

Det._ID: unique detection identifier, date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format
Comments:

Period: Nestling (Fledgling) **Calls Used:** Alarm / (Wail) (Begging)

Survey Year: (1st) 2nd

Survey Time: Start 0741 End 1250
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 54 End 62

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River SDS **Crew:** W. Beard **Month:** 8 **Day:** 1, **2008** **Visit #** 2

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: — **Cloud Cover (midpoint of survey):** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; (6 = 81-100%)

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G73	0741	0745	2	DR	6															
	G72	0755	0759	2	DR	6															
	G71	0835	0839	2	DR	6															
	G87	0843	0847	2	DR	6															
	G88	0900	0904	2	DR	6															
	G85	0920	0924	2	DR	6															
	G91	0937	0941	2	DR	6															
	G81	0952	0957	2	DR	6															
	G82	1016	1020	2	DR	6															
	G83	1032	1042	2	DR	6															
	G92	1048	1053	2	DR	6															
	G36	1130	1134	2	DR	6															
	G35	1144	1148	2	DR	6															
	G31	1217	1221	2	DR	6															
	G33	1226	1230	2	CL	6															
	G32	1246	1250	2	CL	6															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Period: Nestling / (Fledgling) **Calls Used:** Alarm / (Wail) / (Begging)

Survey Year: (1st) 2nd

Survey Time: Start 0920 End 1735
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 68 End 87

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River ISDS **Crew:** W. Beard **Month:** 8 **Day:** 4, **2008** **Visit #** 2

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: — **Cloud Cover (midpoint of survey):** (1 = <5%) 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G85	0920	0924	1	CL	1															
	G26	0946	0950	1	CL	1															
	G27	1002	1006	1	CL	1															
	G29	1017	1021	1	CL	1															
	G31	1037	1041	1	CL	1															
	G32	1054	1059	1	CL	1															
	G31	1113	1117	1	CL	1															
	G30	1127	1131	1	CL	1															
	G24	1230	1234	2	CL	1															
	G21	1248	1252	2	CL	1															
	G23	1305	1309	2	CL	1															
	G25	1327	1331	1	CL	1															
	G22	1338	1342	1	CL	1															
080408001				1	CL	1			U	A	RTHA	1410	1410	350	100	3N	9E	18	NW	0609755	5067097
	G57	1428	1432	2	CL	1															
	G58	1443	1447	2	CL	1															
	G59	1455	1459	2	CL	1															
	G3	1555	1559	2	CL	1															
	G4	1619	1623	1	CL	1															
	G5	1643	1647	2	CL	1															
	G6	1647	1651	2	CL	1															
	G7	1658	1702	2	CL	1															
	G2	1721	1725	2	CL	1															
	G1	1731	1735	2	CL	1															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format
Comments:

Period: Nestling (Fledgling) **Calls Used:** Alarm (Wail) (Begging)

Survey Year: (1st) 2nd

Survey Time: Start 0858 End 1702 **Intensive Nest Search Time:** Start — End — **Temperature (°F):** Begin 76 End 86

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hood River 1505 **Crew:** W. Beard **Month:** 8 **Day:** 5 **, 2008 Visit #** 2

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: — **Cloud Cover (midpoint of survey):** (1 = <5%) 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G19	0858	0902	3	CL	1															
	G18	0920	0924	1	CL	1															
	G16	0937	0941	2	CL	1															
	G15.5	0950	0954	1	CL	1															
	G15	1004	1008	1	CL	1															
	G14.5	1018	1022	1	CL	1															
	G14	1037	1041	1	CL	1															
	G13	1052	1056	1	CL	1															
	G17	1111	1115	2	CL	1															
	G11	1133	1137	2	CL	1															
	G8	1151	1155	2	CL	1															
	G5	1205	1209	2	CL	1															
	G10	1220	1224	2	CL	1															
	G9	1242	1246	2	CL	1															
061208-01				2	CL	1			U	U	SSHA	1259	1259	300	40	2N	9E	13	SE	0607934	5065702
	G12	1333	1337	1	CL	1															
061208-02				1	CL	1			U	U	TUVU	1404	1404	60	200	3N	10E	17	NW	0609901	5066547
	G11	1448	1452	1	CL	1															
	G12	1501	1505	1	CL	1															
	G10.5	1518	1522	2	CL	1															
	G10	1533	1539	2	CL	1															
	G07	1550	1554	1	CL	1															
	G01	1604	1608	1	CL	1															
	G06	1610	1614	1	CL	1															
	G05	1629	1643	1	CL	1															

TUVU

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

G10.5 1646 1650 1 CL 1

1 G 1654 1700 1 CL 1

Period: Nestling / (Fledgling) **Calls Used:** Alarm (Wail) / (Begging)

Survey Year: (1st) 2nd

Survey Time: Start 0902 End 1503
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 73 End 78

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Hoodoo / SDS **Crew:** Wboard **Month:** 8 **Day:** 6, **2008** **Visit #** 2

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: — **Cloud Cover (midpoint of survey):** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; (6 = 81-100%)

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather Code	Cloud Cover	Detection Code	Detection Location	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G115	0902	0906	1	OC	5															
	G131	0912	0916	1	OC	5															
	G135	0930	0934	1	OC	6															
	G134	0945	0949	1	OC	6															
	G132	1005	1009	2	OC	6															
	G133	1032	1036	1	OC	5															
	G114	1056	1100	1	OC	6															
	G113	1119	1123	1	OC	6															
	G109	1216	1220	1	OC	6															
	G117	1230	1234	2	DR	6															
	G126	1250	1254	1	DR	6															
	G120	1306	1310	1	DR	6															
	G130	1323	1327	2	RN	6															
	G129	1345	1349	1	OC	6															
	G138	1402	1406	1	OC	6															
	G139	1417	1421	1	OC	6															
	G128	1529	1533	1	OC	6															
	G120	1543	1547	2	OC	6															
	G119	1459	1503	1	OC	6															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Period: Nestling / (Fledgling) **Calls Used:** Alarm / (Wail) / (Begging)

Survey Year: (1st) 2nd

Survey Time: Start 0930 End 1227

Intensive Nest Search Time: Start ___ End ___

Temperature (°F): Begin 65 End 74

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: Hood River 1505 **Crew:** W. Ward **Month:** 8 **Day:** 7 **, 2008 Visit #** 2

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover (midpoint of survey):** 1 = <5%; 2 = 5-20%; 3 = 21-40%; (4 = 41-60%); 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (>12 mph)

Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

		Sta. Time		Wind	Weather	Cloud	Detection	Detection	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	Code	Cover	Code	Location			Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G140	0930	0934	1	OC	5															
	G141	0941	0945	1	OC	5															
	G122	1013	1017	1	OC	5															
	G126	1029	1033	1	OC	5															
	G127	1048	1052	2	PC	4															
	G125	1131	1135	1	OC	6															
	G121	1144	1148	1	OC	6															
	G123	1159	1203	2	OC	5															
	G119	1213	1217	2	OC	5															
	G124	1223	1227	2	OC	5															

Det._ID: unique detection identifier; date and seqential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

Period: Nestling (Fledgling) **Calls Used:** Alarm / (Wail) (Begging)

Survey Year: (1st) 2nd

Appendix D - Western Gray Squirrel Survey Forms

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A1, A3, A7 (See Map)
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** **3N** **R** **10E** **S** 5,6,7,8 **County:** Skamania
T **4N** **R** **10E** **S** 31 **County:** Skamania

Date(s) Surveyed: 10/14/2008

Start/Stop time(s): 0847-Start/1635-Stop

Surveyor Names and Affiliations: Devin Sahl (TECI)

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

All polygons surveyed were composed of mixed conifer/hardwoods, primarily *PSME* with some scattered *THPL/TSHE*. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant *PSME* >70 years. A few small patches of *Quercus* SPP (likely Quercus Garryana), were observed within the boundaries of the A3 polygon. The trees were not > than 15ft. in height and growing in a few steep, rocky, open areas with a westerly aspect. In Polygons A3 and A7 there were numerous *ACMA present, especially towards the toe of the slope.* Slopes within the polygon boundaries vary between ~0% to 85%. The aspect of each polygon also varies. The A1 polygon has a southern aspect, A3 has a predominantley western aspect and several insised drainages. The A7 polygon has a variety of aspects, primarily eastern and northern. Water was present in seasonally intermittent streams in polygon A3 on the north end and in A7 in a broader drainage that runs through the center of the polygon. Both contained some water at time of survey, streambanks indicte that the water level increases signifiganlty during the wet season. No areas of standing water were observed in any of the polygons.

No Western Gray squirrels, or thier nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A4, A5, A10 (See Map)
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** **3N** **R** **10E** **S** 5,6,7,8 **County:** Skamania

Date(s) Surveyed: 10/14/2008
Start/Stop time(s): 0845-Start/1635-Stop

Surveyor Names and Affiliations: John Kolozar (TECI)

Contact Name, Address, & Phone:
TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.
From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.
All polygons surveyed were composed of mixed conifer/hardwoods, primarily *PSME* with some scattered *THPL/TSHE*. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant *PSME* >70 years. No patches of *Quercus* SPP. were observed within the boundaries of the A4,A5 or A10 polygons. In all the Polygons there were *ACMA and ACCI* present within the polygons. Slopes within the polygon boundaries vary between ~0% to 45%. The aspect of each polygon also varies. The A4 polygon has a southwest aspect, A5 has a predominantly eastern aspect. The A10 polygon was fairly flat and had a subtle northern aspect. No standing water or active drainages were observed in the polygons.

No Western Gray squirrels, or thier nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A2, A6, A9 (See Map)
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 5,6,8 **County:** Skamania
T 4N **R** 10E **S** 31 **County:** Skamania

Date(s) Surveyed: 10/14/2008

Start/Stop time(s): 0832-Start/1635-Stop

Surveyor Names and Affiliations: John Kolozar (TECI)

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

All polygons surveyed were composed of mixed conifer/hardwoods, primarily *PSME* with some scattered *THPL/TSHE*. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant *PSME* >70 years. No patches of *Quercus* SPP. were observed within the boundaries of the A2,A6 or A9 polygons. In all the Polygons there were *ACMA present.* Slopes within the polygon boundaries vary between ~0% to 45%. The aspect of each polygon also varies. The A2 polygon has a southern aspect, A6 has a predominantley southwestern aspect and an active drainage. The A9 polygon was fairly flat and had a slight northeastern aspect. Water was present in seasonally intermittent stream and a small roundish pond (~30 feet across at time of survey) in polygon A6. Water in the pond appeared to be present year round. Both contained some water at time of survey, streambanks indicte that the water level increases signifiganlty during the wet season.

No Western Gray squirrels, or thier nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A12,A13 (See Map)
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 7 **County:** Skamania

Date(s) Surveyed: 10/15/2008
Start/Stop time(s): 1206-Start/1500-Stop

Surveyor Names and Affiliations: Devin Sahl (TECI)

Contact Name, Address, & Phone:
TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.
From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.
The A12 and A13 polygons were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age with a few older remnant trees present. No patches of Quercus SPP. were observed within the boundaries of the polygons. There was some ACMA and ACCI present within the polygons. Both polygons are very flat with slopes within the polygon boundaries vary between ~0% to 5%. Both polygons had very marginal potential WGS habitat. There were no drainages or areas of standing water present within the polygons.

No Western Gray squirrels, or thier nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A14 (See Map)
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** **3N** **R** **10E** **S** 7 **County:** Skamania

Date(s) Surveyed: 10/15/2008
Start/Stop time(s): 0827-Start/1445-Stop

Surveyor Names and Affiliations: Darren Bolen (TECI)

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A14 polygon was composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, stand appeared to be even aged. No patches of Quercus SPP. were observed within the boundaries of the polygon. There was some ACMA and ACCI present within the polygon. Slopes within the polygon boundaries vary between ~0% to 60%. The A14 polygon has a westerly aspect and one seasonal drainage. The drainage was dry at the time of the survey. No standing water or active drainages were observed at the time of survey.

No Western Gray squirrels, or thier nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A15 (See Map)
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** **3N** **R** **10E** **S** 18 **County:** Skamania

Date(s) Surveyed: 10/15/2008
Start/Stop time(s): 1220-Start/1410-Stop

Surveyor Names and Affiliations: John Kolozar (TECI)

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A15 polygon was composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, stand appeared to be even aged. No patches of Quercus SPP. were observed within the boundaries of the polygon. There was some ACMA and ACCI present within the polygon. Slopes within the polygon boundaries vary between ~20% to 80%. The A15 polygon has a westerly aspect and two seasonal drainages. Both of the drainages wer dry at the time of the survey. No standing water or active drainages were observed at the time of survey.

No Western Gray squirrels, or thier nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A11,A17,A18 (See Map)
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** **3N** **R** **10E** **S** 7 **County:** Skamania
T **3N** **R** **9E** **S** 13 **County:** Skamania

Date(s) Surveyed: 10/15/2008

Start/Stop time(s): 0827-Start/1445-Stop

Surveyor Names and Affiliations: Devin Sahl (TECI), Darren Bolen (TECI), John Kolozar (TECI)

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

These polygons were lumped together because they were visited by three surveyors simultaneously on the same day. The A11, A17 and A18 polygons were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age. No patches of Quercus SPP. were observed within the boundaries of the polygons. There was some ACMA and ACCI present within the polygons. Slopes within the polygon boundaries vary between ~0% to 60%. The A11 polygon has multiple pieces all of which contained very marginal potential WGS habitat. There are two seasonal drainages within the area of the polygons and both were dry at the time of the survey. The A17 and A18 polygons were on the extreme southern end of the project area. A18 has a northwestern aspect on a fairly steep slope and a seasonal drainage that was dry at the time of the survey. The A17 polygon had a south and southeast exposure and no significant drainages. It had trees older than the other 2 polygons in the overstory and a few remnant PSME present that were greater than 70yrs of age. The A17 polygon is adjacent to the C1 polygon that had a seasonal stream present in it that had several pools of water present but no f

No Western Gray squirrels, or thier nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: B1,B2,B3,B4,B5,B6,B7,B8 (See Map)

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS):	**T** 3N	**R** 9E	**S** 13	**County:** Skamania
	T 3N	**R** 10E	**S** 5,6,8	**County:** Skamania
	T 4N	**R** 10E	**S** 31,32	**County:** Skamania

Date(s) Surveyed: 11/18/2008

Start/Stop time(s): 0920-Start/1545-Stop

Surveyor Names and Affiliations: Devin Sahl (TECI), Darren Bolen (TECI)

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands.

This set of "B" polygons was surveyed after the "A" polygons due to alterations in the alingment of the proposed turbine strings.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

All polygons surveyed were composed of mixed conifer/hardwoods, primarily *PSME* with some scattered *THPL/TSHE* . The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant *PSME* >70 years. No *Quercus* SPP. Were observed within the boundaries of the polygons surveyed. In Polygons B3, B4 and B5 there were numerous *ACMA present.* Slopes within the polygon boundaries vary between ~0% to 70%. The aspect of each polygon also varies. Water is present in seasonally intermittent streams in polygons B4 and B5. The intermittent stream in B5 was active at time of survey, the intermittent stream in B4 was not.

T

No Western Gray squirrels, or thier nest structures were observed during the survey. One potential nest structure was examined from the ground and determined to have potential to be a douglas squirrel nest. The structure was quite small and constructed ~25 feet up in a small ACMA. The structure appeared to be a small ball (less than 14" in diameter) constructed primarily of lichen, twigs and a few ACMA leaves. Several douglas squirrel cone middens were located in the immediate vicinity. while exploreing the immediate area of the nest looking for other possible nest structures, the surveyor observed 3 distintct douglas squirrel individuals.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observtion form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: C1
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T 3N** **R 10E** **S** 18 **County:** Skamania

Date(s) Surveyed: 10/9/2008
Start/Stop time(s): 0930-Start/1645-Stop

Surveyor Names and Affiliations: Devin Sahl

Contact Name, Address, & Phone:

Devin Sahl
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 for ~2.8 miles to powerline ROW. Turn Left onto the powerline ROW road and proceed ~100 yards to unmarked spur on Left. Continue down Spur road ~0.25 to just before it's end and park. You are parked just outside the NE corner of the polygon.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

Polygon is a stand of mixed conifer/hardwood, primarily *PSME* with some scattered *THPL/TSHE* . The polygon encompasses both sides of a small intermittent stream. The majority of the overstory PSME appears to be >50 years of age, with some scattered remnant *PSME* >70 years. No *Quercus* SPP. Were observed within the boundaries of the polygon but may be present just outside the boundary at the transition to agricultural land (fruit orchard). Slopes within the polygon boundary vary between ~0% to 60% depending on location. The aspect is predominantly SE facing on the western portion of the tract and SSW facing on the eastern portion of the tract, with the intermittent stream being the divider between. Water is present in a seasonally intermittent stream that runs through the middle of the polygon. The stream was predominantly dry at the time of the survey expect for a few small puddles and some water in a maintained penstock that supplies water to landowners downslope. A small, shallow pond was present backed-up behind a non-maintained irrigation structure just outside the SE corner of the polygon.The irrigation structure is designed to impound water form the seasonaly intermittenent stream.It is possible that the irrigation structure would hold some amount of water year round that would be available for wildlife.

No Western Gray squirrels were observed during the survey of this polygon. One potential nest structure was examined from the ground and determined to have potential to be a western gray squirrel nest structure. A subsequent visit to the site 7 days after this visit determined that the structure was a broom type growth emanating form the bole of the PSME. The structure was examined by climbing an adjacent tree and determined to not be a squirrel nest. Several douglas squirrels were heard and obseved within the boundaries of the polygon during the time of the survey and on subsequent visits.

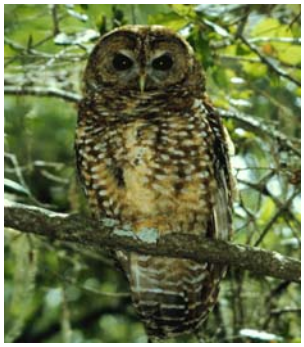
C-7

Final Report: Results of Northern Spotted Owl, Northern Goshawk, Western Gray Squirrel Surveys Conducted for the Saddleback Wind Energy Project. Prepared for SDS Lumber.

Turnstone Environmental Consultants, Inc. 2009

2009 Final Report

Results of Northern Spotted Owl, Western Gray Squirrel and Northern Goshawk Surveys Conducted for the Whistling Ridge Wind Energy Project


Prepared for:

SDS Lumber Company

Prepared by:

Turnstone Environmental Consultants, Inc.
18000 NW Lucy Reeder Rd.
Portland, Oregon 97231

October, 2009

Table of Contents

1. PROJECT OVERVIEW 1

2. NORTHERN SPOTTED OWL 2

2.1. Suitable Habitat 2
2.2. Survey Locations 3
2.3. Survey Methods 4

3. WESTERN GRAY SQUIRREL 6

3.1. Suitable Habitat 7
3.2. Survey Locations 8
3.3. Survey Methods 9

4. NORTHERN GOSHAWK 10

4.1. Suitable Habitat 10
4.2. Survey Locations 10
4.3. Survey Methods 13

5. SURVEY RESULTS 15

5.1. Northern Spotted Owl 15
5.2. Western Gray Squirrel 18
5.3. Northern Goshawk 21

6. CONCLUSION 23

6.1. Northern Spotted Owl 23
6.2. Western Gray Squirrel 24
6.3. Northern Goshawk 24

7. REFERENCES 26

APPENDIX A – MAPS ..... A

APPENDIX B - SPOTTED OWL SURVEY FORMS ..... B

APPENDIX C - NORTHERN GOSHAWK SURVEY FORMS C

APPENDIX D - WESTERN GRAY SQUIRREL SURVEY FORMS ..... D

1. PROJECT OVERVIEW

SDS Lumber Company (SDS) retained the services of Turnstone Environmental Consultants, Inc. (Turnstone) to perform Northern spotted owl (spotted owl), Western gray squirrel (gray squirrel) and Northern goshawk (goshawk) surveys in potential habitat for the Whistling Ridge Wind Energy Project formally known as the Saddleback Wind Energy Project, located in Skamania County, Washington. Survey information will be used to assess the presence, occupancy and reproductive status of spotted owl, gray squirrel and goshawk individuals and populations within areas of proposed wind energy development.

The physiographic range of spotted owl, gray squirrel and goshawk populations are potentially located within the forestlands of the Whistling Ridge Wind Energy Project. As part of the process to avoid "take" of any state or federally listed species, landowners must conduct surveys to determine the presence of listed species, prior to conducting any management activities.

This report summarizes the Wildlife surveys that were conducted in both 2008 and 2009 at the Whistling Ridge Wind Energy Project. All Wildlife surveys were conducted using the best information available during this time period. Turnstone staff followed strict adherence to protocol guidelines and habitat requirements to obtain full compliance with agency requirements and recommendations. All potential habitat and buffers were determined based on the sighting of the proposed wind turbine locations. In late October of 2008, the final proposed turbine alignment was released and the locations of the turbines were slightly altered from their original location. Turnstone re-analyzed the new alignment, confirming all additional buffers were covered and that the adherence to protocols for all species surveyed were sufficient. The survey implications of the adjustments to the proposed turbine locations will be discussed in further detail in the *survey locations* sections for each of the respective species surveyed.

2. NORTHERN SPOTTED OWL

Under the federal Endangered Species Act of 1973, the Northern spotted owl (*Strix occidentalis caurina*) was listed in 1990 as "threatened" by the United States Fish and Wildlife Service. The Washington Fish and Wildlife commission listed the Northern spotted owl as a state endangered species in 1988 (Buchanan and Swedeen, 2004). Both federal and state agencies determined that the spotted owl is likely to become an endangered species in the foreseeable future throughout all or a significant portion of its existing range. The northern spotted owl's range extends from Washington State to Northern California. A recently revised USFWS species recovery plan is in effect for the northern spotted owl (USFWS 2008).

2.1. Suitable Habitat

In Washington, spotted owls inhabit the Eastern and Western Cascades, Western Lowlands, and Olympic Peninsula Provinces. Within these regions, the spotted owl has specific habitat requirements for nesting, roosting, foraging and dispersal. The species utilizes forests with multi-layered canopies and a high incidence of large trees for nesting and roosting. Fragmented habitats may be used for dispersal and foraging. Spotted owls nest primarily in large tree cavities and on broken tops of large trees. Spotted owls have also been reported as nesting on clumps of mistletoe, on large branches, in abandoned stick nests of Northern goshawks, and in cavities on embankments and rock faces (LaHaye 1999).

For the purposes of this project, potentially suitable spotted owl habitat was determined to be coniferous stands with average tree DBH (diameter at breast height) greater than 12 inches and canopy closure of 60% or greater. These standards for suitable spotted owl habitat were based on the availability of forest stand classification GIS data from SDS. By using GIS data that was readily available, initial spotted owl survey areas could be efficiently determined in the office and verified in the field when setting up the survey stations.

The 12" average DBH and 60% canopy closure standards could be considered conservative as compared to the nesting and roosting habitat characteristics that are

discussed in the 2008 USFWS recovery plan. This plan states, “Features that support nesting and roosting typically include a moderate to high canopy closure (60 to 90 percent); a multilayered, multi-species canopy with large overstory trees (with diameter at breast height [dbh] of greater than 30 inches); a high incidence of large trees with various deformities (large cavities, broken tops, mistletoe infections, and other evidence of decadence); large snags; large accumulations of fallen trees and other woody debris on the ground; and sufficient open space below the canopy for spotted owls to fly (Thomas *et al.* 1990).” These types of habitats are typically not present over large areas on managed commercial forest lands. Recently cut areas or young conifer plantations that did not meet the minimum average DBH or canopy closure parameters were excluded from the survey effort. The resulting designated survey areas did contain varying types of habitat that could potentially be used by spotted owls.

2.2. Survey Locations

Turnstone conducted spotted owl surveys within and adjacent to properties managed by SDS and cooperating adjacent landowners. Surveys were conducted in all potentially suitable habitat within the 1.8 mile spotted owl provincial home range radius of the proposed project area. To determine the potential spotted owl survey areas, the proposed turbine alignments were buffered out to a 1.8 mile radius. This created a large polygon of potential survey area that included 14,901 acres. This initial query of potential habitat that fell within the provincial range was not contiguous, it resembled a patchwork of stands that met the survey threshold and would require spotted owl surveys.

The delineated potential survey area polygon intersected two owl activity centers where spotted owls historically lived. A designated spotted owl activity center in this geographical region of Washington is equal to a circle with a 1.8 mile radius. The two spotted owl activity centers are located primarily on public lands north of the project area. The nest cores of these activity centers reside on public land managed by the Washington Department of Natural Resources (WDNR) and the U.S. Forest Service (USFS).

The activity centers intersect (1.8 mile radius provincial range) the northern reach of the proposed wind turbine survey area polygon. The Mill Creek activity center (MSNO# 0991) was located and designated in 1992 and was last considered to have spotted owls present in 2000. The Moss Creek activity center (MSNO#1003) was located and established in 1994 and was last considered to have spotted owls present in 2002. Table 4, in the results section of this document, represents the survey summaries for these activity centers for 1994 thru 2009. These two activity centers are adjacent to one another and overlap by approximately 15%. Because of the close proximity of the spotted owl activity centers all suitable habitat within a 1.8 mile buffer of the nest site was surveyed. This increased the potential survey area to 7,222 acres. Much of this habitat was a patchwork of timber stands that contained potentially suitable and non-suitable habitat.

The final proposed turbine alignment released in late October of 2008 did not affect the survey coverage area for spotted owls during the 2008 survey season. The additional turbines were located to the north end of the project area where surveys were already being conducted in the Mill and Moss Creek activity centers.

Table 1.Township and Range information for northern spotted owl survey areas.

Legal Descriptions for Spotted Owl Survey Areas		
Township	**Range**	**Section***
3N	9E	1,2,11,12,12,14,23,24,25
3N	10E	4-6,7-9,16-18,19,20,30
4N	9E	23,24,25,26,27,34,35,36
4N	10E	19-22, 27-30,31-34

*some sections only had portions of their respective area covered for NSO survey in 2008-2009

2.3. Survey Methods

Potential northern spotted owl habitat was surveyed in 2008 and 2009 in accordance with the 1992, revised version of *"Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls".* This survey protocol is endorsed by the U.S. Fish and Wildlife Service. Under this protocol, Turnstone initiated the 2-year

survey effort in early May of 2008 and completed the second year of spotted owl surveys in August of 2009. Under the two year survey methodology, a minimum of 3 protocol visits must be performed for 2 consecutive years in order to determine probable presence/absence of the spotted owl.

Prior to initiating field surveys, Turnstone biologists analyzed the project area using topographic maps, aerial photography and stand classification data to determine suitable habitat for potential broadcast calling station placement. Calling stations were placed in differing topographies across the survey area of potential habitat. When possible, broadcast calling stations were placed along ridges and prominent points to maximize coverage and increase the probability of hearing distant owl responses. Broadcast calling stations and survey routes were situated to achieve complete coverage of the potential survey area, preferably with coverage from more than one calling point. Stations were spaced approximately ¼ to ½ mile apart where access was possible and permitted. Broadcast calling stations were surveyed at night when owls are more active and are thought to be more responsive to standard survey techniques (USDI 1992). Per protocol guidelines, Turnstone biologists used a minimum of ten-minute calling periods at each designated broadcast calling station. Amplified PA systems were the primary means used to broadcast both male and female spotted owl vocalizations that included four-note contact calls and various agitated calls. Voice hooting and "hoot flutes" were occasionally used to supplement the Amplified PA systems and were also used when conducting daytime visits to historic nest cores. Turnstone conducted surveys between March 15th and August 31st during each survey year, as stipulated by the protocol.

During the first round of broadcast calling in the 2008 survey season, an additional day visit was made to each of the two spotted owl nest core activity centers north of the project area, (Mill Crk, and Moss Crk.). During the 2009 survey season, three additional day visits were made to each of the two spotted owl nest core activity centers.

After consulting with WDFW staff, additional day visits were added in 2009. The intent of these day visits was to further verify if spotted owls were "quietly" occupying the historic spotted owl nest cores but not responding during night surveys. The three day visits conducted by Turnstone staff were made in addition to the three required night surveys outlined in the survey protocol guidelines. These visits involved hiking into the

historic nest core areas and conducting an intensive survey of the area using meandering survey transects in areas of suitable habitat. Turnstone staff attempted to elicit responses from spotted owls using various means while conducting these surveys. Surveys near the nest cores would typically start out with subtle voice or hoot flute calling and then proceed into more aggressive and louder calling using amplified PA systems when no responses or observations occurred. The visits varied in length but typically lasted from two to six hours.

Both the Mill and Moss Creek nest cores are also being surveyed as part of a long term demography study conducted by the Washington Department of Natural Resources on lands within the Klickitat Habitat Conservation Plan Planning Unit. The study was initiated in 2001 and was slated to run for five years. In 2007, a new three year contract was signed to extend the survey effort for another three years. The fieldwork for the project is carried out by staff from the National Council for Air and Stream Improvement (NCASI). Each year NCASI performs a minimum of three visits and as many as 10 survey visits a year to the spotted owl nest cores. These visits involve both day calling the historic nest cores and night calling in the same areas. Survey summary details of the survey results for each of these spotted owl cores can be reviewed in Table 4 of this document.

During the 2008 and 2009 survey seasons, Turnstone biologists recorded all owl species encountered and the sightings of or responses by, potential spotted owl predators. This included barred owls, great horned owls, northern goshawks and other raptor species. There is some evidence that the presence of these species may affect northern spotted owl responses.

3. Western Gray Squirrel

The western gray squirrel (*Sciurus griseus*) was listed as a “threatened” species by the Washington Fish and Wildlife Commission in 1993. In November of 2007, the State of Washington adopted a species recovery plan for the Western Gray Squirrel which is currently in effect.

In January of 2001, a petition was filed with the United States Fish and Wildlife Service to list the Washington State population of the western gray squirrel as a distinct population segment (DPS) in an effort to secure protection for the species under the Endangered Species Act of 1973 (ESA). The petition underwent a 12 month review with a ruling announced on May 30, 2003. This ruling stated the petition action was not warranted because the Washington population of the Western Gray Squirrel is not a DPS therefore, no protection under the ESA would be granted (Federal Register, 2003). There is currently no federal protection for the western gray squirrel.

The physiographic range and habitat requirements of the western gray squirrel are located within the forestlands of the Whistling Ridge Wind Energy Project.

3.1. Suitable Habitat

Western gray squirrels are arboreal (adapted for living in trees) and, although they forage on the ground, they rarely stray far from trees. They use tree canopies for escape, cover and nesting. Western gray squirrels can move rapidly and cover long distances among tree canopies when canopy conditions permit. A contiguous tree canopy that allows arboreal travel for at least 198 feet (60 meters) around the nest is an important feature of western gray squirrel habitat (Ryan and Carey 1995a). Western gray squirrels are active throughout the day but are most active in the morning. Western gray squirrels are most active in August and September, they are less visible in June and July (Ryan and Carey 1995a) while collecting and storing food for winter.

In Washington the western gray squirrel distribution has been reduced to three geographically isolated western gray squirrel populations: the “Puget Trough” population now centered in Thurston and Pierce counties in the Puget Sound region; the “South Cascades” population in extreme eastern Skamania County and Klickitat and Yakima counties; and the “North Cascades” population in Chelan and Okanogan counties.

In Washington, and elsewhere within the gray squirrels range, the principal food is acorns, although the seeds of Douglas-fir and other conifers are also eaten (Dalquest 1948). While pine nuts and acorns are considered essential foods for storing body fat

and conditioning western gray squirrels for winter, green vegetation, seeds and nuts of trees and shrubs, fleshy fruits, mushrooms and other foods are also consumed. Hypogeous fungi (underground fungi such as truffles) comprise a large portion of the western gray squirrel diet (WDW 1993; Carraway and Verts 1994; Ryan and Carey 1995a).

For the purposes of this project, potentially suitable western gray squirrel habitat was defined as any coniferous, deciduous or mixed stands of trees that have an average diameter at breast height (DBH) of at least 10 inches or greater. This criterion was used to ensure a conservative approach in determining survey areas.

3.2. Survey Locations

Turnstone conducted 2 rounds of western gray squirrel nest surveys within the project area. Approximately 738 acres of potentially suitable habitat within the project area were surveyed in the fall of 2008. The survey area was adjusted slightly in 2009 removing 46 acres from the overall survey effort. This area turned out to be outside the established buffers. In the Spring of 2009, a total 692 acres were surveyed for western gray squirrels.

Within the project area, potential gray squirrel survey areas were selected by identifying appropriate stand inventories using GIS analysis and ground-truthing. The initial GIS analysis was used to efficiently determine areas of potentially suitable squirrel habitat prior to conducting the field visits. Ground-truthing was used to validate and finalize the initial GIS analysis while setting up the squirrel survey area blocks.

Western gray squirrel nest surveys were completed in any areas where project activities would remove or structurally modify forest stands. To determine survey areas the proposed wind turbine string was buffered out 150 feet (150 foot radius) to establish a work zone. Then an additional 500 feet of buffer was added, to encompass any areas that may be altered due to obstructions (tall trees) within wind corridors of the proposed turbines. Finally, an additional 400 feet was added as an unaltered habitat buffer. Adding all buffers created a 1,050 foot radius around the turbine string to be surveyed.

Including all buffers the entire survey area of possible habitat was nearly 1,361 acres. Within this area 738 acres were determined to be potentially suitable western gray squirrel habitat in 2008 and 692 acres in 2009. The remaining area within the overall buffer was not surveyed and determined to be non-habitat.

The survey area was broken up into smaller discrete units to facilitate an efficient and systematic survey effort by Turnstone biologists. The discrete units were referred to as polygons and each polygon was given a unique identifier. A map of the western gray squirrel survey area polygons is located in Appendix A.

The final proposed turbine alignment released in late October of 2008 did change the survey coverage for western gray squirrels. The changes made in the final turbine alignment did add additional habitat. These stands were a patchwork of small isolated forests that needed an additional survey. The survey window to conduct western gray squirrel surveys was still open when the new areas were identified. An additional field visit was conducted in early November using the same survey methodology as the first round of squirrel surveys in 2008.

3.3. Survey Methods

Surveys were conducted according to the guidelines in the WDFW report, "*Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance"* (Haegen, Van Leuven, and Anderson 2004). Turnstone biologist also worked with WDFW staff biologists to configure the best survey methodology for the area.

Turnstone biologists performed a general search for western gray squirrels and their nests in the fall of 2008 and the spring of 2009. Walk-through surveys using meandering transects were conducted in all conifer, deciduous, and mixed composition stands within the designated survey area that met the minimum DBH threshold of 10 inches. Surveyors identified all species of squirrels, evidence of squirrel activity and squirrel nests while walking transects. Transects were oriented to parallel the topographic features of the survey polygons when possible to facilitate safe and efficient travel on foot. All transects were laid out systematically in GIS to ensure that they were evenly

spaced and located close enough together so that no habitat areas were excluded from the survey effort. Surveyors would use the plotted transects as general guidelines for a route of travel. The survey was conducted using an intuitive meander of the survey area. Surveyors would deviate from the designated transect to investigate areas of potential habitat or the evidence of squirrel sign.

4. NORTHERN GOSHAWK

The northern goshawk *(Accipiter gentiles)* is classified as a "species of concern" by the U.S. Fish and Wildlife Service and as a "listed candidate" for a state sensitive, threatened, or endangered species by the Washington Fish and Wildlife Commission. The physiographic range and habitat requirements of the northern goshawk can be found within the forest lands of the Whistling Ridge Wind Energy Project.

4.1. Suitable Habitat

Northern goshawks inhabit a wide variety of forest habitats, including true fir (red fir, white fir, and subalpine fir), mixed conifer, lodgepole pine, ponderosa pine, Jeffrey pine, montane riparian deciduous forest and Douglas fir. Occasionally, goshawks nest in coastal redwood and mixed hardwood forests. Goshawk nest sites are associated with patches of forest that are larger and denser than the surrounding landscape. However, home ranges often consist of a wide range of forest age classes and conditions. Numerous habitat studies and modeling efforts have found nest sites to be associated with similar factors, including proximity to water or meadow habitat, forest openings, level terrain or "benches" of gentle slope, northerly aspects and patches of larger, denser trees, but these factors vary widely (Woodbridge 2006).

4.2. Survey Locations

During the 2008 and 2009 northern goshawk survey windows, Turnstone staff conducted northern goshawk surveys within properties managed by SDS Lumber Co. and on lands managed by WDNR. These surveys covered approximately 1,493 acres of potential goshawk habitat. The objective of our survey effort was to determine the presence of northern goshawks.

The potential survey area for the northern goshawk was determined by protocol parameters, consultation with biologists from the WDFW, and GIS analysis. Survey protocol methodology was outlined in the United States Forest Service document, "*Northern Goshawk Inventory and Monitoring Technical Guide, July 2006."* Table 2 depicts the legal descriptions of the where the goshawk survey areas occurred.

Table 2. Township and Range information for northern goshawk survey areas.

Legal Descriptions for Goshawk Survey Areas		
Township	**Range**	**Section**
4N	9E	1, 36
4N	10E	31,32
3N	9E	12,13,24
3N	10E	5,6,7,8,18,19

To determine the area that would require goshawk surveys, a GIS analysis was conducted following the protocol parameters and best available data. The proposed wind turbine right of way was buffered out 150 feet to establish a work area that would likely be permanently disturbed. Then an additional 2,624 feet (800 meters), per protocol recommendations, was added to 50ft buffer to establish an area that was considered the potential northern goshawk survey area. Within this area, GIS data was analyzed to identify conifer stands that may contain suitable habitat structure based on an age class of greater than 25 years and average tree DBH of at least 12 inches.

The resulting suitable habitat areas, or polygons, were then overlaid on current aerial photography (2006), to eliminate any recently harvested stands. This exercise created an initial survey area of 3,013 acres of potential habitat. Of this area approximately 1,100 acres were determined to be forested and contain the habitat characteristics needed to support goshawks. Initial calling points and survey transects were then established in GIS to adequately cover the 1,100 acres of potential goshawk habitat that would require survey.

In order to adequately survey the approximately 1,100 acres of potential goshawk habitat, Turnstone biologists conducted field reconnaissance in areas of all potential habitat that was delineated out in GIS. After ground-truthing the area 136 calling points were set. The areas to be surveyed had irregular shapes and establishing standardized transect strings was not feasible. Survey areas were covered with individual calling points that were placed within the potential goshawk habitat. The objective was to place stations within 150 meters of all potential habitat and to not place stations more than 200 meters apart.

The final proposed turbine alignment was released in late October of 2008. This re-alignment affected the survey coverage to the north of the project site. The changes made in the alignment created an additional 367 acres in the buffered area of potential habitat. The survey window to conduct northern goshawk surveys during the 2008 breeding season had closed making it impossible to survey the additional habitat intersected by the re-alignment. Because the new area was small, Turnstone biologists chose a different survey methodology in the 2009 northern goshawk survey window. The "Intensive Search Survey" methodology was chosen and initiated in summer of 2009. The details of this survey methodology are outlined in the USFS document, "*Northern Goshawk Inventory and Monitoring Technical Guide, July 2006."* This methodology was selected because it could be initiated and completed in a single survey season. Under this rigorous approach, the new survey areas would receive two successive survey visits using a more intense survey methodology in order to determine potential goshawk presence.

During the 2009 survey effort, approximately 34 acres of non-habitat was eliminated from the original 367 acres. An additional 56 acres was added adjacent to the area because of its potential habitat qualities making the total approximately 389 acres of potential habitat. These areas were surveyed using the intensive search methodology while approximately 1,100 acres were surveyed for the second year using the broadcast acoustic methodology.

4.3. Survey Methods

Two different survey methodologies were used during the 2008 and 2009 goshawk survey windows. In 2008 and 2009, two rounds of the "Broadcast Acoustic" surveys were conducted. In 2009 two rounds of the "Intensive Search" survey methodology was conducted where the turbine alignment was extended to the north.

The "broadcast acoustical" survey methodology requires 2 visits to the survey area within a breeding season. The first site visit occurs in the 'nestling period', where adult alarm calls are broadcast at the designated calling points. During the second site visit, in the 'fledgling period', wail and fledgling begging calls are broadcast at the same survey points.

At each station, goshawk calls are broadcast with a portable amplified PA system for ten second periods. Turnstone biologists pause for thirty seconds to listen for goshawk responses, immediately following the broadcast calls. The sequence of broadcasting and listening for responses was repeated two more times, rotating 120 degrees from the last broadcast. The three-call sequence was repeated again, so that each direction received two sets of broadcast calls. During foot travel between broadcast points, the surveyors stayed alert observing and listening for potential goshawks. Surveyors also documented observations of other raptor species when encountered.

Survey periods begin ½ hour before sunrise and conclude ½ hour before sunset, as specified by protocol. If there was a goshawk detected in the project area, then a search for an active nest would ensue, following the 'intensive search' protocol. Locating an active nest is recommended immediately following any goshawk detections. Turnstone also recorded all other incidental raptor species observed during site visits on the field data forms, which are included in *Appendix C*.

The second methodology used in 2009 was the "Intensive Search Survey" methodology. This approach requires one or more visits to the survey area in a breeding season to determine goshawk occupancy. Turnstone biologists chose two site visits in 2009 to reach a high level of assurance that they were not missing goshawks. This survey method combines an intensive visual search with the methods of the "broadcast

acoustic" protocol. The visual search involves multiple surveyors looking for any possible goshawk sign, which could include: nests (active or abandoned), whitewash, prey remains, plucking posts, or molted feathers. Goshawk calls are broadcast while conducting the visual search as recommended in the guidelines in the "broadcast acoustic" protocol.

To be most effective the survey requires the use of multiple observers simultaneously walking the stands. All intensive search surveys conducted used a minimum of three simultaneous observers and sometimes four when necessary to adequately cover the area. Survey transects were established to cover the entire 389 acre site. These transects were overlaid on topographic base maps and aerial photographs in GIS. Start points and end points of the survey transects were then derived and loaded into GPS units to be used as reference tools in the field while conducting the surveys. GPS units also served as a reliable method to mark and map any goshawk observations.

Turnstone biologists began their survey effort later in the nesting period in an attempt to cause fewer disturbances to potential nesting goshawks. Surveys were conducted walking parallel transects in unison with multiple observers looking for goshawk sign and broadcasting goshawk calls. Survey transects were established approximately 20-30 meters apart depending on the terrain and the amount of understory vegetation present. The observer walking the middle transect would broadcast goshawk calls approximately every 250 meters apart along the transect. Observers traveled at a slow pace to increase the level of safety and to give ample time to scan the area for any potential goshawk or goshawk sign. On every third set of transects, all three observers would broadcast goshawk calls, using the same broadcasting procedure recommended in the "broadcast acoustic" survey protocol.

All goshawk sign encountered was analyzed and scrutinized in the field by a team of biologists. Any potential goshawk sign encountered would elicit an intensive search of the area by all biologists. The intensive search would cover an area of at least a 300 meter radius from the goshawk sign observed. All raptor feathers encountered were reviewed in the field and collected in case they needed further review in the lab. The "intensive search survey" methodology is time-consuming and physically demanding of

the biologists. The results however, give us a very high likelihood of detecting the presence of goshawks.

5. Survey Results

5.1. Northern Spotted Owl

Turnstone conducted two consecutive years of spotted owl surveys in 2008 and 2009 with a minimum of three site visits per calling station on and adjacent to SDS properties, (*Appendix A).* Two spotted owl activity centers located on public lands (WDNR, USFS) to the north of the project area were also surveyed. The Mill Creek (MSNO#: 0991) and Moss Creek (MSNO#: 1003) cores are located in Township 4N and Range 10E section 28 and Township 4N and Range 9E section 35, respectively. A total of 80 calling stations were established and surveyed in 2008 and 2009 with no northern spotted owl responses or observations. Seven supplemental stations were added in 2009 adjacent to areas that were determined to have potential habitat. There were no observations or detections of spotted owls at any of the 87 established calling stations in 2008 or 2009.

In 2008, Turnstone conducted an additional day visit to the two Moss and Mill Creek nest cores where spotted owls historically lived. No spotted owl observations or responses were recorded. In 2009, Turnstone added three additional day visits in addition to the required night visits to each nest core with no spotted owl observations or responses.

Tables 3A and 3B summarize all of the Turnstone survey response/observation results for the survey efforts in the 2008 and 2009 survey seasons. A map depicting the locations of the calling stations and locations of all barred owl responses/observations is available for review in Appendix A of this document.

Table 3A. Survey Summary Results for 2008.

Visit #	Dates	# of Stations	Northern Spotted Owl Response	Comments
1	21-May	12	None	No owl responses
1	22-May	20	None	No owl responses
1	24-May	18	None	Barred owls & M/F pair near stations #45 & #82
1	25-May	22	None	Barred owls, likely pair; near stations #74 & #86
1	26-May	8	None	No owl responses
2	10-Jun	22	None	Barred owls (2) from station #74, Barred owls, likely pair from station #86
2	11-Jun	20	None	No owl responses
2	15-Jun	17	None	No owl responses
2	16-Jun	21	None	Barred owl from stations #44 & #45, Unknown begging Juvenile from station #47 (confirmed as barred owl on day visit)
3	27-Jul	15	None	No owl responses
3	28-Jul	20	None	Barred owl from Station #82
3	29-Jul	24	None	No owl responses
3	30-Jul	22	None	No owl responses

Table 3B. Survey Summary Results for 2009.

Visit #	Dates	# of Stations	Northern Spotted Owl Response	Comments
1	5/11/09	22	None	N. Pygmy owl from station #46
1	5/12/09	20	None	N. Pygmy owl from station #63, N. Saw-Whet from station #75
1	5/13/09	23	None	Barred owl from station #37 & #72, N. Pygmy owl from station #38
1	5/14/09	22	None	Barred owl from station #43, N. Saw-Whet from station #82
*2	06/17/09	45	None	Barred owl from station #7 & M/F pair station #28

Visit #	Dates	# of Stations	Northern Spotted Owl Response	Comments
*2	06/18/09	42	None	Barred owl from station #5,#37,#48,#85,#86,32A & M/F pair station #74, N. Pygmy owl from station #77
3	07/21/09	21	None	Barred owl from station #72
3	07/22/09	24	None	N. Pygmy owl from station #11
3	07/23/09	22	None	Barred owl from station #48A, N. Pygmy owl from station #39
3	07/24/09	20	None	No owl responses

* =two observers conducted surveys concurrently on these nights.

Table 4A outlines the results of the northern spotted owl surveys at each of the two nest cores that intersect the project area. Results were derived from data collected by the WDNR southeast Washington NSO demography study and NACASI. The data shows no spotted owl detections in the Mill Creek core since the 2000 breeding season. The Moss Creek core has not had a spotted owl detected since the 2002 breeding season. Table 4B shows the results of the Turnstone survey effort at the two activity centers for the 2003, 2004, 2008 and 2009 survey seasons. Both cores show an increased presence of barred owls detected while conducting surveys for spotted owls.

Table 4A. Spotted Owl Nest Core Survey Details and Results from WDNR and NACASI Data Sources

Year	Mill Creek Spotted Owl Nest Core Survey Results		Moss Creek Spotted Owl Nest Core Survey Results	
	STOC	STVA	STOC	STVA
2009	No response	Pair	No response	Male and Unk. STVA observed
2008	No response	Pair	No response	Male observed
2007	No response	None observed	No response	Male observed
2006	No response	Pair	No response	Male observed
2005	No response	Male	No response	Pair observed
2004	No response	Pair observed	No response	Pair with juvenile observed
2003	No response	None observed	No response[1]	No response[1]
2002	No response	Male observed	Male observed	Pair with juvenile observed
2001	No response	None observed	No response	Pair observed
2000	Non-nesting pair observed	None observed	Reproducing pair with 1 juvenile	None observed
1999	Female observed	None observed	Reproducing pair with 1 juvenile	None observed
1998	Non-nesting pair observed	Female observed	Reproducing pair with 2 juveniles	None observed
1997	Non-nesting pair observed	None observed	No response	None observed
1996	Reproducing pair with 2 juveniles	Unknown	Reproducing pair with 3 juveniles	Unknown
1995	No response	Unknown	Reproducing pair with 2 juveniles	Unknown
1994	Reproducing pair with 2 juveniles	Unknown	Reproducing pair with 2 juveniles	Unknown

[1] =an unknown Strix was detected at Moss Creek in 2003

Table 4B. Spotted Owl Activity Center Survey Details and Results From Turnstone Environmental Consultants

Year	Mill Creek Spotted Owl Activity Center Results*		Moss Creek Spotted Owl Activity Center Results*	
	Spotted Owl	Barred Owl	Spotted Owl	Barred Owl
2009	No response	Male observed	No response	Pair observed
2008	No response	Male & Female observed	No response	Pair observed
2004	No response	Present[1]	No response	Present[1]
2003	No response	Present[1]	No response	No response

* =Activity Center constitutes the entire 1.8 mile provincial range

[1] =Surveyor unable to determine sex of barred owl detected

5.2. Western Gray Squirrel

Western gray squirrel nest surveys were conducted in the fall of 2008 and again in the spring of 2009. These surveys constituted two complete rounds of survey covering all potential habitat within the survey polygons. The objective of this survey effort was to determine western gray squirrel use and/or sign of historical use on any potential habitat within the project buffers. A systematic nest search occurred on 26 polygons at the proposed energy project and 400 ft buffers into adjacent undisturbed suitable squirrel habitat (per WDFW protocol guidelines). No western gray squirrels or western gray squirrel nest structures were observed during the three site visits that occurred over two years.

Table 5A. 2008 Western Gray Squirrel Survey Areas and Results

Survey Polygon Visited	Date	Surveyor	Notes
A1, A3, A7	10/14/2008	D. Sahl	No nests or WGS observed
A4, A5, A10	10/14/2008	J.Kolozar	No nests or WGS observed
A2, A6, A9	10/14/2008	J.Kolozar	No nests or WGS observed
A12, A13	10/15/2008	D.Sahl	No nests or WGS observed
A14	10/15/2008	D. Bolen	No nests or WGS observed
A15	10/15/2008	J. Kolozar	No nests or WGS observed
A11, A17, A18	10/15/2008	D. Sahl, D. Bolen, J. Kolozar	No nests or WGS observed
B1-B8	11/18/2008	D.Sahl, D. Bolen	No nests or WGS observed
C1	10/9/2008	D. Sahl	No nests or WGS observed

Table 5B. 2009 Western Gray Squirrel Survey Areas and Results

Survey Polygon Visited	Date	Surveyor	Notes
A5, B5	3/12/09	D. Bolen	No nests or WGS observed
A6, B4	3/12/09	W. Perkins	No nests or WGS observed
A9, A10	3/10/09	D. Sahl, D. Bolen, W. Perkins	No nests or WGS observed
A12, A13, A14	3/10/09	D.Sahl, W. Perkins	No nests or WGS observed
A15	3/10/09	D.Bolen	No nests or WGS observed
A1, A2, B1, B2	3/11/09	D.Sahl	No nests or WGS observed
A3	3/11/09	D. Bolen	No nests or WGS observed

Survey Polygon Visited	Date	Surveyor	Notes
A4, A11	3/11/09	W. Perkins	No nests or WGS observed
A7	3/12/09	D. Sahl	No nests or WGS observed
A17, A18, B6, B7, C1	3/10/09	D. Sahl, D. Bolen, W. Perkins	No nests or WGS observed
B3	3/12/09	D. Sahl, D. Bolen, W. Perkins	No nests or WGS observed

5.3. Northern Goshawk

Turnstone conducted protocol northern goshawk surveys on SDS properties during the 2008 and 2009 goshawk survey windows. The survey protocol methodology used was the "broadcast acoustical survey" and "Intensive search survey" methodology, outlined in the protocol; "*Northern Goshawk Inventory and Monitoring Technical Guide, USFS, July 2006."* Calling stations were strategically placed throughout the survey area in all suitable habitat within 2,624 feet (800 meters) of the turbine right of way. Turnstone completed two protocol site visits at 136 calling stations, using the "broadcast acoustic survey", during the 2008 and 2009 goshawk survey seasons. One site visit was conducted during the nestling period and the second during the fledgling period as recommended in the protocol. No northern goshawk responses were documented during either of the two site visits in either the 2008 or 2009 survey seasons. Survey dates for the "broadcast acoustic" surveys and incidental raptor observations are summarized in Table 6A and 6B.

Table 6A. Northern Goshawk Broadcast Acoustic Survey Results Summary 2008.

Visit #	# of Stations	Date	N. Goshawk Response	Other Raptors Observed
1	14	6/23	None	OSPR (1) near station 46 RTHA (1) near station 46
1	21	6/24	None	RTHA (1) near station 36
1	22	6/25	None	None observed
1	25	6/26	None	None observed
1	25	6/27	None	None observed
1	11	7/15	None	TUVU (1) near station 62

Visit #	# of Stations	Date	N. Goshawk Response	Other Raptors Observed
1	15	7/16	None	COHA (1) near station 26
1	3	7/28	None	None observed
2	7	7/28	None	None observed
2	14	7/30	None	RTHA (1) near station 67
2	22	7/31	None	TUVU (1) near station 95 TUVU (1) near station 78
2	16	8/01	None	None observed
2	23	8/04	None	RTHA (1) near station 22
2	25	8/05	None	SSHA (1) near station 9 TUVU (8) near station 12
2	19	8/06	None	None observed
2	10	8/07	None	None observed

COHA = Cooper's hawk *(Accipiter cooperii)*
OSPR = Osprey *(Pandion haliaetus)*
RTHA = Red-tailed hawk *(Buteo jamaicensis)*
SSHA = Sharp-shinned hawk *(Accipter striatus)*
TUVU = Turkey vulture *(Cathartes aura)*

Table 6B. Northern Goshawk Broadcast Acoustic Survey Results Summary 2009

Visit #	# of Stations	Date	N. Goshawk Response	Other Raptors Observed
1	11	06/24/09	None	BAEA (1) near station 57
1	34	06/25/09	None	RTHA (2) near station 124 & 127
1	40	06/26/09	None	TUVU (2) near station 28 & 36, Unk. Owl (likely pygmy or saw-whet) at station G13
1	40	06/29/09	None	TUVU (3) near station 68 & 90 & 91
1	11	06/30/09	None	RTHA (1) near station 60.5
2	33	07/09/09	None	None observed
2	46	07/10/09	None	TUVU (1) near station 73
2	27	07/15/09	None	TUVU (2) near station 48 & 46
2	30	07/16/09	None	None observed

BAEA = Bald Eagle (*Haliaeetus leucocephalus)*
COHA = Cooper's hawk *(Accipiter cooperii)*
OSPR = Osprey *(Pandion haliaetus)*
RTHA = Red-tailed hawk *(Buteo jamaicensis)*
SSHA = Sharp-shinned hawk *(Accipter striatus)*
TUVU = Turkey vulture *(Cathartes aura)*

Changes in the proposed alignment of the project area intersected additional goshawk habitat in October of 2008. These changes occurred after the goshawk survey window in 2008. In 2009, additional goshawk habitat was surveyed using a different survey methodology. The "Intensive search survey" methodology was used to survey approximately 389 acres in 2009. This survey effort involved two rounds of survey effort using a minimum of three biologists simultaneously. No northern goshawk responses or goshawk sign was documented during either of the two site visits.

Survey dates for the "intensive search survey" and incidental raptor observations are summarized in Table 6C. Maps of the survey areas for northern goshawks in 2008 and 2009 are available for review in Appendix A. Copies of the field data sheets for the 2009 survey effort are available for review in Appendix C.

Table 6C. Northern Goshawk Intensive Search Survey Results Summary 2009

Visit #	# of Stations	Date	N. Goshawk Response	Other Raptors Observed
1	C24-1	07/13/09	None	STVA (1) seen only, no audio response
1	A48	07/15/09	None	SSHA (1) heard only
2	B33	07/28/09	None	RTHA (1) seen only
2	C49	07/29/09	None	SSHA (1) seen and heard, plucking post observed near bird location

RTHA = Red-tailed hawk *(Buteo jamaicensis)*
SSHA = Sharp-shinned hawk *(Accipter striatus)*
STVA= Barred Owl (*Strix varia)*

6. CONCLUSION

6.1. Northern Spotted Owl

During the 2008 and 2009 Northern spotted owl survey seasons, Turnstone conducted six site visits to each of the established spotted owl calling points. A total of 80 calling stations were established and surveyed in 2008 and 2009. Seven supplemental stations were added in 2009 adjacent to areas that were determined to have potential habitat. There were no observations or detections of spotted owls at any of the calling stations in

2008 or 2009. Turnstone also conducted an additional day visit to both nest cores (Mill Creek, Moss Creek) in 2008. In 2009 three additional day visits up and beyond the required three night visits were conducted. These visits were spread strategically throughout the nesting season in an attempt to see or hear spotted owls. The survey effort covered potentially suitable northern spotted owl habitat within the approximately 22,123 acres of survey area. Turnstone recorded no northern spotted owl observations or responses during any of the 10 site visits.

6.2. Western Gray Squirrel

During the 2008 and 2009 western gray squirrel survey windows, Turnstone biologists conducted nest searches on 26 different polygons of potential western gray squirrel habitat. The first round of surveys occurred in the fall of 2008 with the second round soon to follow the spring of 2009. Approximately 738 acres of potential western gray squirrel habitat was surveyed in 2008 and 692 acres were surveyed in 2009. Turnstone biologists did not observe any Western gray squirrels or their nest structures during two site visits.

It should be noted that very few oak trees, a prime source of food for gray squirrels, were observed in the project area. . The few that were observed within the western gray squirrel survey area boundaries were small (less than 20 feet tall), stunted, and growing in openings on exposed rocky slopes in shallow soils. Sources of year round water are also important to populations of western gray squirrels. There were few observed year round water sources with the exception of a few drainages and one wetland area.

6.3. Northern Goshawk

Turnstone conducted protocol northern goshawk surveys on SDS properties during the 2008 and 2009 goshawk survey windows. The survey protocol methodology used was the “broadcast acoustical survey” and “Intensive search survey” methodology, outlined in the protocol; “*Northern Goshawk Inventory and Monitoring Technical Guide, USFS, July 2006.”* Turnstone completed two protocol site visits at 136 calling stations, using the “broadcast acoustic survey”, during the 2008 and 2009 goshawk survey seasons. One

site visit was conducted during the nestling period and the second during the fledgling period as recommended in the protocol. No northern goshawk responses were documented during either of the two site visits.

The “Intensive search survey” methodology was used to survey approximately 389 acres on SDS and WDNR property. This survey effort involved two rounds of survey using three to four biologists simultaneously. No northern goshawk observations, responses or goshawk sign was documented during either of these two site visits.

7. REFERENCES

Buchanan, Joseph and Swedeen, Paula. 2005. Final Briefing Report to the Washington State Forest Practices Board Regarding Spotted Owl Status and Forest Practice Rules. Washington Department of Fish and Wildlife, Olympia, Washington. USA.

Carraway, L. N., and B. J. Verts, 1994. *Mammalian Species*, No. 474, Sciurus griseus Dec. 2, 1994, pp. 1-7 American Society of Mammalogists

Courtney, S. Pl, J A Blakesley, R E Bigley, M L Cody, J P Dumbacher, R C Fleischer, A B Franklin, J F Franklin, R J Gutiérrez, J M Marzluff, L Sztukowski. 2004. Scientific evaluation of the status of the Northern Spotted Owl. Sustainable Ecosystems Institute, Portland, Oregon.

Cross, S. P., 1969. Behavioral aspects of western gray squirrel ecology. Tucson, AZ: University of Arizona. 168 p. Ph.D. dissertation.

Dalquest, W. W., 1948. Mammals of Washington. University of Kansas Publications, Museum of Natural History, 2:1 – 444.

Federal Register, 2003. Endangered and Threatened Wildlife and Plants; Status Review and 12-Month Finding for a Petition to List The Washington Population of the Western Gray Squirrel. 68 Federal Register 111 (10 June 2003), pp. 34628 - 34640.

Forsman, E. D., 2008. Demographic Characteristics of Spotted Owls in the Oregon Coast Ranges, 1990-2007.

Kelly, E.G., Forsman, E.D., and Anthony, R.G., 2003, Are barred owls displacing spotted owls?: Condor, v. 105, p. 45–53.

Luoma, D.L. 1991. Annual changes in seasonal production of hypogeous sporocarps in Oregon Douglas-fir forests. In: Ruggiero, L.F.; Aubry, K.B.; Carey, A.B.; Huff, M.H., tech. coords. Wildlife and vegetation of unmanaged Douglas-fir forests. Gen. Tech. Rep. PNW-GTR-285. Portland, OR: U.S. Department of Agriculture, Forest Service. Pacific Northwest Research Station: 83-90.

Ryan, L. A. and Carey 1995a Ryan, L. A.; Carey, A.B. 1995b. Distribution and Habitat of the Western Gray Squirrel (*Sciurus griseus*) on Fort Lewis, Washington. Northwest Science 69(3):204-216

Thomas, JW., Forsman, E.D., Lint, J.B., Meslow, E.C., Noon, B.R., and Verner, J. 1990. A conservation strategy for the northern spotted owl. Interagency Scientific Committee to Address the Conservation of the Northern Spotted Owl, Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS) 2008. Final Recovery Plan for the Northern Spotted Owl, *Strix occidentalis caurina*. U.S. Fish and Wildlife Service, Portland, Oregon. xii + 142 pp.

U.S. Fish and Wildlife Service (USFWS) 1992. Recovery Plan for the Northern Spotted Owl. United States Fish and Wildlife Service.

U.S. Department of the Interior (USDI) 1992. Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls. United States Fish and Wildlife Service. 16 pp.

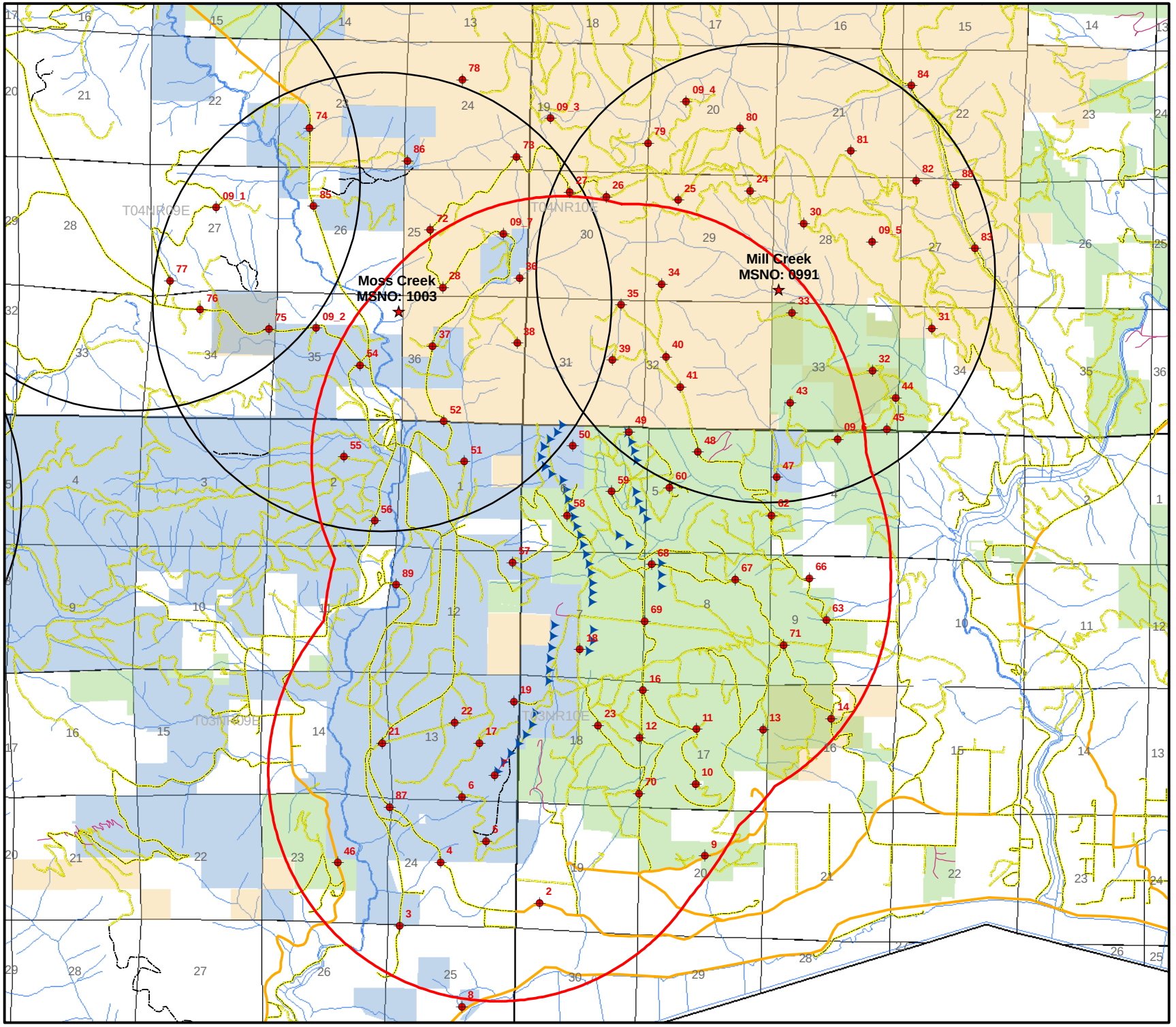
Washington Department of Wildlife (WDW) 1993. Status of the Western Gray Squirrel (*Sciurus griseus*) in Washington. Olympia, WA: Wash. Dept. of Wildlife. Final status report. 36 p.

Woodbridge, B.; Hargis, C.D. 2006. Northern goshawk inventory and monitoring technical guide. Gen. Tech. Rep. WO-71. Washington, DC: U.S. Department of Agriculture, Forest Service. 80 p.

Vander Haegen, M., S. Van Leuven, and D. Anderson. 2004. Surveys for western gray squirrel nests on sites harvested under approved forest practice guidelines: analysis of nest use and operator compliance. Wildlife Research Report. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Appendix A – Maps

Whistling Ridge NSO Survey 2008/2009 Spotted Owl Calling Points



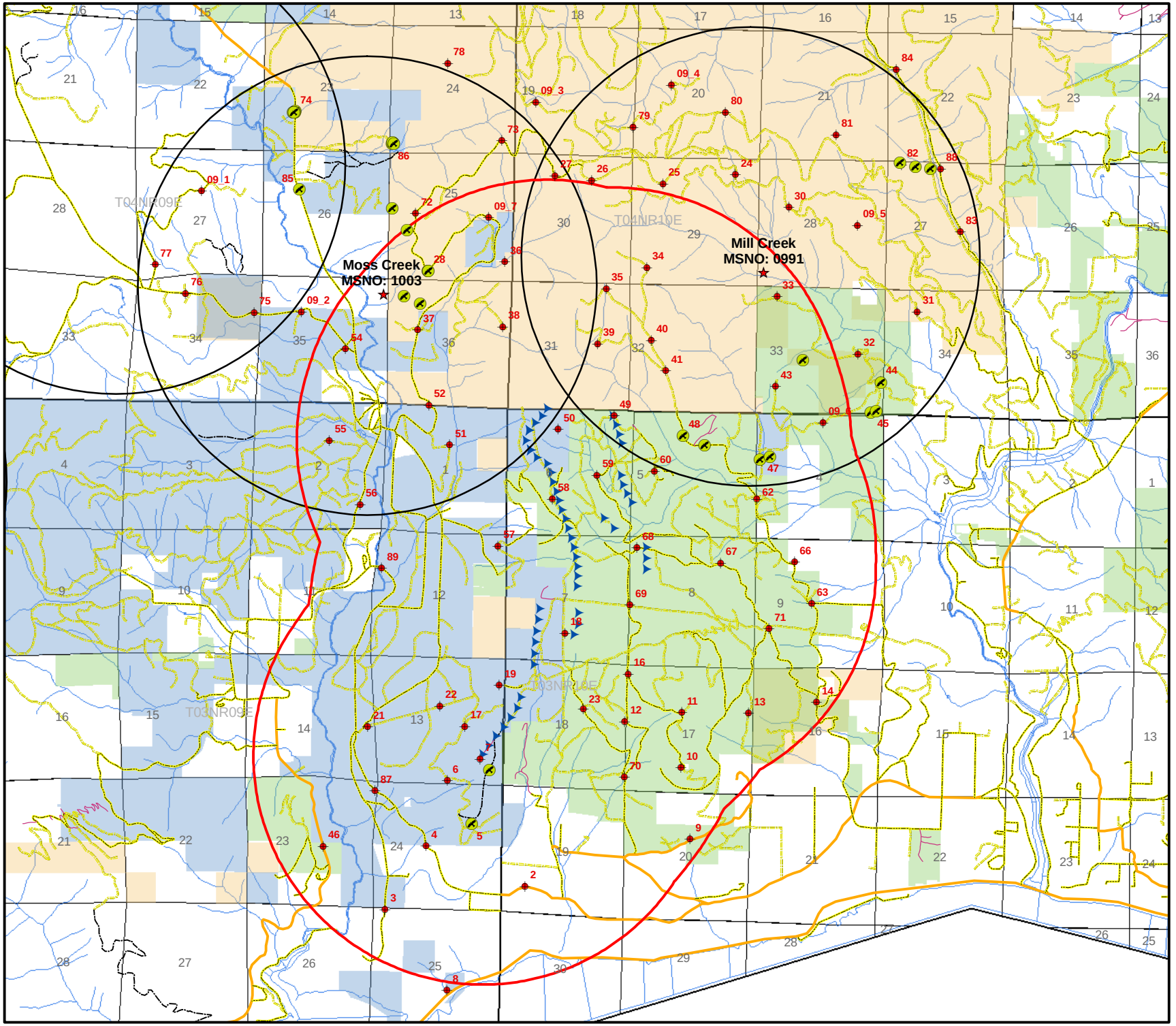
Legend

- NSO Calling Points
- Historic NSO Nests
- **Proposed Turbine Locations**
- Project Area (1.8 mile)
- Historic NSO Nest Provincial Range
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- SDS Ownership
- BLC Ownership
- DNR Ownership

N

1:65,000

Whistling Ridge NSO Survey 2008/2009 Barred Owl Detections



Legend

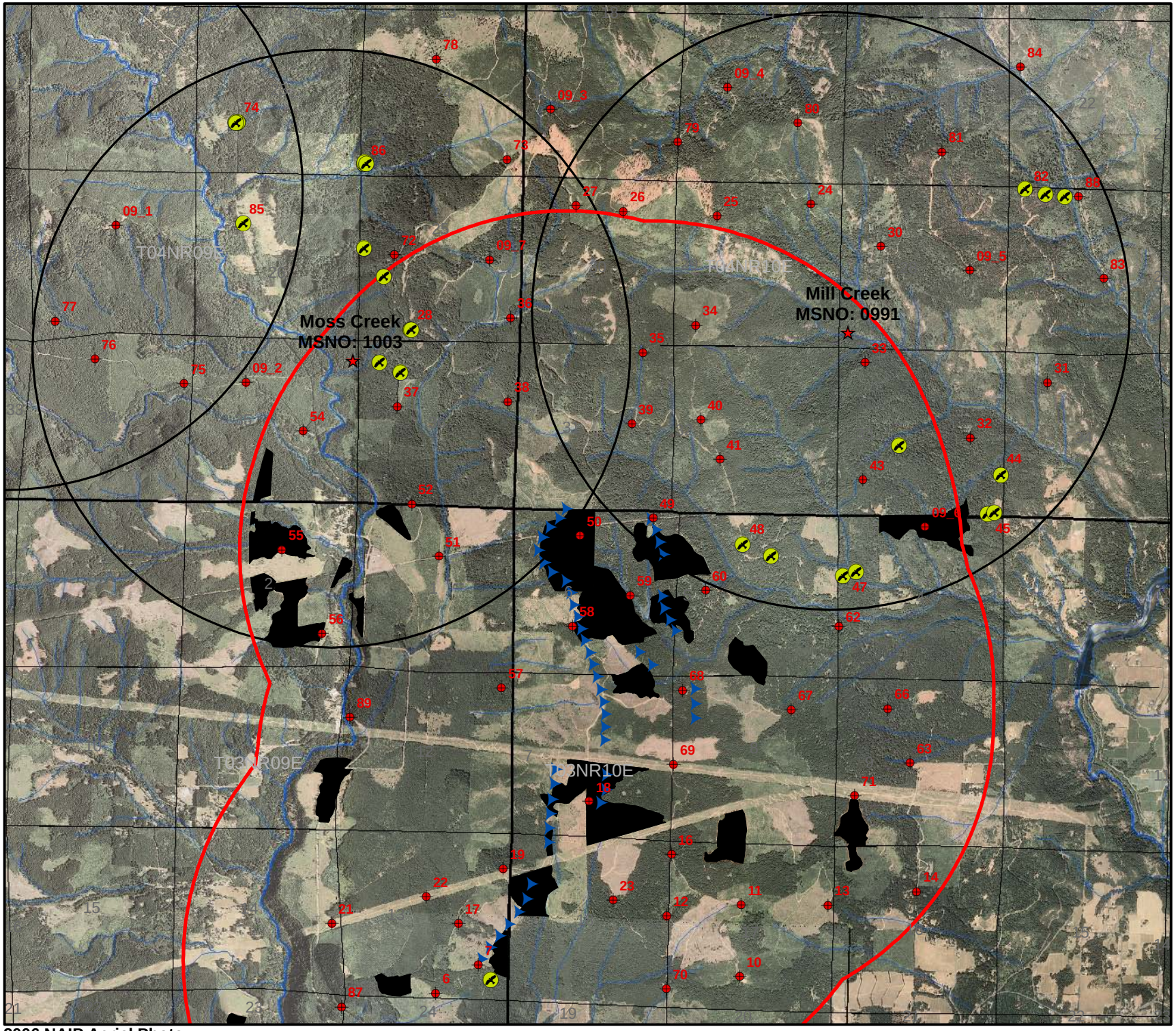
- SDS 2008/2009 Barred Owl Detections
- NSO Calling Points
- Proposed Turbine Locations
- Historic NSO Nests
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- Project Area (1.8 mile)
- Historic NSO Nest Provincial Range
- SDS Ownership
- BLC Ownership
- DNR Ownership

N

1:65,000

Whistling Ridge NSO Survey 2008/2009 Barred Owl Detections

Aerial Photo
North Half



Legend

- SDS 2008/2009 Barred Owl Detections
- NSO Calling Points
- Historic NSO Nests
- Proposed Turbine Locations
- Project Area (1.8 mile)
- Historic NSO Nest Provincial Range
- Recent SDS Harvet (since 2006)

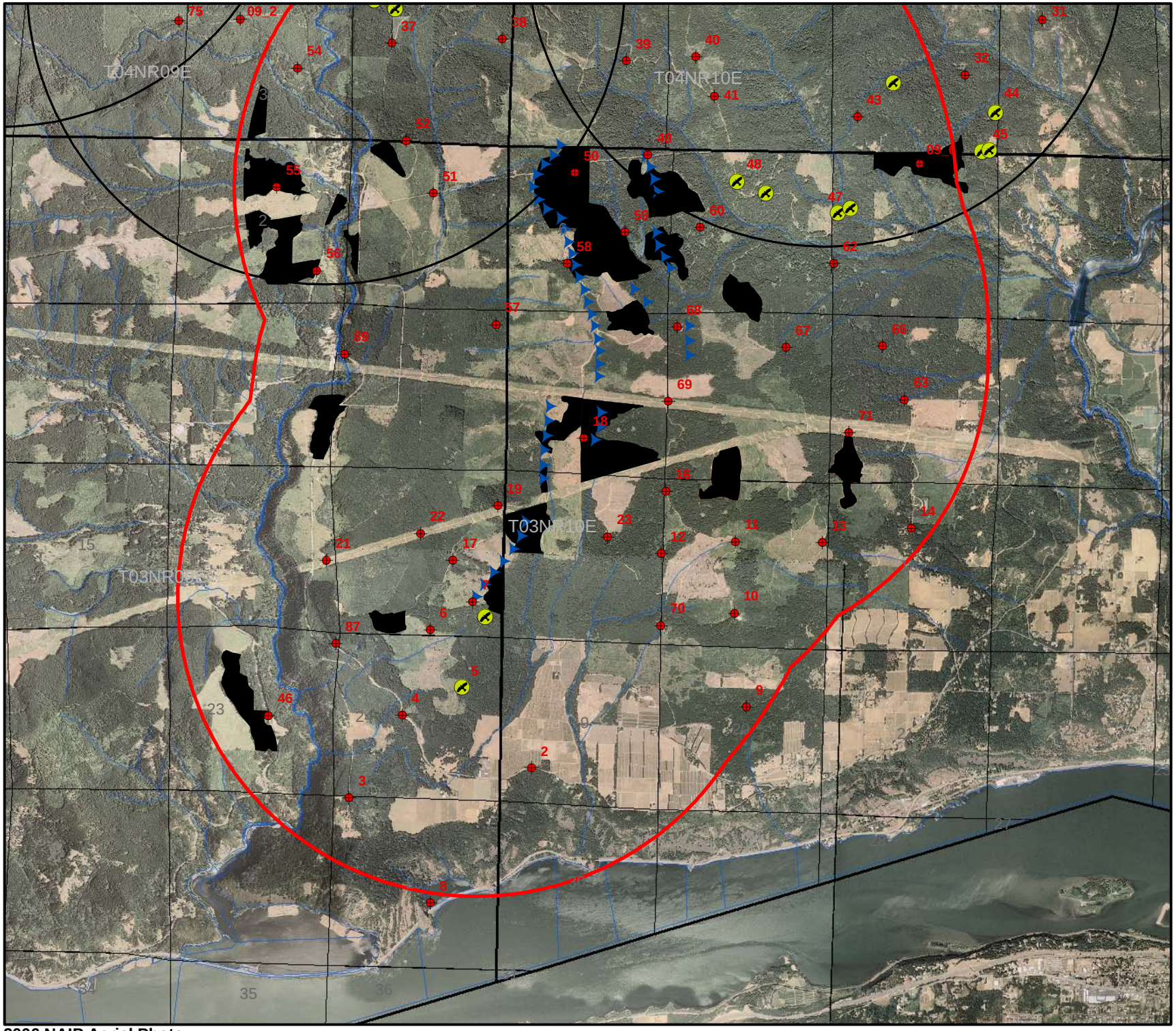
N

1:50,000

2006 NAIP Aerial Photo

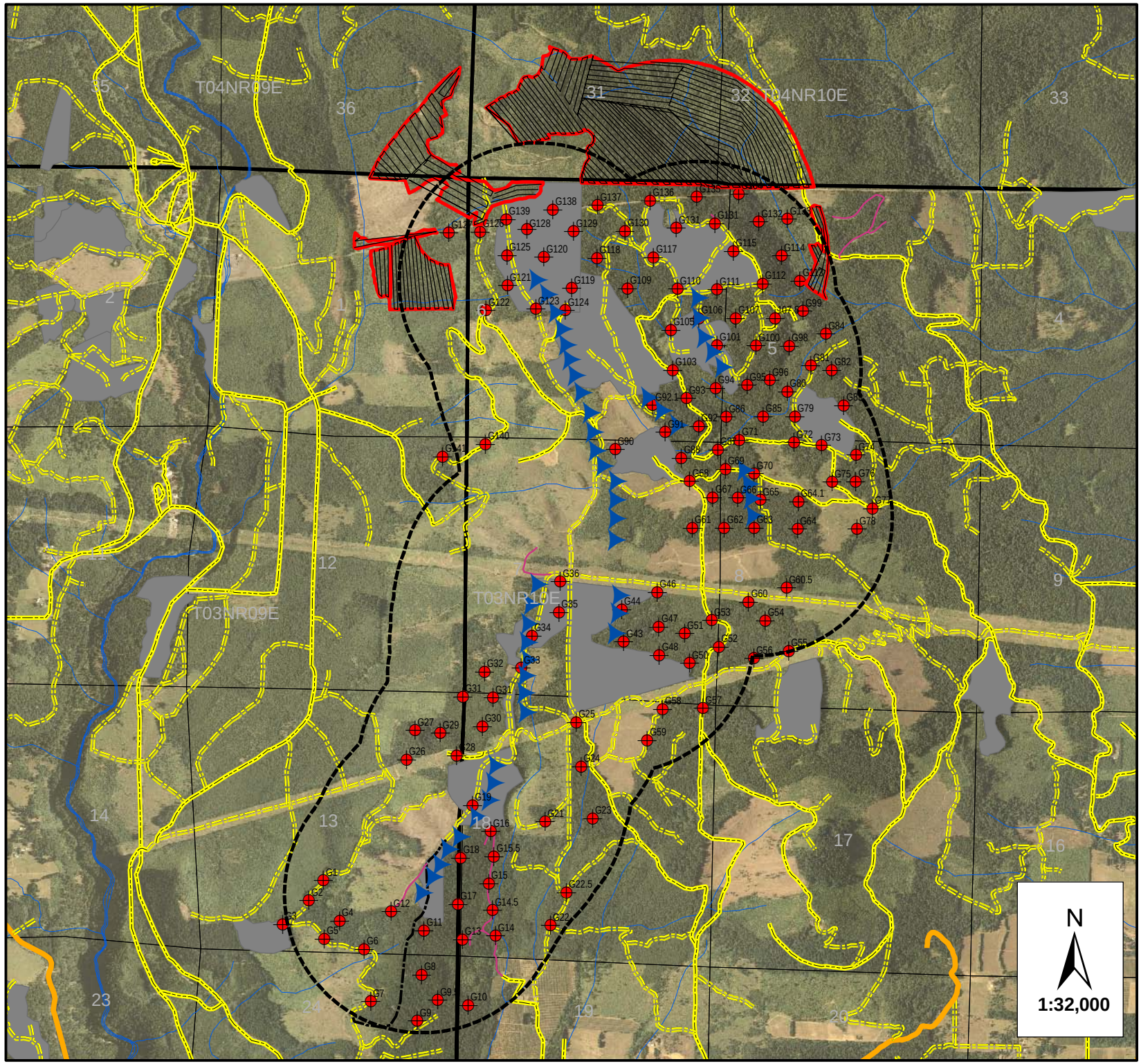
Whistling Ridge NSO Survey 2008/2009 Barred Owl Detections

Aerial Photo
South Half



2006 NAIP Aerial Photo

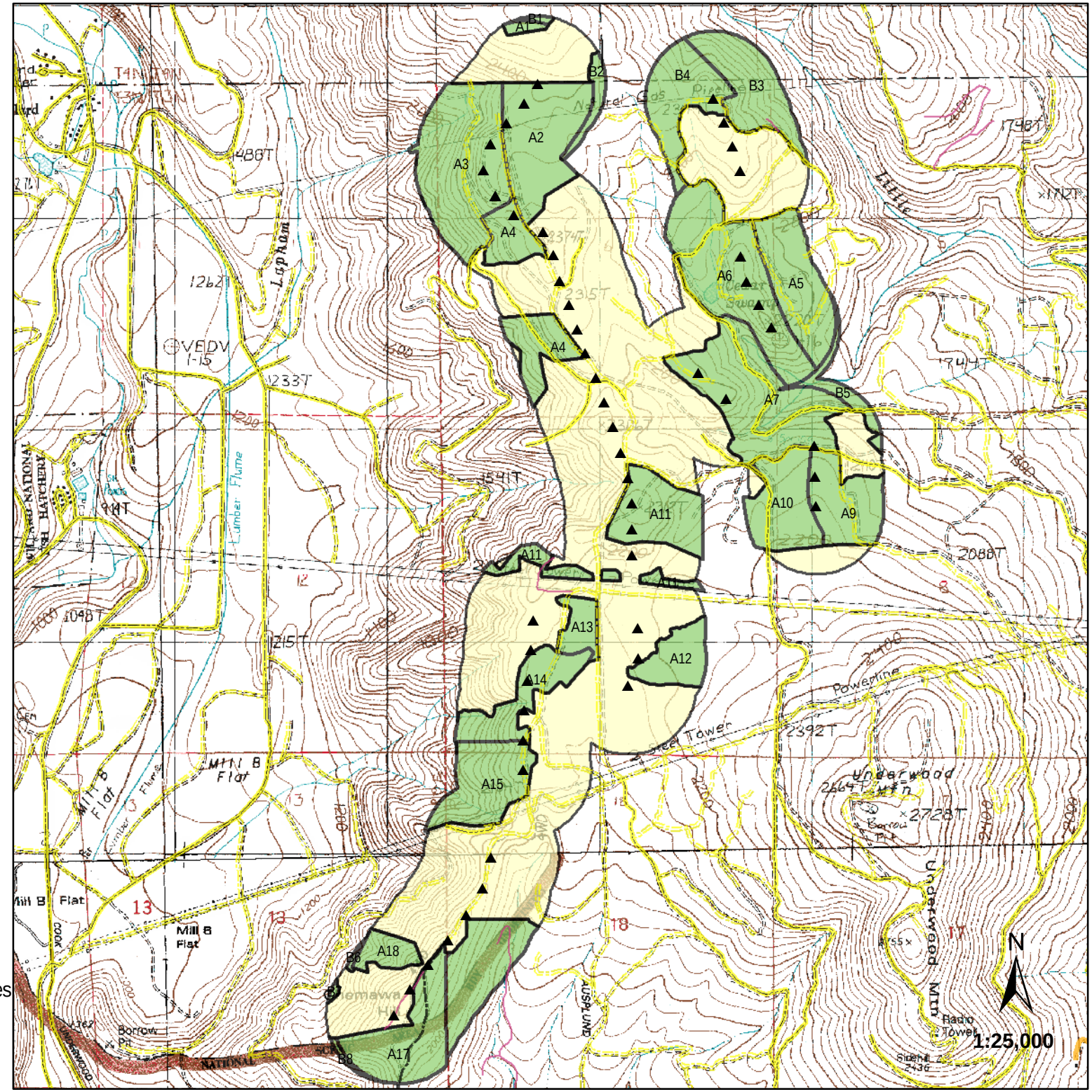
Whistling Ridge Project Area 2008/2009 Northern Goshawk Survey Areas



TURNSTONE
ENVIRONMENTAL CONSULTANTS

Whistling Ridge Project Area

Western Gray Squirrel Survey Areas Overview Map



- Proposed Wind Turbine Locations
- Western Gray Squirrel Survey Areas
- Non-habitat or Clearcut Areas

Roads

- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD

0 0.2 0.4 0.8 Miles

Appendix B – Northern Spotted Owl Survey Forms

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 1

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 5 **Day:** 11, 2009

Tape Voice (Flute) **Other:** _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) (**3** = Gentle breeze (8-12 mph)) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy (**OC** = Overcast) **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
2		2035	2045	2	DC	N														
4		2050	2100	2	OC	N														
3		2106	2116	2	OC	N														
87		2121	2131	2	OC	N														
21		2135	2145	2	OC	N														
89		2153	2203	2	OC	N														
46		2221	2231	2	OC	A	U	A	GLGN	Stan	2223	2231	75°	800ft	3N	10E	23	NE		
22		2257	2307	3	OC	N														
17		2312	2322	3	OC	N														
6	X	1820	1830	3	OC	N														
5	X	1858	1908	3	OC	N														
23		0009	0019	3	OC	N														
19		0030	0040	3	PC	N														
7		0046	0056	3	PC	N														
18		0104	0114	3	PC	N														
57		0128	0138	3	PC	N														
58		0147	0157	3	PC	N														
50		0203	0213	3	PC	N														
59		0217	0227	3	PC	N														
49		0235	0245	3	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 1

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 5 **Day:** 11, **2009**

Tape Voice (Flute) Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
60		0250	0300	3	PC	N														
8		0326	0336	3	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 1

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 5 **Day:** 12, 2009

Tape Voice (Flute) **Other:** _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) (3 = Gentle breeze (8-12 mph)) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, (DR = Drizzle) LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
9		2025	2035	2	DR	N														
70		2044	2054	3	DR	N														
12		2059	2109	2	DR	N														
16		2113	2123	2	PC	N														
69		2128	2138	3	PC	N														
68		2142	2152	3	PC	N														
67		2158	2208	3	PC	N														
62		2214	2224	3	DR	N														
66		2231	2241	3	DR	N														
63		2245	2255	3	DR	A	U	U	GLGN	Stan	2247	2255	270°	500	3N	10E	9	NW		
71		2301	2311	3	DR	N														
14		2318	2328	3	PC	N														
13		2350	0000	3	PC	N														
10		0011	0021	3	PC	N														
11		0031	0041	3	PC	N														
56		0129	0139	2	DR	N														
55		0144	0154	1	DR	N														
54		0201	0211	2	DR	N														
09-2		0216	0226	2	PC	N														
75		0230	0240	2	PC	A	U	U	AEAC	Stan	0230	0236	170°	150	4N	10E	34	NE		

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** Moss Creek **Visit #** 1

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 5 **Day:** 13 **, 2009**

Tape Voice (Flute) Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **(2** = Light breeze (4-7 mph)**)** **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **(PC** = Partly Cloudy**)** **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
76		2036	2046	1	PC	N														
77		2051	2101	2	PC	N														
09-1		2111	2121	2	PC	N														
86	X	1905	1915	2	PC	N														
74		2133	2143	2	PC	N														
85		2147	2157	2	PC	N														
51		2209	2219	2	DR	N														
52		2224	2234	2	DR	N														
37		2238	2248	2	DR	A	U	A	STVA	8	2242	2248	340°	1500	4N	10E	6	NW		
38		2257	2307	2	PC	A	U	U	GLGN	Stan	2300	2307	20°	300	4N	10E	6	NE		
36		2313	2323	2	PC	N														
09-7		2328	2338	2	PC	N														
28		2342	2352	2	PC	N														
72		2357	0007	3	PC	A	U	A	STVA	A	2359	0006	210°	8009	4N	10E	25	SW		
73		0012	0022	3	PC	N														
27		0028	0038	3	PC	N														
26		0042	0052	3	PC	N														
09-3		0102	0112	3	PC	N														
78		0129	0139	3	PC	N														
79		0204	0214	3	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** Moss Creek **Visit #** 1

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 5 **Day:** 13, 2009

Tape Voice (Flute) **Other:** _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
09-4		0219	0229	3	PC	N														
25		0239	0249	3	PC	N														
80		0256	0306	3	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** Mill Creek **Visit #** 1

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 5 **Day:** 14 **, 2009**

Tape Voice (Flute) **Other:** _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph), (**2** = Light breeze (4-7 mph)), **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog (**PC** = Partly Cloudy) **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
48		2052	2102	2	PC	N														
41		2107	2117	2	PC	N														
39		2123	2133	2	PC	N														
40		2139	2149	2	PC	N														
35		2158	2208	2	PC	N														
34		2214	2224	2	PC	N														
47		2246	2256	2	PC	N														
43	X	2315	2325	2	CL	A	U	A	STVA	8	2317	2320	10°	800	4N	10E	33	SW		
09-6		2350	0000	1	CL	N														
45		0007	0017	1	PC	N														
44	X	1805	1815	1	CL	N														
32	X	1836	1846	1	CL	N														
33	X	1921	1931	1	CL	N														
31		0038	0048	2	PC	N														
30		0059	0109	2	PC	N														
09-5		0117	0127	2	PC	N														
24		0139	0149	2	PC	N														
81		0206	0216	2	PC	N														
82		0223	0233	2	PC	A	U	U	AEAC	Stan	0226	0231	150°	500	4N	10E	27	NW		
83		0253	0303	3	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** Mill Creek **Visit #** 1

Project Area: WHETLING RIDGE **Crew:** Wade Perkins **Month:** 5 **Day:** 14, **2009**

Tape Voice (Flute) **Other:** _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) (**2** = Light breeze (4-7 mph)) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog (**PC** = Partly Cloudy) **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
83		0308	0318	2	PC	N														
84		0326	0336	2	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SOS **Owl Site(s):** _____ **Visit #** 2

Project Area: WHISTLING RIDGE **Crew:** DARREN BOLEN **Month:** 06 **Day:** 17 **, 2009**

(Tape) Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
2		1950	2000	3	PC	NR														
4		2003	2013	3	PC	NR														
3		2017	2027	3	PC	NR														
		@ 2028	approaching	24 man in truck asking questions							who I was with (Sara the MADE THEM WILDLIFE refuge)							
87		2033	2043	2	PC	NR														
21		2046	2056	2	PC	NR														
22		2101	2111	3	PC	NR														
17		2117	2127	3	PC	NR														
19		2140	2150	3	PC	NR														
7		2159	2209	3	PC	A	U	A	STVA	8	2206	2209	130	600	03N	09E	13	SE		
18		2235	2245	3	PC	NR														
23		2250	2300	2	PC	NR														
70		2305	2315	2	CL	NR														
12		2319	2329	2	CL	NR														
16		2332	2342	2	CL	NR														
11		2348	2358	2	CL	NR														
10		0002	0012	2	CL	NR														
69		0035	0045	1	CL	NR														
68		0048	0058	1	CL	NR														
67		0102	0112	1	CL	NR														

Time: Military format (midnight is 0000). **Resp. Codes:** N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. **Sex:** M = male, F = female, U = unknown. **Age:** A = adult. S = subadult, J = juvenile **Species. Codes:** STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), Stan = (standard) other non-*Strix* owls

Comments: BEAR ON ROAD BELOW STATION 7

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SOS **Owl Site(s):** _____ **Visit #** 2

Project Area: WHITLING RIDGE **Crew:** DARAN BOLEN **Month:** 06 **Day:** 17, **2009**

(Tape) Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
13		0120	0130	1	CL	NR														
71		0135	0145	1	CL	NR														
14		0149	0159	1	CL	NR														
9		0207	0217	1	CL	NR														

Time: Military format (midnight is 0000). **Resp. Codes:** N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. **Sex:** M = male, F = female, U = unknown. **Age:** A = adult. S = subadult, J = juvenile **Species. Codes:** STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), Stan = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 2

Project Area: WHISTLING RIDGE **Crew:** D. SAHL **Month:** 06 **Day:** 17, [redacted] 2009

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph), 2 = Light breeze (4-7 mph), 3 = Gentle breeze (8-12 mph), 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

ST#	Hits	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼
84		2034	2044	0	PC	N												
88		2048	2100	0	PC	A	U	A	STVA	B	2051	2100	270	400				
83		2101	2114	0	PC	N												
31		2038	2046	1	PC	N												
82		2106	2116	1	PC	N												
09-5		2134	2148	3	PC	N												
30		2152	2202	2	CL	N												
81		2215	2225	1	CL	N												
24		2233	2243	1	CL	N												
80		2250	2300	3	CL	N												
25		2306	2316	1	CL	N												
79		2326	2336	1	CL	N												
09-4		2346	2356	3	CL	N												
09-3		0010	0020	1	CL	N												
78		0039	0049	3	CL	N												
26		0105	0115	2	CL	N												
27		0118	0128	3	CL	N												
73		0132	0142	3	CL	N												
72		0146	0156	2	CL	N												
29		0159	0213	1	CL	A	M	A	STVA	A/CO	0209	0212	180	50				

Time: Military format (midnight is 0000). **Resp. Codes:** N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. **Sex:** M = male, F = female, U = unknown. **Age:** A = adult, S = subadult, J = juvenile **Species Codes:** STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), Stan = other non-*Strix* owls

Comments: SOME NOISE FROM BUCK CRK. @ STA. #'S 81/88/83

09-5: wind gusts of 3-4

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Owl Site(s): _____ Visit # 2

Project Area: WHISTLING RIDGE Crew: D. SAHL Month: 06 Day: 17, [redacted] 2009

~~Tape~~ Voice Flute Other: _____ Block/Area ID: _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph), 2 = Light breeze (4-7 mph), 3 = Gentle breeze (8-12 mph), 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼
28		0159	0213	1	CL	A	F	A	STVA	A/CO	0210	0212	180	50				
~~297~~		0217	0227	1	CL	N												
36		0235	0245	1	CL	N												

Time: Military format (midnight is 0000). Resp. Codes: N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. Sex: M = male, F = female, U = unknown. Age: A = adult, S = subadult, J = juvenile Species. Codes: STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. Call Type(s): 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), Stan = other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 2

Project Area: WHISTLING RIDGE **Crew:** D. SAHL **Month:** 06 **Day:** 18, **2009**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hiker	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
32A	Y	1950	2010	1	PC	A	M	A	STVA	6, A	1950	2000	200	600						
33	Y	2027	2037	1	PC	N														
32	Y	2055	2105	0	PC	N														
44		2112	2122	1	PC	N														
45		2125	2135	2	PC	N														
09-6		2138	2148	3	PC	N														
43	Y	2206	2216	3	PC	N														
47		2229	2239	1	PC	N														
48		2244	2254	2	PC	A	V	A	STVA	A	2253	2254	250	40						
34		2305	2315	3	PC	N														
35		2324	2334	2	PC	N														
40		2340	2350	2	OC	N														
41		2353	0003	2	OC	N														
39		0008	0018	1	OC	N														
50		0049	0059	1	OC	N														
49		0103	0113	1	OC	N														
60		0134	0144	1	OC	N														
59	Y	0157	0207	2	OC	N														
63		0220	0230	1	DR	N														
606		0233	0243	1	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. **Sex:** M = male, F = female, U = unknown. **Age:** A = adult. S = subadult, J = juvenile **Species. Codes:** STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments: 32A: Incidental station, CALLED Continuously on Hike into Sta. 32/33 @ Dusk, Started Hike @ 1922,
45: Moved Sta. up Road due to new clear cut + BANK TRAP. (most adjacent habitat has been cut).
48: BIRD IN TREE Just off Road.
* Page 3 is a MAP of where Sta. 32A was located

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 2

Project Area: WHISTLING RIDGE **Crew:** D. SAHL **Month:** 06 **Day:** 18, **2009**

~~Tape~~ ~~Voice~~ ~~Flute~~ **Other:** _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
02		0247	0257	1	DR	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species.** **Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 2

Project Area: WHISTLING RIDGE **Crew:** DARREN BOLEN **Month:** 06 **Day:** 18, **2009**

(Tape) Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hiker	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
5	X	1840	1850	3	PC	B	U	A	STVA	8, A	1843	1850	60	50	03N	09E	24	SE		
6	X	1903	1913	3	PC	NR														
57		1935	1945	2	PC	NR														
38		2010	2020	2	PC	NR														
37		2030	2040	2	PC	A	U	A	STVA	8	2036	2038	12	1000	04N	09E	36	NW		
52		2044	2054	2	PC	NR														
51		2104	2114	2	PC	NR														
54		2122	2132	1	PC	NR														
09-2		2135	2145	1	PC	NR														
75		2147	2157	1	PC	NR														
76		2159	2209	1	PC	NR														
77		2213	2223	1	PC	A	U	A	GLGN	STAN	2316	2322	230	500	04N	09E	27	SW		
09-1		2231	2241	1	PC	NR														
85		2300	2310	1	PC	B	U	A	STVA	B	2308	2310	90	20	04N	09E	26	NW		
74		2314	2324	1	PC	B	m	A	STVA	8	2321	2324	20	20	04N	09E	23	SW		
74		2314	2324	1	PC	B	F	A	STVA	8, A	2321	2324	20	20	04N	09E	23	SW		
86		2334	2344	1	PC	NR														
55		2355	0005	1	PC	NR														
56		0010	0020	1	PC	NR														
89		0025	0035	1	PC	NR														

Time: Military format (midnight is 0000). **Resp. Codes:** N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. **Sex:** M = male, F = female, U = unknown. **Age:** A = adult. S = subadult, J = juvenile **Species. Codes:** STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), Stan = (standard) other non-*Strix* owls

Comments: - HIKED STATIONS 5 & 6 WITH CHAINSAW, CLEARED ROAD FOR NEXT SURVEY
- 09-1 NEEDS SMALL VEHICLE
- CALLED 57 TWICE DUE TO EARLY START

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 2

Project Area: WHISTLING RIDGE **Crew:** DARREN BOLEN **Month:** 06 **Day:** 18 **, 2009**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83 GPS data only	UTMY NAD83 GPS data only
58		0058	0108	1	PC	NR														
57		0120	0130	1	PC	NR														
46		0141	0151	1	PC	NR														
B		0159	0209	1	PC	NR														

Time: Military format (midnight is 0000). **Resp. Codes:** N = no owl response, A = audio response only, V = visual response only, B (or A, V) = both audio and visual response. **Sex:** M = male, F = female, U = unknown. **Age:** A = adult. S = subadult, J = juvenile **Species. Codes:** STOC = Northern Spotted Owl, STVA = Barred Owl, STRIX = *Strix*-species unknown, STNE = Great Gray Owl, BUVI = Great Horned Owl, AEAC = Northern Saw-whet Owl, OTKE = Western Screech Owl, GLGN = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** 4 = 4 Note Call (STOC Only), A = Agitated, B = Bark, CO = Contact Call, JB = Juvenile Begging, W = Whistle/Nest Call, 8 = 8 Note call (STVA only), Stan = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SOS **Owl Site(s):** _____ **Visit #** 3

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 7 **Day:** 21, **2009**

(Tape) Voice Flute Other: _____ **Block/Area ID:** Moss Creek MSNO 1003

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) (2 = Light breeze (4-7 mph)) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: (CL = Clear) FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
09-1		2038	2048	2	CL	N														
77		2053	2103	2	CL	N														
76		2107	2117	2	CL	N														
75		2121	2131	2	CL	N														
09-2		2134	2144	2	CL	N														
54		2149	2159	2	CL	N														
85		2206	2216	2	PC	N														
86		2227	2237	2	PC	N														
74		2247	2257	2	PC	N														
78		2319	2329	3	PC	N														
09-3		2336	2346	3	PC	N														
27		2353	0003	3	PC	N														
73		0008	0018	3	PC	N														
72		0025	0035	3	PC	A	U	A	STVA	A	0029	0035	280°	900ft	4N	9E	25	NW		
28		0039	0049	3	PC	N														
09-7		0055	0105	3	CL	N														
36		0112	0122	2	CL	N														
38		0132	0142	2	CL	N														
37		0151	0201	2	CL	N														
52		0205	0215	2	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 3

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 7 **Day:** 21, 2009

Tape Voice Flute Other: _____ **Block/Area ID:** Moss Creek MSNO 1003

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) (2 = Light breeze (4-7 mph)) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: (CL = Clear) FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
51		0219	0229	2	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 3

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 7 **Day:** 22, **2009**

(Tape) Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) (3 = Gentle breeze (8-12 mph)) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog (PC = Partly Cloudy) OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
49		2032	2042	3	PC	N														
50		2047	2057	3	PC	N														
60		2101	2111	3	PC	N														
59		2116	2126	3	PC	N														
68		2132	2142	2	PC	N														
67		2146	2156	2	PC	N														
69		2203	2213	2	PC	N														
16		2217	2227	2	PC	N														
11		2231	2241	3	PC	A	U	U	GLGN	Stan	2234	2246	190°	600ft	3N	10E	17	NW		
10		2245	2255	3	PC	N														
18		2304	2314	3	PC	N														
19		2320	2330	3	PC	N														
7		2335	2345	3	PC	N														
23		2350	0000	3	PC	N														
12		0009	0019	3	PC	N														
70		0024	0034	3	PC	N														
9		0041	0051	3	PC	N														
13		0106	0116	2	PC	N														
71		0120	0130	2	PC	N														
14		0135	0145	2	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 3

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 7 **Day:** 22, **2009**

(Tape) Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) (**3** = Gentle breeze (8-12 mph)) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog (**PC** = Partly Cloudy) **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
63		0150	0200	2	PC	N														
66		0203	0213	3	PC	N														
62		0218	0228	3	PC	N														
47		0235	0245	3	PC	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species. Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 3

Project Area: WHISTLING RIDGE **Crew:** Wade Perkins **Month:** 7 **Day:** 23, **2009**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: 0 = Calm (<1 mph), 1 = Light air (1-3 mph) 2 = Light breeze (4-7 mph) 3 = Gentle breeze (8-12 mph) 4+ =Unsuitable (13+ mph)
Weather Codes: CL = Clear FG = Fog PC = Partly Cloudy OC = Overcast, DR = Drizzle LR = Light Rain HR = Heavy Rain (unsuitable) SN = Snow, H = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
55		2036	2046	3	PC	N														
56		2051	2101	3	PC	N														
89		2106	2116	3	PC	N														
57		2127	2137	3	PC	N														
58		2144	2154	3	PC	N														
21		2214	2224	2	PC	N														
22		2229	2239	2	PC	N														
17		2243	2253	2	PC	N														
6		2258	2308	2	PC	N														
5		2313	2323	2	PC	N														
87		2338	2348	2	PC	N														
4		2352	0002	2	PC	N														
3		0012	0022	2	PC	N														
2		0040	0050	2	CI	N														
46		0108	0118	2	CI	N														
8		0126	0136	2	CI	N														
48		0158	0208	2	CI	N														
41		0212	0222	2	CI	N														
39		0226	0236	2	CI	A	U	U	GLGN	Stan	0229	0236	220°	1000	HV	10E	31	SE		
40		0242	0252	2	CI	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments: STVA visual 0155 flying off road before STA 48
Unknown sex - Unknown age

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS **Owl Site(s):** _____ **Visit #** 3

Project Area: WHITTLING RIDGE **Crew:** Wade Perkins **Month:** 7 **Day:** 23, **2009**

Tape Voice Flute Other: _____ **Block/Area ID:** _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
35		0257	0307	2	CL	N														
34		0314	0324	2	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex: M** = male, **F** = female, **U** = unknown. **Age: A** = adult. **S** = subadult, **J** = juvenile **Species. Codes: STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments:

Turnstone Environmental Consultants
NSO Survey Form

Survey Area: SDS Owl Site(s): _____ Visit # 3

Project Area: WHISTLING RIDGE Crew: D. SAHL Month: 07 Day: 24, 2009

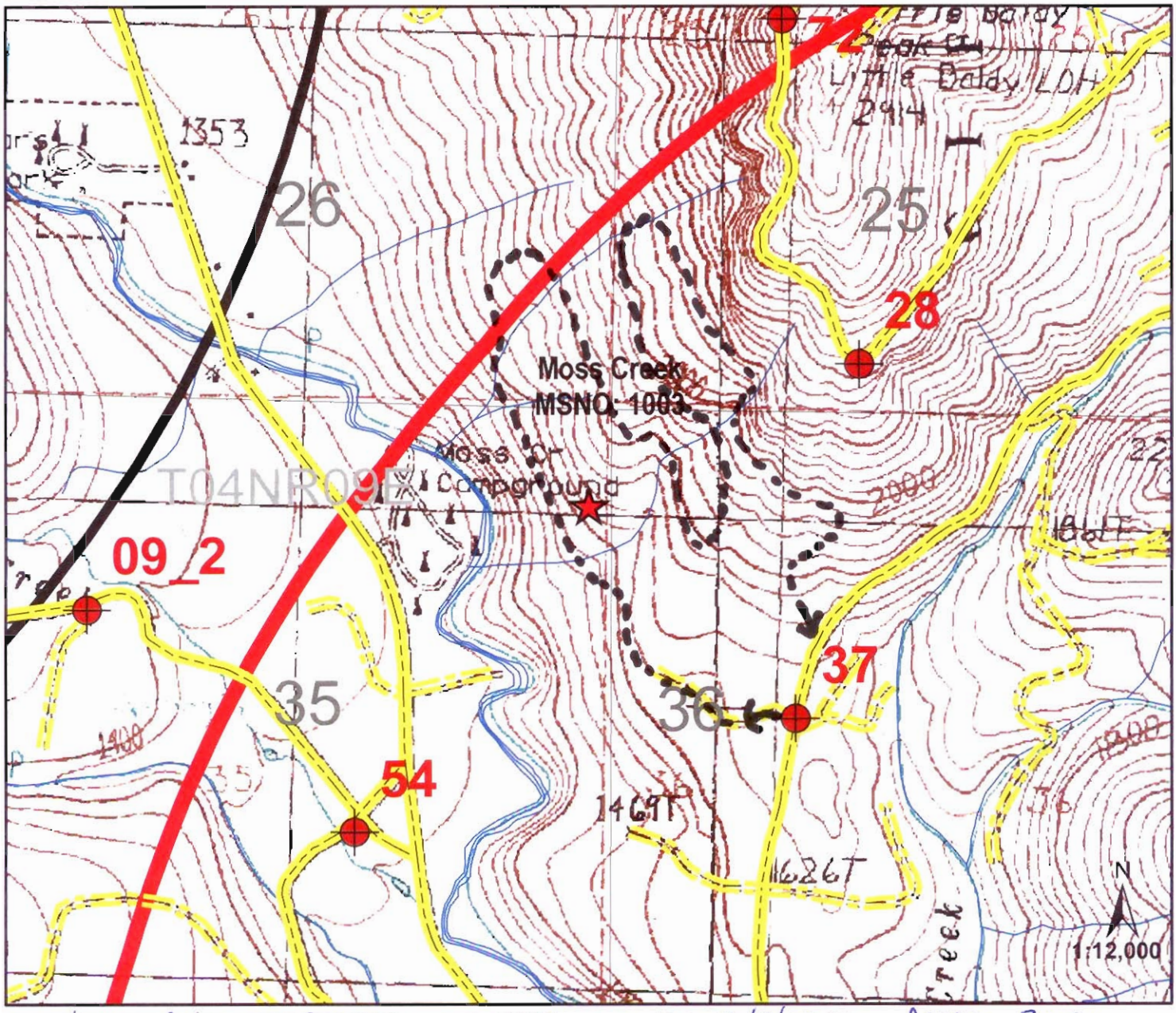
(Tape) Voice (Flute) Other: _____ Block/Area ID: _____

Wind Codes: **0** = Calm (<1 mph), **1** = Light air (1-3 mph) **2** = Light breeze (4-7 mph) **3** = Gentle breeze (8-12 mph) **4+** =Unsuitable (13+ mph)
Weather Codes: **CL** = Clear **FG** = Fog **PC** = Partly Cloudy **OC** = Overcast, **DR** = Drizzle **LR** = Light Rain **HR** = Heavy Rain (unsuitable) **SN** = Snow, **H** = Hail

ST#	Hike	Time Begin	Time End	Wind Code	Weather Code	Resp. code	Sex	Age	Species	Call Type(s)	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (feet)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
33		2021	2035	2	CL	N														
32		2100	2110	Ø	CL	N														
44		2122	2132	1	CL	N														
45		2136	2146	1	CL	N														
83		2203	2213	Ø	CL	N														
88		2216	2226	Ø	CL	N														
84		2230	2240	Ø	CL	N														
31		2255	2305	Ø	CL	N														
82		2317	2327	Ø	CL	N														
09-5		2336	2346	1	CL	N														
81		2355	0005	Ø	CL	N														
30		0014	0024	Ø	CL	N														
24		0028	0038	Ø	CL	N														
40		0051	0101	Ø	CL	N														
25		0113	1123	Ø	CL	N														
79		0129	0139	Ø	CL	N														
09-4		0148	0158	1	CL	N														
26		0209	0219	1	CL	N														
09-6		0255	0305	1	CL	N														
43	Y	0326	0336	2	CL	N														

Time: Military format (midnight is 0000). **Resp. Codes:** **N** = no owl response, **A** = audio response only, **V** = visual response only, **B** (or A, V) = both audio and visual response. **Sex:** **M** = male, **F** = female, **U** = unknown. **Age:** **A** = adult. **S** = subadult, **J** = juvenile **Species.** **Codes:** **STOC** = Northern Spotted Owl, **STVA** = Barred Owl, **STRIX** = *Strix*-species unknown, STNE = Great Gray Owl, **BUVI** = Great Horned Owl, **AEAC** = Northern Saw-whet Owl, **OTKE** = Western Screech Owl, **GLGN** = Northern Pygmy, TYAL = Barn Owl. OTFL = Flammulated Owl. **Call Type(s):** **4** = 4 Note Call (STOC Only), **A** = Agitated, **B** = Bark, **CO** = Contact Call, JB = Juvenile Begging, **W** = Whistle/Nest Call, **8** = 8 Note call (STVA only), **Stan** = (standard) other non-*Strix* owls

Comments: 43: Couple of Down Logs on RP.



TWN: 4N RNG: 9E Sec: 25,26,35,36 1/4 Sec: — 1/16 Sec: — Date: 06/19/09 Obs: DARREN BOLEN

Resp T: — Start T: 1115 End T: 1420 Wind: 1 Weather: PC Time(D/N): D Visit Type: RO Resp Type: NR

Mice out: — # Mice taken: —

Adults/Sub: Males (spp.): — #Females (spp.): — Pair Status: — Sex Unk(spp): — # Juveniles: — #Fledglings: —

Nest: Status — NestLoc — Nest# — Nest Location UTM (nad83) Xcoord: — Ycoord: —

Please Provide Visit Notes & Description of Events:

HIKED ROUTE DRAWN IN ON MAP. NO RESPONSE. BROADCAST WITH PA, HOOT FLUTE. MAJORITY OF HABITAT located NEAR OLD NEST TREE.

---- = ROUTE HIKED

NR = NO RESPONSE

ROADS
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD

SDS NSO Calling Points

Historic NSO Nests

Observation Location UTM (nad83) Xcoord: — Ycoord: — Record All Bird and Band Details on Reverse:

Date: 06/19/09 Observer: DARREN BOLEN Page: 2 of 2

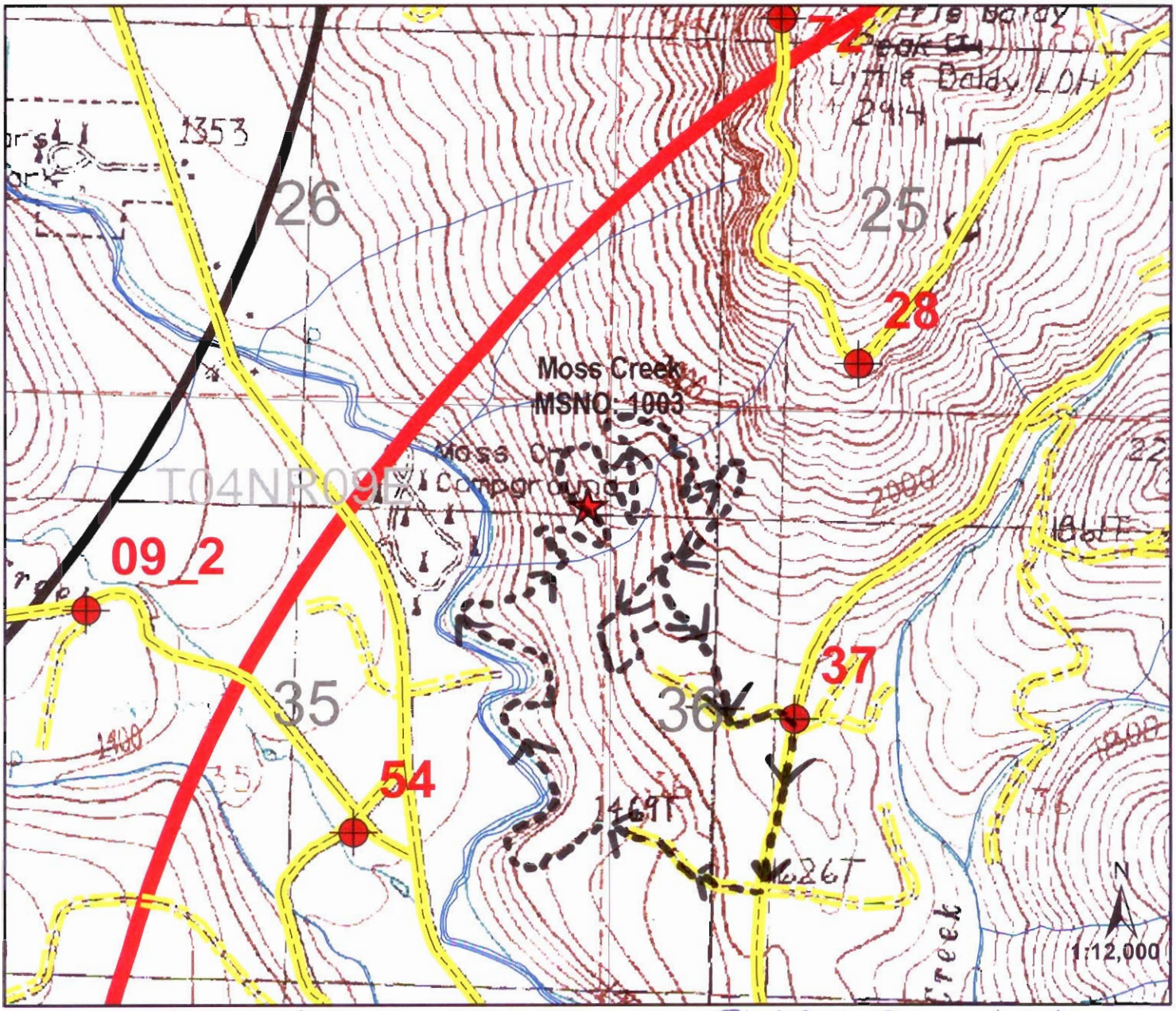
Male: Obs Type: NONE OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Female: Obs Type: NONE OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y1: Obs Type: NONE OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y2: Obs Type: NONE OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Additional notes:
NO SPOW OBSERVED



TWN: 4N RNG: 9E Sec: 35/36 1/4 Sec: — 1/16 Sec: — Date: 7/22/09 Obs: D. SAHL / J. VOTOS

Resp T: — Start T: 1541 End T: 1850 Wind: 2 Weather: CL Time(D/N): D Visit Type: RO Resp Type: NR

Mice out: — # Mice taken: —

Adults/Sub: Males (spp.): — #Females (spp.): — Pair Status: — Sex Unk(spp): — # Juveniles: — #Fledglings: —

Nest: Status — NestLoc — Nest# — Nest Location UTM (nad83) Xcoord: — Ycoord: —

Please Provide Visit Notes & Description of Events:

HIKED Route Drawn on Map. Two OBSERVERS were used for this visit. Broadcast with Voice, Hoot Flute and PA system. Majority of Quality Habitat is around old Nest Core. NO SPOW OBSERVED or Detected.

----- = ROUTE HIKED

ROADS
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- SDS NSO Calling Points
- Historic NSO Nests

Observation Location UTM (nad83) Xcoord: — Ycoord: — Record All Bird and Band Details on Reverse:

Date: 7/22/09 Observer: D. SAHL / J. VOTOS Page: 2 of 2

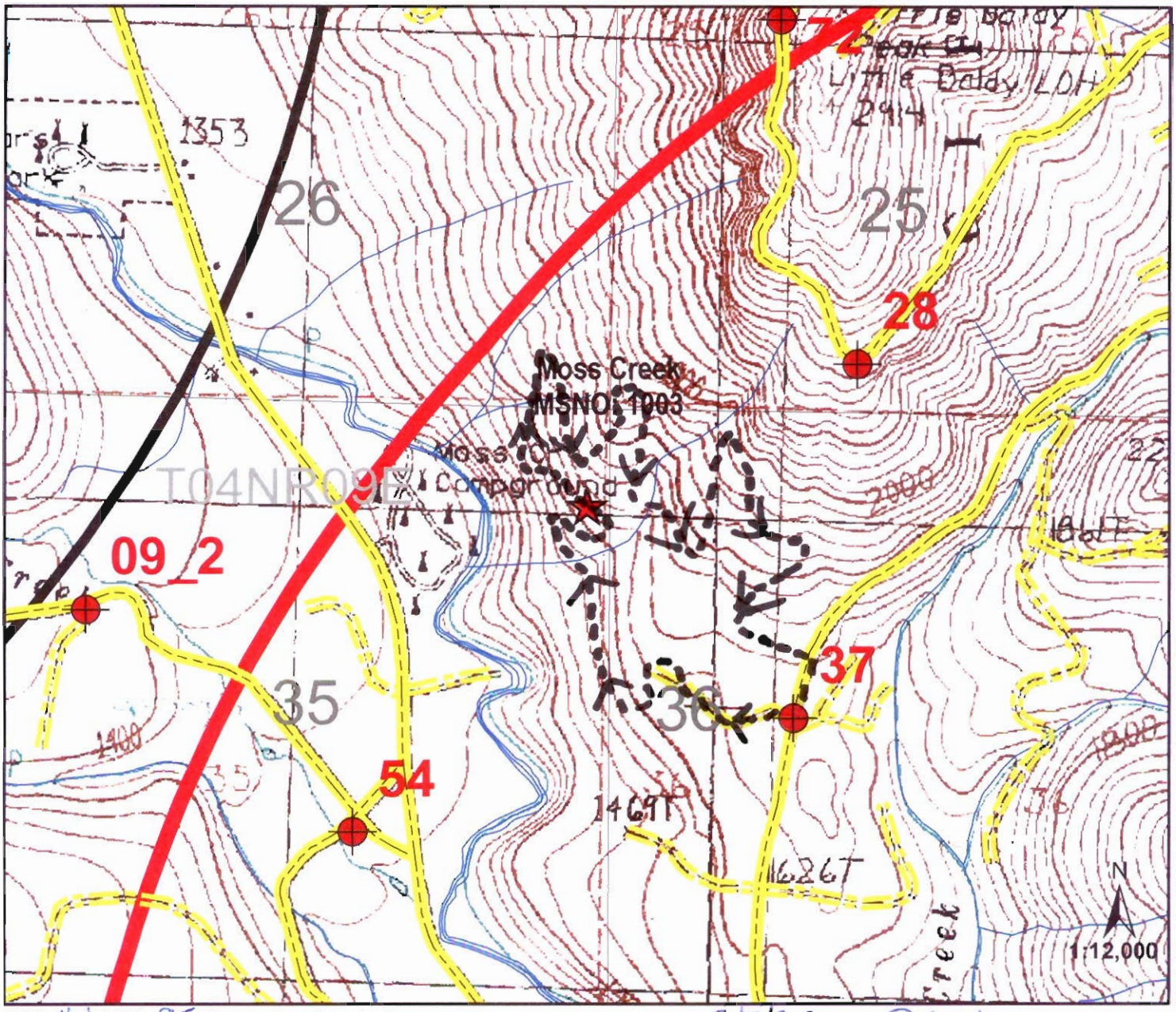
Male: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Female: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y1: Obs Type: NONE OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y2: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Additional notes:
NO NSO Detected or OBSERVED During VISit



TWN: 4N RNG: 9E Sec: 25/26/35/36 1/4 Sec: — 1/16 Sec: — Date: 9/7/2009 Obs: D.SAHL

Resp T: — Start T: 1545 End T: 1900 Wind: 1 Weather: CL Time(D/N): D Visit Type: RO Resp Type: NR

Mice out: — # Mice taken: —

Adults/Sub: Males (spp.): — #Females (spp.): — Pair Status: — Sex Unk(spp): — # Juveniles: — #Fledglings: —

Nest: Status — NestLoc — Nest# — Nest Location UTM (nad83) Xcoord: — Ycoord: —

Please Provide Visit Notes & Description of Events:

HIKED Route on Map. Broadcast calls W/ voice, PA and Hoot flute. Sharp shinned hawk Heard in the area, South of old nest core. No NSO observed or Detected.

---- Route HIKED

ROADS

- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- **SDS NSO Calling Points**
- Historic NSO Nests

Observation Location UTM (nad83) Xcoord: — Ycoord: — Record All Bird and Band Details on Reverse:

Date: 6/7/2009 Observer: D. SAHL Page: 2 of 2

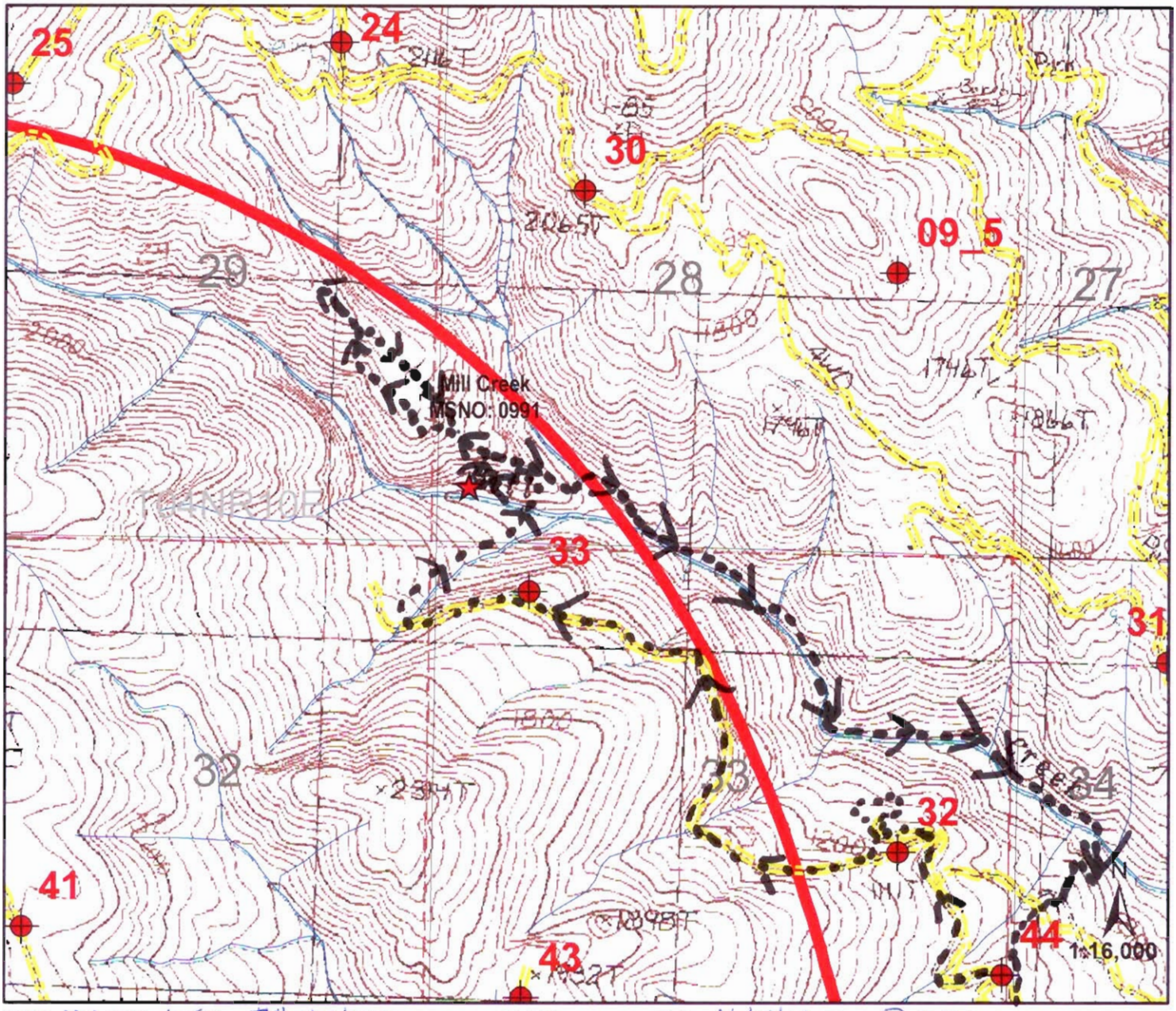
Male: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Female: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y1: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y2: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Additional notes:
NO NSO OBSERVED or Detected During Visit.



TWN: 4N RNG: 10E Sec: 31/32/33/1/4 Sec: — 1/16 Sec: — Date: 06/19/09 Obs: D. SAHL

Resp T: — Start T: 1100 End T: 1733 Wind: 1 Weather: PC Time(D/N): D Visit Type: RO Resp Type: NR

Mice out: — # Mice taken: —

Adults/Sub: Males (spp.): — #Females (spp.): — Pair Status: — Sex Unk(spp): — # Juveniles: — #Fledglings: —

Nest: Status — NestLoc — Nest# — Nest Location UTM (nad83) Xcoord: — Ycoord: —

Please Provide Visit Notes & Description of Events: ----= Route HIKED

HIKED Route Drawn on Map, Broadcast with Voice, Hoot Flute and P.A. System. Older forest type Near historic Nest Cave and further upstream from Heat Area. Would advise others to access Old Nest Cave from TOP Down (follow Ridge to Decom RD.) Due to Creek Route Being Slow.

NO Response from NSO During Visit!

ROADS
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- SDS NSO Calling Points
- Historic NSO Nests

Observation Location UTM (nad83) Xcoord: — Ycoord: — Record All Bird and Band Details on Reverse:

Date: 06/19/09 Observer: D. Sahl Page: 2 of 2

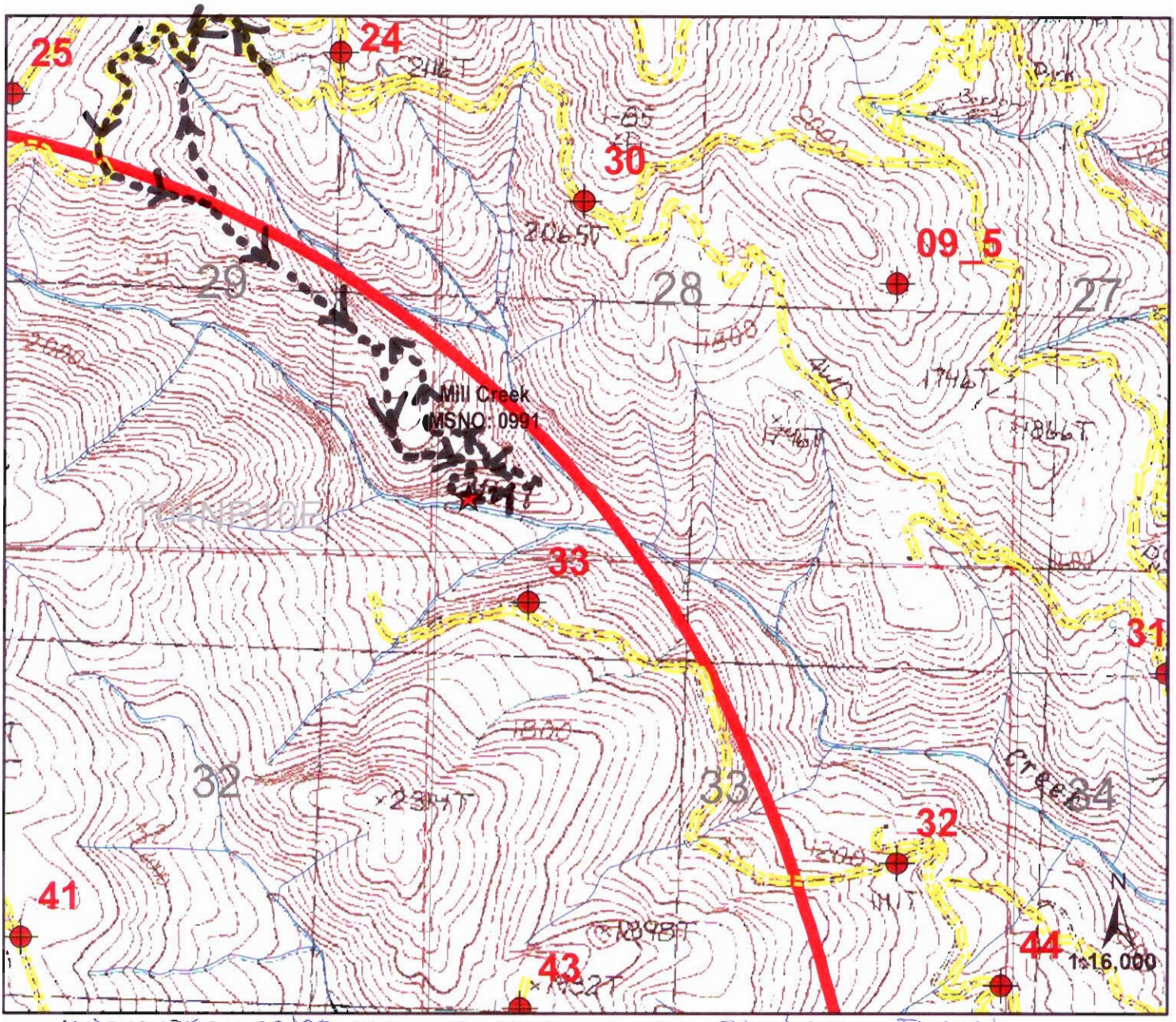
Male: Obs Type: NONE OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Female: Obs Type: NONE observed Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y1: Obs Type: None OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y2: Obs Type: NONE OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Additional notes:
No NGO OBSERVED or Detected during visit.
NR = NO RESPONSE



TWN: 4N RNG: 10E Sec: 28/29 1/4 Sec: — 1/16 Sec: — Date: 7/25/09 Obs: D. Sahl

Resp T: — Start T: 1106 End T: 1517 Wind: Ø Weather: CL Time(D/N): D Visit Type: RO Resp Type: NR

Mice out: — # Mice taken: —

Adults/Sub: Males (spp.): — #Females (spp.): — Pair Status: — Sex Unk(spp): — # Juveniles: — #Fledglings: —

Nest: Status — NestLoc — Nest# — Nest Location UTM (nad83) Xcoord: — Ycoord: —

Please Provide Visit Notes & Description of Events:

HIKED route drawn on map. Broadcast NSO calls with Voice, Hoot Flute and PA System. RIDGE Down hike is significantly Easier than going up Mill CREEK. Majority of high quality habitat is Near old Nest Cores and around the bottom of the drainage. NO NSO Retected or observed.

----= Route HIKED

ROADS
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- SDS NSO Calling Points
- Historic NSO Nests

Observation Location UTM (nad83) Xcoord: — Ycoord: — Record All Bird and Band Details on Reverse:

Date: 07/25/2004 Observer: D. Sahl Page: 2 of 2

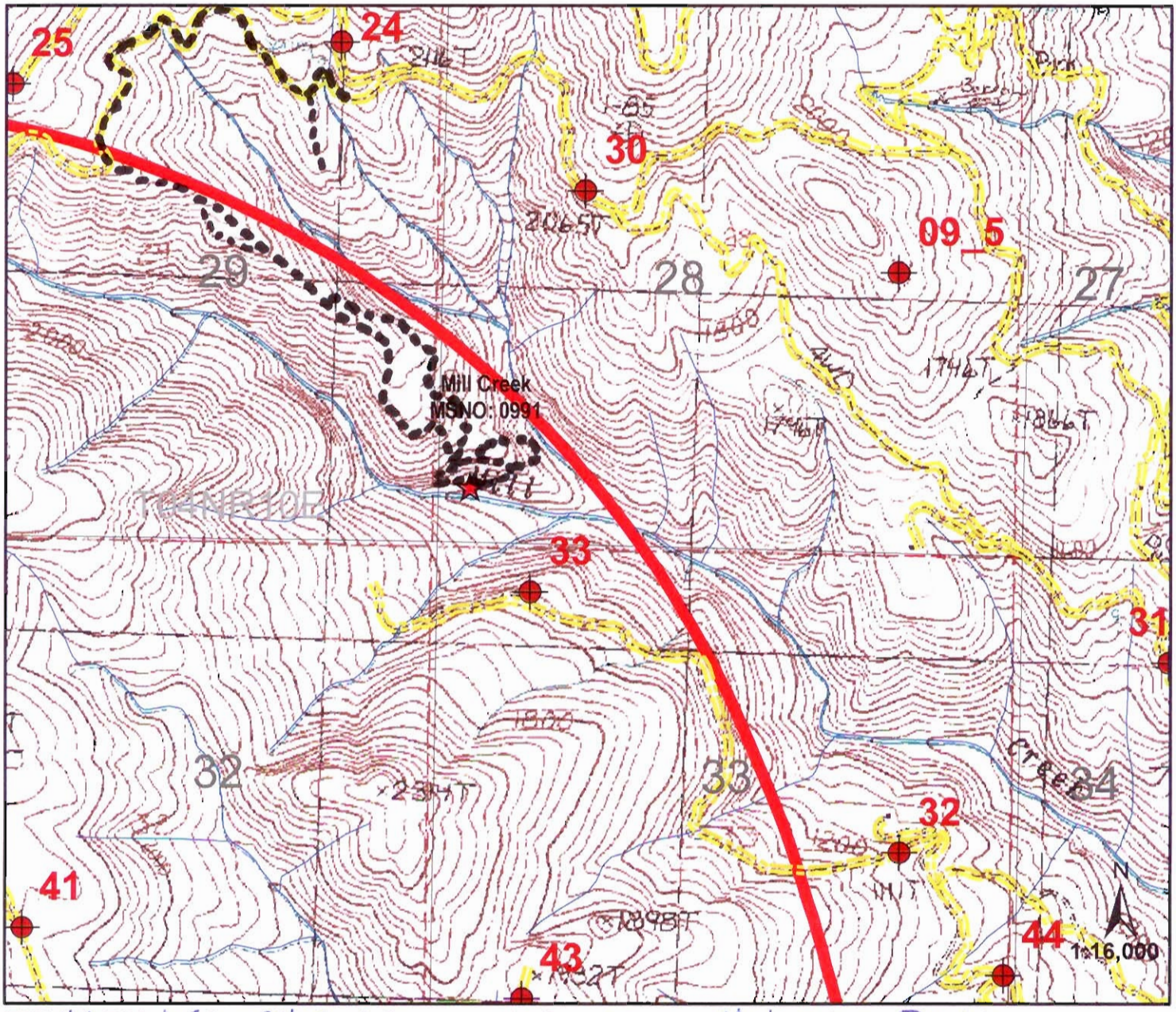
Male: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Female: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y1: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y2: Obs Type: NOT OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Additional notes:
No NSO Detected or OBSERVED Ringtail.
Beware a bald face hornet Nest on old SKid Rd. on Ridge Into the Mill Creek Site.



TWN: 4N RNG: 10E Sec: 28/29 1/4 Sec: — 1/16 Sec: — Date: 9/3/2009 Obs: D. SAHL

Resp T: — Start T: 1000 End T: 1430 Wind: 1 Weather: CL Time(D/N): D Visit Type: RO Resp Type: NR

Mice out: — # Mice taken: —

Adults/Sub: Males (spp.): — #Females (spp.): — Pair Status: — Sex Unk(spp): — # Juveniles: — #Fledglings: —

Nest: Status — NestLoc — Nest# — Nest Location UTM (nad83) Xcoord: — Ycoord: —

Please Provide Visit Notes & Description of Events:

HIKED Route on Map. Broadcast calls with PA/voice/Hoot Flute. No Response from NSO, NO NSO Observed.

---: Route HIKED

ROADS
- Other
- HWY
- DIRT
- ROCK
- TRAIL-4WD
- SDS NSO Calling Points
- Historic NSO Nests

Observation Location UTM (nad83) Xcoord: — Ycoord: — Record All Bird and Band Details on Reverse:

Date: 6/8/2009 Observer: D. Sahl Page: 2 of 2

Male: Obs Type: NON OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Female: Obs Type: NON OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: ## _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y1: Obs Type: NON OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Y2: Obs Type: NON OBSERVED Age: _____ Tip Color: _____ Tip Shape: _____
USFWS #: _____ Leg(R/L): _____ Weights: _____
Color Band - Primary Color: _____ Leg (R/L): _____ Pat: _____ Sec. Color: _____ Tab: _____

Additional notes:
No NSO Detected or OBSERVED during the VBit.

Appendix C - Northern Goshawk Survey Forms

Survey Time: Start 1430 End 1645

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 68 End 68

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WLB **Month:** 6 **Day:** 24, **2009** **Visit #** 1

Period: (Nestling) / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	657	1456	1502	3	PC	2	4	NC															
✓ 062409-1I				3	PC	2	4	V	BT	1	U	A	BAEA	1456	1458	overhead	0	3N	10E	17	NW	6097741	5067651
	658	1515	1521	5	PC	3	4	NC															
	659	1534	1540	5	PC	3	4	NC															
	625	1557	1603	5	PC	3	4	NC															
	624	1621	1627	2	PC	1	4	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

✓

NC= No Contact

Survey Time: Start 1500 End 1650

Intensive Nest Search Time: Start____ End____

Temperature (°F): Begin 78° End 76°

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** TDG **Month:** 06 **Day:** 24 **2009** **Visit #** 1

Period: (Nestling) / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** **1** = <5%; **2** = 5-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 81-100%

Wind Codes: **1** = Light air (>1mph), **2** = Light breeze (1-3 mph), **3** = Gentle breeze (4-7 mph), **4** =Light Wind (8-12 mph), **5** =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): **CL** = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow **Weather Intensity (WI):** **1**=light, **2**=moderate, **3**=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G43	1505	1514	5	PC	2	4	NC															
	G44	1521	1530	5	PC	2	4																
	G46	1536	1545	5	PC	2	4																
	G47	1553	1602	5	PC	2	4																
	G48	1609	1617	5	PC	3	4																
	G50	1627	1636	5	PC	3	4	↓															

Age: **(A)**dult, **(F)**ledgling, **(N)**estling, **(U)**nknown **Sex:** **(M)**ale, **(F)**emale, **(U)**nknown **Det. Code:** **(A)**udio, **(V)**isual, **(B)**oth **Det. Location:** **(AT)** station, **(BT)** between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments: Wind gusts became began to hinder my ability to hear Zoo m. Ended surveying @ 1650

NC = No contact

Survey Time: Start 0800 End 1615

Intensive Nest Search Time: Start ~ End ~

Temperature (°F): Begin 55° End 59°

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WCB **Month:** 6 **Day:** 25, **2009** **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st / 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G141	0952	0959	2	OC	1	6	NL															
	G140	1008	1015	2	OC	1	6	↓															
	G122	1044	1050	3	OC	1	6	↓															
	G127	1126	1132	3	OC	1	6	NL															
062509-II								V		1	U	A	RTHA	1126	1126	314	60	3N	10E	6	NW	10T 0608094	5070505
	G126	1158	1204	2	OC	1	6	NL															
	G139	1220	1226	3	OC	1	6	↓															
	G138	1237	1243	3	OC	1	6	↓															
	G137	1250	1256	3	OC	1	6	↓															
	G130	1308	1314	2	OC	1	6	↓															
	G129	1333	1339	2	OC	1	6	↓															
	G118	1350	1356	2	PC	1	6	↓															
	G119	1410	1416	2	PC	1	6	↓															
	G124	1422	1428	3	PC	1	5	NL															
062509-II								V		1	U	U	RTHA	1424	1425	224	300	3N	10E	6	NW	10T 0608802	5070336
	G109	1545	1551	3	PC	1	5	NL															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Survey Time: Start 0745 End 1500

Intensive Nest Search Time: Start____ End____

Temperature (°F): Begin 52° End 60°

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** TDG **Month:** June **Day:** 25 **, 2009 Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G105.5	0806	0814	3	OC	1	6	NC															
	G110	0820	0828	3	OC	1	6																
	G117	0834	0842	3	OC	1	6																
	G136	0848	0855	3	OC	1	6																
Dropped	G131	0909	0917	4	OC	1	6																
Dropped	G116	0927	0935	4	OC	1	6																
	G111	0942	0949	4	OC	1	6																
	G112	0954	1002	4	OC	1	6																
	G115	1011	1019	4	OC	1	6																
	G131.1	1029	1037	4	OC	1	6																
	G135	1052	1100	4	OC	1	6																
	G134	1114	1122	4	OC	1	6																
	G132	1133	1141	4	OC	1	6																
	G133	1157	1204	4	OC	1	6																
	G114	1217	1225	4	OC	1	6																
	G113	1236	1244	4	OC	1	6																
	G99	1300	1308	4	OC	1	6																
	G99.5	1320	1327	4	PC	1	5																
	G107	1338	1346	5	PC	1	5																
	G106	1355	1403	5	PC	1	5																
	G105	1416	1423	5	PC	1	5																
* Dropped	G102	1436	1444	5	PC	1	5																
	G103	1450	1457	5	PC	1	5	↓															
	G107.5	1522	1529	4	PC	1	5	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

* Clearcut AREA

Survey Time: Start 0740 End 1715

Turnstone Environmental Consultants

Goshawk Survey Form

Page 1 of 1 (including maps)

Intensive Nest Search Time: Start____ End____

Temperature (°F): Begin 55 End 73

Survey Area/Project Area: SDS Crew: TDG Month: 06 Day: 26, 2009 Visit # 1

Period: (Nestling) / Fledgling Call(s) Used: (Alarm) / Wail / Begging Survey Year: 1st (2nd) Nest Search: Y / (N) (if yes attach Search Form) Nest Found: Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G1	0743	0751	2	CL	1	1	NC															
	G2	0754	0802	2	CL	1	1																
	G3	0809	0817	2	CL	1	1																
	G5	0828	0836	2	CL	1	1																
	G4	0846	0853	2	CL	1	1																
	G6	0909	0917	2	CL	1	1																
	G7	0934	0941	2	CL	1	1																
	G9	1001	1009	2	CL	1	1																
	G10	1026	1034	2	CL	1	1																
	G9.5	1047	1054	2	CL	1	1																
	G8	1107	1115	3	PC	1	2																
	G11	1125	1133	3	PC	1	2																
	G12	1148	1155	3	PC	1	2																
	G17	1235	1243	3	PC	1	2																
*	G13	1258	1306	3	PC	1	2	V	AT	1	U	U	URAP	1303	1303	90°	30	3N	10E	18	SW	6004462	5506955
	G14	1326	1334	3	PC	1	2	NC															
	G14.5	1344	1352	3	PC	1	2																
	G15	1406	1414	3	PC	1	2																
	G22.5	1432	1441	3	PC	1	2																
	G22	1448	1455	3	PC	1	2																
	G14.1	1518	1526	3	PC	1	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format

Comments: * smaller owl-like body shape. URAPTOR FIEW out of large residual doug fir to the East, I hiked after it but was unable to locate or elicit any audio responses. Did not resemble Goshawk individual. Possibly a saw-whet or PYGMY owl.

NC = no contact

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Time: Start 0815 End 1530
Intensive Nest Search Time: Start ___ End ___
Temperature (°F): Begin 55 End 70
Survey Area/Project Area: SDS **Crew:** WLB **Month:** 6 **Day:** 26, **2009** **Visit #** 1

Period: (Nestling) / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G23	0823	0829	2	CL	1	2	NC															
	G21	0844	0850	2	CL	1	1																
	G15.5	0911	0917	2	CL	1	1																
	G16	0928	0934	2	CL	1	1																
	G18	0947	0953	2	CL	1	1																
	G19	1009	1015	5	CL	2	1																
	G28	1044	1050	3	CL	1	1	NC															
✓ 061209-1	I							V	BT	1	U	U	TUNU	1047	1047	48	400	3N	9E	18	NW	10T 0608347	5067337
	G26	1112	1118	2	CL	1	1	NC															
	G27	1130	1136	2	CL	1	1																
	G29	1147	1153	2	CL	1	1																
	G31	1211	1218	2	CL	1	1																
	G30	1233	1239	2	CL	1	1																
	G31	1255	1301	3	CL	1	1																
	G32	1316	1322	3	CL	1	1																
	G33	1342	1348	3	CL	1	1																
	G34	1354	1400	3	CL	1	1																
	G35	1407	1413	4	CL	1	1	NC															
✓ 061209-2	I							V	BT	1	U	A	TUNU	1416	1416	160	150	3N	9E	7	SW	10T 0608541	5068402
	G36	1422	1428	4	CL	1	1	NC															
	G53	1457	1503	4	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1; 061208-2, ect) **Time:** Military format.
Comments:

Survey Time: Start 0910 End ____

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 64 End 72

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SNS **Crew:** WCB **Month:** 6 **Day:** 27, **2009** **Visit #** 1

Period: (Nestling) / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G77	0922	0928	3	CL	1	1	NC															
	G76	0943	0949	1	CL	1	1																
	G74	0958	1004	3	CL	1	1																
	G73	1014	1020	2	CL	1	1																
	G75	1041	1047	3	CL	1	1																
	G64	1109	1115	2	CL	1	1																
	G65	1131	1137	2	CL	1	1																
	G70	1145	1151	2	CL	1	1																
	G69	1158	1204	2	CL	1	1																
	G66	1214	1220	2	CL	1	1																
	G67	1229	1235	3	CL	1	1	↓															
	G68	1245	1251	4	CL	2	1	NC															
✓	062909-1i							V	BT	4	U	U	TUVU	1254	1254	312	400	3N	10E	7	NE	1OT 0609611	5069036
	G90	1312	1318	4	CL	2	1	NC															
✓	062909-2i							V	BT	1	U	A	TUVU	1312	1312	52	20	3N	10E	7	NE	1OT 0609148	5069217
	G921	1337	1343	3	CL	1	1	NC															
	G91	1408	1412	4	CL	2	1	NC															
✓	062909-3i							V	BT	1	U	U	TUVU	1411	1411	0	0	3N	10E	6	SE	1OT 0609453	5069363
	G88	1429	1435	4	CL	2	1	NC															
	G87	1447	1453	3	CL	1	1																
	G71	1458	1504	3	CL	1	1																
	G72	1514	1520	3	CL	1	1																
	G120	1625	1631	3	CL	2	1																
	G128	1640	1646	2	CL	1	1																
	G125	1658	1704	2	CL	1	1	↓															
								NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC= No Contact

Survey Time: Start 0910 End 1710

Intensive Nest Search Time: Start____ End____

Temperature (°F): Begin 64° End 72°

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** TDz **Month:** 06 **Day:** 25 **, 2009 Visit #** 1

Period: (Nestling) / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G83	0918	0926	3	CL	1	1	NC															
	G82	0928	0945	3	CL	1	1																
	G81	0957	1004	3	CL	1	1																
	G84	1018	1026	3	CL	1	1																
	G98	1045	1053	3	CL	1	1																
	G80	1112	1119	3	CL	1	1																
	G79	1130	1138	3	CL	1	1																
	G85	1147	1155	3	CL	1	1																
	G96	1209	1216	3	CL	1	1																
	G100	1241	1249	3	CL	1	1																
	G95	1306	1314	4	CL	1	1																
	G101	1330	1337	4	CL	1	1																
	G94	1355	1403	4	CL	1	1																
	G86	1418	1425	4	CL	1	1																
	G92	1445	1453	4	CL	1	1																
	G93	1504	1512	4	CL	1	1																
	G123	1635	1643	4	CL	2	1	↓															
	G121	1647	1654	4	CL	2	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No contact

Turnstone Environmental Consultants
Goshawk Survey Form

Page 1 of 1 (including maps)

Survey Time: Start 0715 End 0900
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 65 End 70
Survey Area/Project Area: SDS **Crew:** WLB **Month:** 6 **Day:** 30, **2009** **Visit #** 1

Period: (Nestling) / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** **1** = <5%; **2** = 5-20%; **3** = 21-40%; **4** = 41-60%; **5** = 61-80%; **6** = 81-100%

Wind Codes: **1** = Light air (>1mph), **2** = Light breeze (1-3 mph), **3** = Gentle breeze (4-7 mph), **4** =Light Wind (8-12 mph), **5** =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): **CL** = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow **Weather Intensity (WI):** **1**=light, **2**=moderate, **3**=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G61	0735	0741	3	CL	2	1	NC															
	G62	0749	0755	3	CL	2	1	NC															
	G63	0806	0812	2	CL	1	1	NC															
	G64	0821	0827	2	CL	1	1	NC															
	G78	0845	0851	3	CL	2	1	NC															

Age: **(A)**dult, **(F)**ledgling, **(N)**estling, **(U)**nknown **Sex:** **(M)**ale, **(F)**emale, **(U)**nknown **Det. Code:** **(A)**udio, **(V)**isual, (B)oth **Det. Location:** **(AT)** station, **(BT)** between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Survey Time: Start 0710 End 0915

Intensive Nest Search Time: Start____ End____

Temperature (°F): Begin 55° End____

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** TJG **Month:** 06 **Day:** 30, **2009** **Visit #** 1

Period: (Nestling) / Fledgling **Call(s) Used:** (Alarm) / Wail / Begging **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G52	0724	0731	2	CL	1	1	NC															
	G56	0738	0745	2	CL	1	1	↓															
	G55	0750	0758	2	CL	1	1																
	G54	0806	0813	2	CL	1	1	↓															
✓ 060504-1i	G60.5	0819	0827	3	CL	2	1	V	AT	1	M	A	RTHA	0830	0830	270°	100	3N	10E	8	SW	610224	5368[illegible]
	G60	0835	0843	3	CL	2	1	NC															
	G51	0857	0905	2	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

Survey Time: Start 1145 End 1615

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 70

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WCB **Month:** 7 **Day:** 9, **2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail / Begging) **Survey Year:** 1st (2nd) **Nest Search:** Y (N) (if yes attach Search Form) **Nest Found:** Y (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G75	1156	1202	3	PC	2	3	NC															
	G77	1209	1215	3	PC	2	3																
	G78	1223	1229	3	PC	2	3																
	G76	1245	1251	2	PC	1	3																
	G74	1258	1304	2	PC	1	3																
	G83	1315	1321	3	PC	1	3																
	G82	1335	1341	2	PC	1	3																
	G81	1349	1355	3	PC	2	3																
	G84	1413	1419	2	PC	1	3																
	G98	1440	1446	2	PC	1	3																
	G96	1506	1512	2	PC	1	3																
	G80	1525	1531	3	PC	1	3																
	G85	1544	1550	2	PC	1	3																
	G86	1600	1606	2	PC	1	3	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Survey Time: Start 1134 End 1704

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 61° End 78°

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** J. Votos **Month:** 7 **Day:** 9 **, 2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail) / (Begging) **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G122	1154	1200	4	PC	1	2	NC															
	G140	1220	1227	4	PC	1	2																
	G141	1230	1237	4	PC	1	2																
	G121	1315	1322	4	PC	1	2																
	G125	1330	1337	4	PC	1	2																
	G139	1349	1356	4	PC	2	2																
	G126	1400	1407	4	PC	2	2																
	G127	1414	1421	4	PC	2	2																
	G128	1447	1454	4	PC	2	2																
	G120	1501	1507	4	PC	2	2																
	G129	1514	1521	4	PC	2	2																
	G138	1529	1536	4	PC	2	2																
	G137	1545	1552	4	PC	2	2																
	G136	1555	1602	4	PC	2	2																
	G130	1607	1615	4	PC	2	2																
	G118	1624	1631	4	PC	2	2																
	G119	1639	1646	4	PC	2	2																
	G124	1648	1654	4	PC	2	2	↓															
	G123	1657	1704	4	PC	2	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Survey Time: Start 0715 End 1415

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 57 End —

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WLB **Month:** 7 **Day:** 10 **, 2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail / Begging) **Survey Year:** 1st (2nd) **Nest Search:** Y /(N) (if yes attach Search Form) **Nest Found:** Y /(N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G95	0802	0808	1	PC	1	3	NC															
	G94	0821	0827	1	PC	1	3																
	G93	0841	0847	1	PC	1	3																
	G92	0901	0907	1	PC	1	3																
	G91	0917	0923	1	PC	1	4																
	G90	0942	0948	2	PC	1	4																
	G88	1003	1009	2	PC	1	4																
	G92	1022	1028	2	PC	1	4																
	G87	1041	1047	1	PC	1	4																
	G71	1052	1058	1	PC	1	4																
	G72	1106	1112	1	PC	1	4																
	G79	1118	1124	2	PC	1	2																
	G73	1131	1137	2	PC	1	2	V															
071009-1i			.	2	PC	1	2	V	BT	1	U	U	TUVU	1136	1136	340°	300	3N	10E	8	NE		
	G64.1	1155	1201	2	PC	1	2	NC															
	G64	1208	1214	2	PC	1	2																
	G63	1223	1229	2	PC	1	2																
	G62	1235	1241	2	PC	1	2																
	G61	1251	1257	2	PC	1	2																
	G67	1305	1311	1	PC	1	2																
	G68	1318	1324	2	PC	1	2																
	G69	1329	1335	2	PC	1	2																
	G66	1341	1347	2	PC	1	2																
	G65	1350	1356	2	PC	1	2																
	G70	1359	1405	3	PC	1	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC= NO Contact

Survey Time: Start 0717 End 1322 Page 1 of 1 (including maps)

Intensive Nest Search Time: Start - End -

Temperature (°F): Begin 57 End 78

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS Whistling Ridge **Crew:** J. Yates **Month:** 7 **Day:** 10 **, 2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail) / (Begging) **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town.	Range	Sect	¼	NAD83-GPS data only	
	G103	0748	0754	1	PC	1	3	NC															
	G105	0803	0810	1	PC	1	3																
	G109	0823	0830	1	PC	1	3																
	G117	0835	0842	1	PC	1	4																
	G110	0845	0852	1	PC	1	4																
	G105.5	0857	0904	1	PC	1	4																
	G102	0913	0920	1	PC	1	4																
	G101	0924	0930	1	PC	1	5																
	G106	0933	0940	1	PC	1	5																
	G111	0945	0952	1	PC	1	6																
	G112	0958	1005	1	PC	1	6																
	G107	1028	1035	1	PC	1	6																
	G100	1041	1047	1	PC	1	6																
	G99.5	1049	1056	1	PC	1	4																
	G99	1102	1109	1	PC	1	4																
	G113	1118	1125	1	PC	1	4																
	G114	1134	1142	1	PC	1	4																
	G133	1154	1201	1	PC	1	4																
	G132	1211	1218	1	PC	1	4																
	G134	1224	1231	1	PC	1	5																
	G135	1240	1247	1	OC	1	6																
	G131	1252	1259	1	OC	1	6																
	G131.1	1303	1310	1	PC	1	5																
	G115	1315	1322	1	PC	1	5	↓															
	G107.5	1336	1344	1	PC	1	5	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No contact

Survey Time: Start 1552 End 1902 Page 1 of 1 (including maps)

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 84° End 82°

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS WHISTLING RIDGE **Crew:** J. YOTOS **Month:** 7 **Day:** 15 **, 2009 Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail) / (Begging) **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G22	1552	1559	1	CL	1	1	NC															
	G226	1603	1610	1	CL	1	1																
	G23	1628	1635	1	CL	1	1																
	G21	1644	1651	1	CL	1	1																
	G24	1658	1704	1	CL	1	1																
	G25	1714	1721	1	CL	1	1																
	G58	1733	1740	1	CL	1	1																
	G59	1745	1752	1	CL	1	1																
	G57	1802	1809	1	CL	3	1																
	G56	1818	1825	1	CL	2	1																
	G55	1830	1837	1	CL	3	1																
	G54	1853	1900	1	CL	3	1	↓															
	G38	1902	1909	1	CL	3	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

✓ NC = No Contact

Survey Time: Start 1545 End 1930

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 84 End 78

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SOS **Crew:** WLB **Month:** 7 **Day:** 15, **2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail / Begging) **Survey Year:** 1st (2nd) **Nest Search:** Y (N) (if yes attach Search Form) **Nest Found:** Y (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical), Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G54	1557	1603	2	CL	1	1	NC															
	G605	1614	1620	3	CL	2	1																
	G60	1626	1632	2	CL	1	1																
	G53	1641	1647	2	CL	2	1																
	G52	1654	1700	2	CL	2	1																
	G51	1710	1706	1	CL	1	1																
	G50	1725	1731	2	CL	1	1	↓															
	G48	1739	1745	3	CL	1	1	NC															
071509-1i				3	CL	1	1	V		2	U	U	TUVU	1740	1741	174	100	3N	10E	8	SW	10T 0609457	5067966
	G47	1752	1758	1	CL	1	1	NC															
	G46	1806	1812	3	CL	1	1	NC															
071509-2i				3	CL	1	1	V		1	A	U	TUVU	1807	1808	300	200	3N	10E	8	SW	10T 0609409	5068351
	G44	1820	1826	3	CL	1	1	NC															
	G43	1834	1840	2	CL	1	1	↓															
	G36	1900	1906	2	CL	1	1	↓															
	G35	1910	1916	2	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Survey Time: Start 0841 End 1252

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 68° End 91°

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: SDS WHISTLING RIDGE **Crew:** J. VOTOS **Month:** 7 **Day:** 16 **, 2009 Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail) / (Begging) **Survey Year:** 1st (2nd) **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: (Broadcast Acoustical) Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G20	0841	0848	1	CL	1	1	NC															
	G19	0854	0901	1	CL	1	1																
	G18	0912	0919	1	CL	1	1																
	G12	0940	0947	1	CL	1	1																
	G11	0954	1001	1	CL	1	1																
	G8	1010	1017	1	CL	1	1																
	G9	1024	1031	1	CL	1	1																
	G10	1040	1050	1	CL	1	1																
	G9.5	1058	1105	1	CL	1	1																
	G13	1121	1128	1	CL	1	1																
	G17	1137	1144	1	CL	1	1																
	G14	1158	1205	1	CL	1	1																
	G14.5	1212	1219	1	CL	1	1																
	G15	1221	1228	1	CL	1	1																
	G15.5	1231	1238	1	CL	1	1	↓															
	G16	1245	1252	1	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Survey Time: Start 0845 End 1330

Intensive Nest Search Time: Start ___ End ___

Temperature (°F): Begin 63° End 80°

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WLB **Month:** 7 **Day:** 16, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ___ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY
	G32	0850	0856	2	CL	1	1	NC															
	G31	0911	0917	1	CL	1	1																
	G31.1	0929	0935	1	CL	1	1																
	G30	0948	0954	1	CL	1	1																
	G29	1008	1014	1	CL	1	1																
	G27	1022	1028	1	CL	1	1																
	G26	1036	1042	1	CL	1	1																
	G1	1103	1109	1	CL	1	1																
	G2	1112	1118	1	CL	1	1																
	G3	1122	1128	2	CL	1	1																
	G5	1133	1139	1	CL	1	1																
	G4	1150	1156	1	CL	1	1																
	G6	1209	1215	1	CL	1	1																
	G7	1223	1229	1	CL	1	1	✓															
	G28	1309	1315	2	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier, date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Survey Time: Start 1000 End 1050

Turnstone Environmental Consultants

Goshawk Survey Form

Page 1 of 2 (including maps)

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin UNK. End UNK.

Survey Area/Project Area: WHISTLING RIDGE

Crew: D. DAHL / T. GALLIHER / W. BEARD

Month: 06 Day: 30, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search or Dawn Acoustical, Other: _____ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det_ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	A1	1000	1046	3	CL	/	1	NC															
	B1	1000	1046	3	CL	/	1																
	C1	1000	1046	3	CL	/	1																
	A2	1056	1138	2	CL	/	1																
	B2	1056	1138	2	CL	/	1																
NO	C3	T-SELT																					
*	A3	1146	1242	3	PC	/	2																
*	B3	1146	1242	3	PC	/	2																
*	C3	1146	1242	3	PC	/	2																
	A4	1250	1321	3	PC	/	2																
	B4	1250	1321	3	PC	/	2																
	C4	1250	1321	3	PC	/	2																
	A5	1350	1417	3	PC	/	2																
	B5	1350	1417	3	PC	/	2																
	C5	1350	1417	3	PC	/	2																
*	A6	1423	1458	2	PC	/	2																
*	B6	1423	1458	2	PC	/	2																
*	C6	1423	1458	2	PC	/	2																
	A7	1510	1520	2	PC	/	2																
	B7	1510	1520	2	PC	/	2																
	C7	1510	1520	2	PC	/	2																
	A8	1526	1537	3	PC	/	2																
	B8	1526	1537	3	PC	/	2																
	C8	1526	1537	3	PC	/	2	↓															
*	A9	1545	1602	3	PC	/	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

* = All 3 OBSERVERS Broadcast Calls on transect

NC = No contact

Survey Time: Start 1000 End 2050

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin UNK. End UNK.

Survey Area/Project Area: Whistling Ridge C

Crew: D. SAHL / T. GILLEO J. Voss / W. BEARD

Month: 06 Day: 30, 2009 Visit # 1

Period: (Nestling) / Fledgling Call(s) Used: (Alarm) / Wail / Begging Survey Year: (1st) 2nd Nest Search: Y (N) (if yes attach Search Form) Nest Found: Y (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search), or Dawn Acoustical, Other: _____ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
★	B9	1545	1602	3	PC	/	2	NC															
★	C9	1545	1602	3	PC	/	2																
	A10	1623	1715	3	PC	/	2																
	B10	1623	1715	3	PC	/	2																
	C10	1623	1715	3	PC	/	2																
	A11	1721	1806	3	PC	/	2																
	B11	1721	1806	3	PC	/	2																
	C11	1721	1806	3	PC	/	2																
★	A53	1849	2009	2	PC	/	2																
★	B53	1849	2009	2	PC	/	2																
★	C53	1849	2009	2	PC	/	2																
	A54	2012	2023	2	PC	/	2																
	B54	2012	2023	2	PC	/	2																
	C54	2012	2023	2	PC	/	2																
	A55	2030	2041	2	PC	/	2																
	B55	2030	2041	2	PC	/	2																
	C55	2030	2041	2	PC	/	2	NL															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: ★ = All 3 OBSERVERS Broadcast Calls NC = NO contact

WILD TURKEY observed on B54 t-SECT

Survey Time: Start 0755 End 1635

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 80

Survey Area/Project Area: WHISTLING RIDGE Crew: W. BEARD T. Gillen, J. Votos Month: 07 Day: 01, 2009 Visit # 1

Period: (Nestling) / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: (1st) 2nd Nest Search: Y / (N) (if yes attach Search Form) Nest Found: Y / (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search) or Dawn Acoustical, Other: _____ Cloud Cover: 1 = <5%, 2 = 5-20%; 3 = 21-40%; 4 = 41-60%, 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det. ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
*	A12	0755	0852	1	CL		1	NC															
*	B12	↓	↓	1	CL		1																
*	C12	↓	↓	1	CL		1																
	A13	0855	0941	1	CL		1																
	B13	↓	↓	1	CL		1																
	C13	↓	↓	1	CL		1																
	A14	0956	1102	1	CL		1																
	B14	↓	↓	1	CL		1																
	C14	↓	↓	1	CL		1																
*	A15	1118	1214	1	CL		1																
*	B15	↓	↓	1	CL		1																
*	C15	↓	↓	1	CL		1																
	A16	1241	1324	2	CL		1																
	B16	↓	↓	2	CL		1																
	C16	↓	↓	2	CL		1																
	A17	1345	1436	1	CL		1																
	B17	↓	↓	1	CL		1																
	C17	↓	↓	1	CL		1																
*	A18	1436	1459	1	CL		1																
*	B18	↓	↓	1	CL		1																
*	C18	↓	↓	1	CL		1																
	A19	1502	1512	1	CL		1																
	B19	↓	↓	1	CL		1																
	C19	↓	↓	1	CL		1	↓															
	A20	1516	1530	1	CL		1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det. ID: unique detection identifier, date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: * = All 3 OBSERVERS Broad Cast Calls NC = NO Contact

Survey Time: Start 0755 End 1635

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 90

Survey Area/Project Area: WRESTLING RIDGE Crew: T. Gillen, J. Dodds, W. BEARD Month: 07 Day: 01, 2009 visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: (1st) 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other _____ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%, 5 = 61-80%, 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	B20	1516	1530	1	CL	/	1	NC															
	C20	↓	↓	1	CL	/	1																
*	A21	1534	1544	1	CL	/	1																
*	B21	↓	↓	1	CL	/	1																
*	C21	↓	↓	1	CL	/	1																
	A22	1549	1600	1	CL	/	1	↓															
	B22	↓	↓	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det # for the day, (061208-1, 061208-2, ect) Time: Military format

Comments: * = All 3 observers Broadcast calls at Intervals

NC = No Contact

Survey Time: Start 0915 End 1620

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 59 End 69

Survey Area/Project Area: Whistling Ridge Crew: R. Stahl, W. Beard, J. Votaw Month: 07 Day: 13, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y (N) (if yes attach Search Form) Nest Found: Y (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: _____ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
*	A23	0915	0949	3	DR	1	4	NC															
*	B23	↓	↓	3	DR	1	4																
*	C23	↓	↓	3	DR	1	4																
	A23-1	0949	1010	3	DR	1	4																
	B23-1	↓	↓	3	DR	1	4																
	C23-1	↓	↓	3	DR	1	4																
	A23-2	1016	1039	3	DR	1	4																
	B23-2	↓	↓	3	DR	1	4																
	C23-2	↓	↓	3	DR	1	4																
*	A23-3	1041	1056	3	DR	1	4																
*	B23-3	↓	↓	3	DR	1	4																
*	C23-3	↓	↓	3	DR	1	4																
	A24-4	1101	1114	3	DR	1	4																
	B24-4	↓	↓	3	DR	1	4																
	C24-4	↓	↓	3	DR	1	4																
	A24-3	1115	1130	3	DR	1	3																
	B24-3	↓	↓	3	DR	1	3																
	C24-3	↓	↓	3	DR	1	3																
*	A24-2	1131	1145	3	DR	1	3																
*	B24-2	↓	↓	3	DR	1	3																
*	C24-2	↓	↓	3	DR	1	3																
*	A24-1	1140	1300	3	DR	2	5																
*	B24-1	↓	↓	3	DR	2	5	↓															
571809-11 *	C24-1	↓	↓	3	DR	2	5	V	BT	1	U	A	STVA	1134	1155	097	15	4N	10E	32	SW	0609743	5071371
	A25	1310	1355	3	OC	/	6	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

* All 3 observers broadcast calls @ intervals

C24-1 = Very skittish Barred owl observed flying through stand, would only perch briefly before flying off when observers approached. Broadcast STOC calls in case there was another strix in the stand. there was no response to the STOC calls or additional observations of ofthe original STVA. NC = No contact

Survey Time: Start 0915 End 1820

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start ____ End ____

Temperature (°F): Begin 59 End 69

Survey Area/Project Area: Whistling Ridge Crew: P. SAHL, W. BEARD, S. VOKS Month: 07 Day: 13, 2009 Visit # 1

Period: (Nestling) / Fledgling Call(s) Used: (Alarm) / Wail / Begging Survey Year: (1st) 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search), or Dawn Acoustical, Other: _____ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	B25	1310	1355	3	OC	/	6	NC															
	C25	↓	↓	3	OC	/	6																
*	A25-1	1400	1410	3	OC	/	6																
*	B25-1	↓	↓	3	OC	/	6																
*	C25-1	↓	↓	3	OC	/	6																
	A25-2	1411	1444	3	OC	/	6																
	B25-2	↓	↓	3	OC	/	6																
	C25-2	↓	↓	3	OC	/	6																
	A25-3	1446	1510	3	OC	/	6																
	B25-3	↓	↓	3	OC	/	6																
	C25-3	↓	↓	3	OC	/	6																
*	A26-2	1512	1524	3	OC	/	4																
*	B26-3	↓	↓	3	OC	/	4																
*	C26-2	↓	↓	3	OC	/	4																
	A26-1	1527	1600	3	OC	/	4																
	B26-2	↓	↓	3	OC	/	4																
	C26-2	↓	↓	3	OC	/	4																
	A27	1601	1643	3	OC	/	4																
	B27	↓	↓	3	OC	/	4																
	C27	↓	↓	3	OC	/	4																
*	A27-1	1649	1719	3	OC	/	4																
*	B27-1	↓	↓	3	OC	/	4																
*	C27-1	↓	↓	3	OC	/	4																
TO END *	A28-1	1729	1748	3	OC	/	4	↓															
TO END *	B28-1	1731	1741	3	OC	/	4	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier, date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

Y, ALL 3 OBSERVERS Played Broadcast Calls @ intervals NC= NO Contact

Survey Time: Start 0950 End 1400

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 77

Survey Area/Project Area: Whistling Ridge Crew: P.Stahl / W.Beard / Yates Month: 07 Day: 14, 2009 Visit # 1

Period: (Nestling) / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: (1st) 2nd Nest Search: Y (N) (if yes attach Search Form) Nest Found: Y (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search) or Dawn Acoustical, Other: _____ Cloud Cover : 1 = <5%, 2 = 5-20%; 3 = 21-40%; 4 = 41-60%, 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det_ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	A29	0925	0948	1	CL	-	1	NC															
	B29	↓	↓	1	CL	-	1																
	C29	↓	↓	1	CL	-	1																
	A30	0952	1015	1	CL	-	1																
	B30	↓	↓	1	CL	-	1																
	C30	↓	↓	1	CL	-	1																
*	A31-1	1016	1100	1	CL	-	1																
*	B31-1	↓	↓	1	CL	-	1																
*	C31-1	↓	↓	1	CL	-	1																
	A32	1110	1138	1	CL	-	1																
	B32	↓	↓	1	CL	-	1																
	C32	↓	↓	1	CL	-	1																
	A32-1	1140	1245	1	CL	-	1																
	B32-1	↓	↓	1	CL	-	1																
	C32-1	↓	↓	1	CL	-	1																
*	B30-1	1330	1400	1	CL	-	1																
*	B30-1	↓	↓	1	CL	-	1																
*	C30-1	↓	↓	1	CL	-	1		NO Habitat														
	A39-1	↓	↓	1	CL	-	1																
	B39-1	↓	↓	1	CL	-	1																
	C39-1	↓	↓	1	CL	-	1																
	A41-1	1410	1427	1	CL	-	1																
	B41-1	↓	↓	1	CL	-	1																
	C41-1	↓	↓	1	CL	-	1	↓															
*	A30-1	1439		2	CL	-	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det_ID: unique detection identifier; date and sequential det # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: 29-34 = Good V NO Habitat * = All 3 observations Broadcast CALLS.
TREES

30-1 → 39-1; AREA has little to NO Potential NO Habitat, Drop Area (~3Acres) for round 2 and adjust the #41 to cent,

NC = NO Contact

Survey Time: Start 0950 End 1900

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 77

Survey Area/Project Area: Whistling Ridge Crew: R.Sahl / W.Beers / J.Hoos Month: 07 Day: 14, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: (1st) 2nd Nest Search: Y (N) (if yes attach Search Form) Nest Found: Y (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search), or Dawn Acoustical. Other: _____ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det_ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY
*	B361	1439	1540	2	CL	/	1	NC															
*	C361	↓	↓	2	CL	/	1																
	A33	1550	1614	3	CL	/	1																
	B33	↓	↓	3	CL	/	1																
	C33	↓	↓	3	CL	/	1																
*	A34	1615	1625	3	CL	/	1																
*	B34	↓	↓	3	CL	/	1																
*	C34	↓	↓	3	CL	/	1																
	A35	1645	1716	3	CL	/	1																
	B35	↓	↓	3	CL	/	1																
	C35	↓	↓	3	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format
Comments: * = All 3 observers Broadcast Calls @ Intervals

Beware of cliffs South of C361 area.

NC= No contact

Survey Time: Start 0845 End ____

Turnstone Environmental Consultants

Goshawk Survey Form

Page 1 of 1 (including maps)

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 72 End 90

Survey Area/Project Area: Whistling Ridge Crew: R.Sch/W.Beard/J.Voss Month: 07 Day: 15, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: _____ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	A43	0915	0938	1	CL	/	1	NC															
	B43	↓	↓	1	CL	/	1																
	C43	↓	↓	1	CL	/	1																
*	A45-1	0941	1021	1	CL	/	1																
*	B45-1	↓	↓	1	CL	/	1																
*	C45-1	↓	↓	1	CL	/	1																
	A46	1025	1100	1	CL	/	1																
	B46	↓	↓	1	CL	/	1																
	C46	↓	↓	1	CL	/	1																
	A47-1	1115	1200	1	CL	/	1																
	B47-1	↓	↓	1	CL	/	1																
	C47-1	↓	↓	1	CL	/	1	↓															
*	A48	1210	1250	1	CL	/	1	NC															
571609-1i *	B48	↓	↓	1	CL	/	1	A	BT	U	U	A	SSHA	1238	1239	87°	100	3N	9E	1	NE	0608030	5070108
*	C48	↓	↓	1	CL	/	1	NC															
	A49-1	1300	1336	1	CL	/	1																
	B49-1	↓	↓	1	CL	/	1																
	C49-1	↓	↓	1	CL	/	1																
*	A52	1342	1407	1	CL	/	1																
*	B52	↓	↓	1	CL	/	1																
	B42	1435	1453	1	CL	/	1	↓															
	B42	↓	↓	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: * = All 3 observers Broadcast Calls @ intervals

Note: Area East (upslope) of the A/B 52 Tsects is not NOGO Habitat. Area is Predominately shrubby non-conifer until it intersects with area covered by the Broadcast Acoustic Survey effort. NC = No Contact

Survey Time: Start 0920 End 1452

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 74

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: Whistling Ridge **Crew:** D. Sahl / W. Beard / ~~Jules~~ **Month:** 07 **Day:** 23, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st / 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX	UTMY
																						NAD83-GPS data only	
	A1	1000	1028	3	PC	/	2	NC															
	B1	↓	↓	3	PC	/	2																
	C1	↓	↓	3	PC	/	2																
	A1-2	1035	1054	3	PC	/	2																
	B1-2	↓	↓	3	PC	/	2																
*	A3	1057	1133	3	PC	/	2																
*	B3	↓	↓	3	PC	/	2																
*	C3	↓	↓	3	PC	/	2																
	A4-1	1201	1236	3	PC	/	2																
	B4-1	↓	↓	3	PC	/	2																
	C4-1	↓	↓	3	PC	/	2																
	A5	1241	1305	3	PC	/	2																
	B5	↓	↓	3	PC	/	2																
	C5	↓	↓	3	PC	/	2																
*	A6-1	1310	1334	3	PC	/	2																
*	B6-1	↓	↓	3	PC	/	2																
*	C6-1	↓	↓	3	PC	/	2																
	A7	1346	1352	3-4	PC	/	2																
	B7	↓	↓	3-4	PC	/	2																
	C7	↓	↓	3-4	PC	/	2																
	A8-1	1355	1412	3-4	PC	/	2																
	B8-1	↓	↓	3-4	PC	/	2																
	C8-1	↓	↓	3-4	PC	/	2																
*	A9	1417	1452	2	PC	/	2	↓															
*	B9	↓	↓	2	PC	/	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments: * = All 3 observers Broadcast Calls NC = No Contact

Survey Time: Start 0920 End 1452

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 74

Survey Area/Project Area: Whistling Ridge Crew: R.Gehl / W.Beard / J.Yates Month: 07 Day: 23, 2009 Visit # 2

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical / Intensive Search, or Dawn Acoustical, Other: _____ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX	UTMY
																						NAD83-GPS data only	
*	C9	1417	1452	2	PC	/	2	NC															
*	A10	1500	1556	1	PC	/	2	↓															
	B10	↓	↓	1	PC	/	2																
	C10	↓	↓	1	PC	/	2																
	A11-1	1600	1641	1	PC	/	2																
	B11-1	↓	↓	1	PC	/	2																
	C11-1	↓	↓	1	PC	/	2																
*	A53	1738	1801	1	PC	/	2																
	B53	↓	↓	1	PC	/	2																
	C53	↓	↓	1	PC	/	2																
	A54	1806	1815	1	PC	/	2																
	B54	↓	↓	1	PC	/	2																
	C54	↓	↓	1	PC	/	2																
	A55	1822	1830	1	PC	/	2																
	B55	↓	↓	1	PC	/	2	↓															
	C55	↓	↓	1	PC	/	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: * = All 3 observers Broadcast Calls @ Intervals

NC = No Contact

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Time: Start 0810 End 1800
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 72 End 90
Survey Area/Project Area: _____ **Crew:** D. Stahl / J. Votos / W. Beard **Month:** 07 **Day:** 24, **2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail) / (Begging) **Survey Year** (1st) 2nd **Nest Search:** Y (N) (if yes attach Search Form) **Nest Found:** Y (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical (Intensive Search) or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	A12	0850	0930	1	PC	/	2	NC															
	B12	↓	↓	1	PC	/	2																
	C12	↓	↓	1	PC	/	2																
*	A13	0940	1050	1	PC	/	2																
*	B13	↓	↓	1	PC	/	2																
*	C13	↓	↓	1	PC	/	2																
	A14-1	1100	1147	1	PC	/	2																
	B14-1	↓	↓	1	PC	/	2																
	C14-1	↓	↓	1	PC	/	2																
	A15	1155	1249	1	PC	/	1																
	B15	↓	↓	1	PC	/	1																
	C15	↓	↓	1	PC	/	1																
*	A16-1	1259	1400	1	PC	/	1																
*	B16-1	↓	↓	1	PC	/	1																
*	C16-1	↓	↓	1	PC	/	1																
	A17	1405	1450	1	PC	/	1																
	B17	↓	↓	1	PC	/	1																
	C17	↓	↓	1	PC	/	1																
	A18-1	1456	1536	1	PC	/	1																
	B18-1	↓	↓	1	PC	/	1																
	C18-1	↓	↓	1	PC	/	1																
*	A19	1554	1624	1	PC	/	1																
*	B19	↓	↓	1	PC	/	1																
*	C19	↓	↓	1	PC	/	1	↓															
	A20-1	1632	1652	1	PC	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments: * = All 3 observers Broadcast calls @ Intervals

NC = No Contact

Survey Time: Start 0810 End 1400

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 72 End 90

Survey Area/Project Area: Whistling RIDGE Crew: R.SAHL/S.UBOS/W.BEARD Month: 07 Day: 24, 2009 Visit # 2

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: _____ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	B20-1	1632	1652	1	PC	/	1	NC															
	C20-1	↓	↓	1	PC	/	1																
*	A21	1700	1713	1	PC	/	1																
*	B21	↓	↓	1	PC	/	1																
*	C21	↓	↓	1	PC	/	1																
	A22-1	1719	1727	1	PC	/	1	↓															
	B22-1	↓	↓	1	PC	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: * = All 3 observers Broadcast Calls @ intervals

NC = No Contact

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Time: Start 1027 End 1640
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 78 End 95
Survey Area/Project Area: WHISTLING RIDGE **Crew:** J. Watts W. BEARD, K. Rostad **Month:** 7 **Day:** 27 **, 2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail) / (Begging) **Survey Year:** (1st) 2nd **Nest Search:** Y (N) (if yes attach Search Form) **Nest Found:** Y (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical / (Intensive Search) / Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
K	A23	1033	1054	1	CL	–	1	NC															
W	B23	↓	↓	1	CL	–	1	↓															
J	C23	↓	↓	1	CL	–	1	↓															
K	A23-1	1058	1119	1	CL	–	1	↓															
W	B23-1	↓	↓	1	CL	–	1	↓															
J	C23-1	↓	↓	1	CL	–	1	↓															
* K	A23-2	1122	1151	1	CL	–	1	↓															
* W	B23-2	↓	↓	1	CL	–	1	↓															
* J	C23-2	↓	↓	1	CL	–	1	↓															
K	A23-3	1154	1207	1	CL	–	1	↓															
W	B23-3	↓	↓	1	CL	–	1	↓															
J	C23-3	↓	↓	2	CL	–	1	↓															
K	A24-4	1229	1243	2	CL	–	1	↓															
J	B24-4	↓	↓	2	CL	–	1	↓															
W	C24-4	↓	↓	2	CL	–	1	↓															
* K	A24-3	1243	1303	2	CL	–	1	↓															
* J	B24-3	↓	↓	2	CL	–	1	↓															
* W	C24-3	↓	↓	2	CL	–	1	↓															
K	A24-2	1304	1316	2	CL	–	1	↓															
J	B24-2	↓	↓	2	CL	–	1	↓															
W	C24-2	↓	↓	2	CL	–	1	↓															
K	A24-1	1317	1352	2	CL	–	1	↓															
J	B24-1	↓	↓	2	CL	–	1	↓															
W	C24-1	↓	↓	2	CL	–	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

* = All 3 surveyors Broadcast calls @ intervals
NC = No Contact

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Time: Start 1410 End 1640
Intensive Nest Search Time: Start — End —
Temperature (*F): Begin 78 End 95
Survey Area/Project Area: WHISTLING RIDGE **Crew:** J. Votos, W. Beard, K. Rostad **Month:** 7 **Day:** 27, **2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail) / (Begging) **Survey Year** (1st) / 2nd **Nest Search:** Y (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical / (Intensive Search) / or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
*J	A25 *	1411	1452	2	CL	/	1	NC															
*K	B25	↓	↓	2	CL	/	1	↓															
*W	C25	↓	↓	2	CL	/	1	↓															
J	A25-1	1454	1502	2	CL	/	1	↓															
K	B25-1	↓	↓	2	CL	/	1	↓															
W	C25-1	↓	↓	2	CL	/	1	↓															
J	A25-2	1504	1521	2	CL	/	1	↓															
K	B25-2	↓	↓	2	CL	/	1	↓															
W	C25-2	↓	↓	2	CL	/	1	↓															
*J	A25-3	522	1610	2	CL	/	1	↓															
*K	B25-3	↓	↓	2	CL	/	1	↓															
*W	C25-3	↓	↓	2	CL	/	1	NC															
	END																						

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

* = All 3 OBSERVERS Broadcast Calls
NC = No Contact

Survey Time: Start 0651 End 1345

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 70 End 100

Survey Area/Project Area: WHISTLING RIDGE Crew: J. HOTOS / K. ROSTAD / W. BEARD Month: 7 Day: 28, 2009 Visit # 2

Period: Nestling (Fledgling) Call(s) Used: Alarm / (Wail) / (Begging) Survey Year: (1st) 2nd Nest Search: Y / (N) (if yes attach Search Form) Nest Found: Y / (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search), or Dawn Acoustical, Other: _____ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
*	A29	0725	0750	1	CL	/	1	NC															
*	B29	0725	0750	1	CL	/	1																
*	A30-1	0800	0810	1	CL	/	1																
	B30-1	0800	0810	1	CL	/	1																
	C30-1	0800	0810	1	CL	/	1																
	A31	0838	0906	1	CL	/	1																
	B31	0838	0906	1	CL	/	1																
	C31	0838	0906	1	CL	/	1																
*	A32	0943	1000	1	CL	/	1																
*	B32	0943	1000	1	CL	/	1																
*	C32	0943	1000	1	CL	/	1																
	A32-1	1001	1028	1	CL	/	1																
	B32-1	1001	1028	1	CL	/	1																
	C32-1	1001	1028	1	CL	/	1																
	A35-1	1034	1059	1	CL	/	1																
	B35-1	1034	1059	1	CL	/	1																
	C35-1	1034	1059	1	CL	/	1																
*	A41-1	1110	1120	2	CL	/	1																
*	B41-1	1110	1120	2	CL	/	1																
*	C41-1	1110	1120	2	CL	/	1																
	A36-1	1132	1145	1	CL	/	1																
	B36-1	1132	1145	1	CL	/	1																
	C36-1	1132	1145	1	CL	/	1																
	A36	1203	1250	1	CL	/	1	↓															
	B36	1203	1250	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

* = All 3 Observers Broadcast Calls @ Intervals

NC = No Contact

Survey Time: Start 0651 End 1345

Intensive Nest Search Time: Start — End —

Temperature (*F): Begin 70 End 100

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: Whistling Ridge Crew: J. Hess, K. Rosand, V. Beard Month: 7 Day: 28, 2009 Visit # 2

Period: Nestling / (Fledgling) Call(s) Used: Alarm / (Wail / Begging) Survey Year: (1st) 2nd Nest Search: Y / (N) (if yes attach Search Form) Nest Found: Y / (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical (Intensive Search) or Dawn Acoustical, Other: _____ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX	UTMY
	C32	1257	1320	1	CL	/	1	NC														NAD83-GPS data only	
*	A33	1257	1320	1	CL	/	1	NC															
070828-117	B33	1257	1320	1	CL	/	1	V	BT	2	U	A	RTHA	1315	1317	190	30M	4N	9E	36	SE	0607656	5070958
*	A34	1327	1337	1	CL	/	1	NC															
*	B34	1327	1337	1	CL	/	1	↓															
*	C34	1327	1337	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

* = ALL 3 observers Broadcast Calls @ Intervals

NC = NO Contact

Turnstone Environmental Consultants
Goshawk Survey Form

Page 1 of 2 (including maps)

Survey Time: Start 0530 End 1430
Intensive Nest Search Time: Start — End —
Temperature (*F): Begin 78 End 100
Survey Area/Project Area: Whistling Ridge **Crew:** J. Wolos, K. Posthe, W. Beers **Month:** 7 **Day:** 29, **2009** **Visit #** 2

Period: Nestling / (Fledgling) **Call(s) Used:** Alarm / (Wail / Begging) **Survey Year:** (1st) 2nd **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical / (Intensive Search) / or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX	UTMY
	A263	0537	0550	1	CL	/	/	NC														NAD83-GPS data only	
	B263	0537	0550	1	CL	/	/	↓															
	C263	0537	0550	1	CL	/	/	↓															
*	A262	0552	0606	1	CL	/	/	↓															
*	B262	0552	0606	1	CL	/	/	↓															
*	C262	0552	0606	1	CL	/	/	↓															
	A261	0608	0647	1	CL	/	/	↓															
	B261	0608	0647	1	CL	/	/	↓															
	C261	0608	0647	1	CL	/	/	↓															
	A27	0658	0725	2	CL	/	/	↓															
	B27	0658	0725	2	CL	/	/	↓															
	C27	0658	0725	2	CL	/	/	↓															
*	A27-1	0726	0736	1	CL	/	/	↓															
*	B27-1	0726	0736	1	CL	/	/	↓															
*	C27-1	0726	0736	1	CL	/	/	↓															
	A&B28	0738	0738	1	CL	/	/	↓															
	A 49	0935	1000	1	CL	/	/	↓															
	B 49	0935	1000	1	CL	/	/	↓															
	C49	0935	1000	1	CL	/	/	↓															
072909-1i	—	—	—	1	CL	/	/	V	OUTSIDE	3	U	J/SUB	SSHA	1000	1015	90	0	3N	9E	1	NE	1608126	5069997
*	A48-1	1028	1045	1	CL	/	/	NC															
*	B48-1	1028	1045	1	CL	/	/	↓															
*	C48-1	1028	1045	1	CL	/	/	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments: * = All 3 observers Broadcast Calls @ Intervals
NC = No Contact
C49 = 3 SSHA individuals observed, one was a Juvenile the other 2 were likely adults but observer was unable to Determine for sure. Birds were observed ~50m outside of the survey polygon.

Plucking post 10M from this point

Survey Time: Start 0530 End 1430

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 78 End 100

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: Whistling Ridge **Crew:** J. JOBS, K. ROSAD, W. BIRD **Month:** 7 **Day:** 29, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: _____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town.	Range	Sect	¼	NAD83-GPS data only	
	A47	1100	1125	1	CL	/	1	NC															
	B47	1100	1125	1	CL	/	1																
	C47	1100	1125	1	CL	/	1																
	A46-1	1128	1155	2	CL	/	1																
	B46-1	1128	1155	2	CL	/	1																
	C46-1	1128	1155	2	CL	/	1																
*	A45	1157	1215	1	CL	/	1																
*	B45	1157	1215	1	CL	/	1																
*	C45	1157	1215	1	CL	/	1																
	A44	1219	1238	2	CL	/	1																
	B44	1219	1238	2	CL	/	1																
	A43	1244	1300	3	CL	/	1																
	B43	1244	1300	3	CL	/	1																
	C43	1244	1300	3	CL	/	1																
*	A42-1	1310	1315	3	CL	/	1																
*	B42-1	1310	1315	3	CL	/	1																
*	A52-1	1340	1408	3	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments: * = All 3 OBSERVERS Broadcast Calls @ Intervals

NC = No Contact

Appendix D - Western Gray Squirrel Survey Forms

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: A1,A2, B1,B2

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 4N **R** 10E **S** 31 **County:** Skamania

T 3N **R** 10E **S** 6 **County:** Skamania

Date(s) Surveyed: 3/11/09

Start/Stop time(s): 0930-1215

Surveyor Names and Affiliations: D. Sahl, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

All polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant PSME >70 years. Slopes within the polygon boundaries vary between ~0% to 30%. The aspect of each polygon also varies. The A1, A2, B1 and B2 polygons have a predominantly southern aspect. No areas of standing water were observed in any of the polygons during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed. Several Rabbits were observed in the A2 polygon.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A3

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): T 3N R 10E S 6 **County:** Skamania

T 3N R 9E S 1 **County:** Skamania

Date(s) Surveyed: 3/11/09

Start/Stop time(s): 0915-1220

Surveyor Names and Affiliations: D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

All polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >15 years of age, with some scattered remnant PSME >70 years. A few small patches of Quercus SPP (likely Quercus Garryana), were observed within the boundaries of the A3 polygon. The trees were not > than 15ft. in height and growing in a few steep, rocky, open areas with a westerly aspect. In Polygons A3 there were numerous ACMA and ACCI present, especially towards the toe of the slope and along drainages. Slopes within the polygon boundary vary but are generally steep, with a few rocky cliff areas, between ~0% to 85%. The A3 polygon has a predominantly western aspect and several active incised drainages. Water was present in seasonally intermittent streams in polygon A3 on the north end of the polygon at the time of survey. No areas of non-flowing, standing water were observed in the polygon during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed. Recent Bract piles were observed in several locations all were presumed to be created by douglas squirrels.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: A5,B5
(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 5,6,8 **County:** Skamania
T **R** **S** **County:**

Date(s) Surveyed: 3/12/09
Start/Stop time(s): 0935-1210

Surveyor Names and Affiliations: D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:
TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

Both polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant PSME >70 years. No patches of Quercus SPP. were observed within the boundaries of the A5 or B5 polygons. In both Polygons there were ACMA present. Slopes within the polygon boundaries vary between ~0% to 30%. Both polygons have predominantly north to NNE aspects. Their was a small section of active drainage in B5.Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. Numerous douglas squirrels were heard and observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: A6,B4

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 6 **County:** Skamania

T 4N **R** 10E **S** 31 **County:** Skamania

Date(s) Surveyed: 3/12/09

Start/Stop time(s): 0930-1215

Surveyor Names and Affiliations: W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

Both polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant PSME >70 years. No patches of Quercus SPP. were observed within the boundaries of the A6 or B4 polygons. In both Polygons there were ACMA present. Slopes within the polygon boundaries vary between ~0% to 45%. The A6 polygon has a predominantly southwestern aspect, the B4 polygon has several aspects that include;, NW, NE and S. Both polygons had had active drainages. Their were 2 small active drainages in B4 and a larger active drainage and a pond in the A6 polygon. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey. The pond that was present in A6 was roundish in shape and appeared to be shallow (>10' deep and ~50 feet across at time of survey), it was difficult to determine the exact extent of the pond area due to the snowpack. Water in the pond is present year round as observed in mid August of this year. No Western Gray squirrels, or their nest structures were observed during the survey. Numerous douglas squirrels were heard and observed. Several large bract piles were encountered in the A6 polygon which were attributed to the douglas squirrels observed. A coyote was also observed on the edge of the A6 polygon.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A10, A9

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): T 3N R 10E S 7,8 **County:** Skamania

T R S **County:**

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 1300-1520

Surveyor Names and Affiliations: D Sahl, W. Perkins, D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A10 and A9 polygons were surveyed in a leapfrog fashion by 3 surveyors walking adjacent meandering transects. The A10 and A9 polygons are composed of mixed conifer/hardwoods, primarily PSME with some scattered TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age with a few older remnant trees present. No patches of Quercus SPP. were observed within the boundaries of the polygons. Both polygons are fairly flat with slopes within the polygon boundaries that vary between ~0% to 5%. There were no drainages or areas of standing water present within the polygons. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed. Bract piles were observed in several areas within the survey polygons, they were attributed to the numerous douglas squirrels observed during the survey.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A12, A13, A14

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): T 3N R 10E S 7 **County:** Skamania

T R S **County:**

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 0940-1200

Surveyor Names and Affiliations: D Sahl, W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A12 and A13 polygons were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age with a few older remnant trees present. No patches of Quercus SPP. were observed within the boundaries of the polygons. Both polygons are very flat with slopes within the polygon boundaries vary between ~0% to 5%. Both polygons had very marginal potential WGS habitat. There were no drainages or areas of standing water present within the polygons. The A14 polygon was composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, stand appeared to be even aged. No patches of Quercus SPP. were observed within the boundaries of the polygon. There was some ACMA and ACCI present within the polygon. Slopes within the polygon boundaries vary between ~0% to 60%. The A14 polygon has a westerly aspect and one seasonal drainage. The drainage was dry at the time of the survey. No areas of non-flowing, standing water were observed in the polygon during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey. No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A17,A18,B6,B7, B8, C1

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 7,18 **County:** Skamania

T 3N **R** 9E **S** 13 **County:** Skamania

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 1330-1740

Surveyor Names and Affiliations: D. Bolen, D. Sahl and W. Perkins with Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A18, A17, B6, B7, B8 and C1 polygons were surveyed by 3 surveyors walking concurrent, adjacent meandering transects. All of the survey polygons are along the top or flanks of a ridge running almost north/south. The B6, B7 and B8 polygons are small extension of the A17 and A18 polygons that were added to the survey area after the the boundaries of the original polygons were determined. The habitat type in the B polygons is similar to their adjacent A polygon. The survey polygons are composed of mixed conifer/hardwoods, primarily PSME with some scattered TSHE and THPL in the drainages. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age. A few scattered remnant trees older than 70 years were present. No patches of Quercus SPP. were observed within the boundaries of the polygons. There were some areas ACMA and ACCI present within the polygons. All of these polygons were on the extreme southern end of the project area. A18 has a northwestern aspect on a fairly steep slope and a seasonal drainage that was wet and flowing at the time of the survey.
The A17 polygon had a south and southeast exposure and no significant drainages. It had trees older than the other polygons in the overstory and a few remnant PSME present that were greater than 70yrs of age. The A17 polygon is adjacent to the C1 polygon that had a seasonal stream present in it that was flowing at the time of survey but was obscured due to snowpack in most places. The C1 polygon had a SW aspect. Slopes within the polygon boundaries vary between ~10% to 80%. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A15

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 7,18 **County:** Skamania

T 3N **R** 9E **S** 19 **County:** Skamania

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 0910-1125

Surveyor Names and Affiliations: D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A15 polygon is composed of mixed conifer/hardwoods, primarily PSME with some scattered TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >25 years of age with a few older remnant trees present. No patches of Quercus SPP. were observed within the boundaries of the polygons. There was some ACMA and ACCI present within the polygon. Slopes within the polygon boundary vary between ~10% to 80%. The A15 polygon has a westerly aspect and two seasonal drainages. The drainages were wet at the time of the survey and partially obscured by snowpack. No areas of non-flowing standing water were observed at the time of survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A4, A11

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 6, 7 **County:** Skamania

T **R** **S** **County:**

Date(s) Surveyed: 3/11/09

Start/Stop time(s): 0900-1200

Surveyor Names and Affiliations: W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age. No patches of Quercus SPP. were observed within the boundaries of the polygons. There was some ACMA and ACCI present within the polygons. Slopes within the polygon boundaries vary between ~0% to 60%. The A4 polygon had a western aspect and the A11 polygons had varying aspects that included NW, NE and easterly. The A11 polygon has multiple pieces all of which contained very marginal (primarily young tightly spaced trees) potential WGS habitat. There are two seasonal drainages within the area of the polygons and both appeared to be dry at the time of the survey, but were obscured by snowpak. No areas of non-flowing, standing water were observed in the polygon during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A7

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 5,6,7,8 **County:** Skamania

T **R** **S** **County:**

Date(s) Surveyed: 3/12/09

Start/Stop time(s): 0915-1135

Surveyor Names and Affiliations: D. Sahl, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A7 polygon surveyed was composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >20 years of age, with some scattered remnant PSME >70 years. Some areas of this polygon had large amounts of vine maple. Slopes within the polygon boundary vary between ~0% to 40%. The A7 polygon has a variety of aspects, primarily eastern and northern. Water was present in 2 streams in the polygon. one stream appears to be seasonally intermittent and the other appears to have some water present all season (as observed while conducting other surveys in july/august). Both contained water at time of survey, stream banks indicate that the water level increases significantly during the wet season. No areas of non-flowing standing water were observed in the A7 polygon. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed. Recent Bract piles were observed in several locations all were presumed to be created by douglas squirrels.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: B3

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 5 **County:** Skamania

T 4N **R** 10E **S** 31,32 **County:** Skamania

Date(s) Surveyed: 3/12/09

Start/Stop time(s): 1310-1535

Surveyor Names and Affiliations: D. Bolen, D. Sahl, W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

This polygon was surveyed by 3 surveyors simultaneously. The polygon is composed of mixed conifer/ hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >30 years of age, with some scattered remnant PSME >80 years. No patches of Quercus SPP. were observed within the boundaries of the polygon. In Scattered ACMA was present throughout the polygon. Slopes within the polygon boundaries vary between ~0% to 70%. The polygon has a predominant north to NE aspect. Their were a few seep areas that appeared to be active seasonally in the bottom of a few of the small drainages present in the polygon. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. Several douglas squirrels were heard and observed while surveying the polygon.

C-8

Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, August 20 – October 21, 2007. Prepared for SDS Lumber Company.

WEST, Inc. 2007

Final Report

Bat Acoustic Studies for the Saddleback Wind Energy Project Skamania County, Washington

August 20th – October 21st, 2007

Prepared for:

SDS Lumber Company

Prepared by:

Donald Solick, Greg Johnson and Jerry Baker
Western **E**co**S**ystems **T**echnology, Inc.
2003 Central Avenue
Cheyenne, Wyoming

WEST, Inc.

February 14, 2008

EXECUTIVE SUMMARY

In August 2007 Western EcoSystems Technology, Inc. initiated surveys designed to assess bat use within the proposed Saddleback Wind Energy Project, Skamania County, Washington. Passive AnaBat® II echolocation detectors were used to perform acoustic surveys for bats from August 20 through October 21, 2007. Three survey stations were established in the study area and each Anabat surveyed continuously during the night time hours over the study period.

The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the study area by bats. Two Anabat echolocation detectors were used to periodically monitor bat use at the study during the period August 20 - October 21, 2007. A total of 348 bat passes were recorded during 45 detector nights. Just over half (55%) of the calls were < 35 kHz in frequency (e.g., big brown bat, hoary bat), and the remaining calls were > 35 kHz (e.g., *Myotis* bat species). Species identification was only possible for the hoary bat, which made up 5% of all passes. Activity levels for bat passes peaked in late August/early September. Activity levels for hoary bats were highest in mid-September, suggesting this species migrates through the study area at this time of year. However, equipment failures prevented data collection between September 17 and October 14, so bat activity during this period is unknown.

The mean number of bat passes per detector per night was compared to existing data at five wind-energy facilities where both bat activity and mortality levels have been measured. The level of bat activity documented at the Saddleback Wind Resource Area was higher than that at wind-energy facilities in Minnesota and Wyoming, where reported bat mortalities are low, but was much lower than at facilities in the eastern US, where reported bat mortality is highest. Based on the available data it is likely that some bat mortality will occur in the study area, but the mortality is not expected to be as high as other facilities, and most casualties may occur late-August to mid-September, during likely migration periods. Assuming that a relationship between bat activity and bat mortality exists, and that it extends to the western US, the rate of bat mortality at the Saddleback Wind Resource Area would likely be greater than the 2.2 bat fatalities/turbine/year reported at the wind-energy facility at Buffalo Ridge, Minnesota, and would likely be much lower than the 20.8 fatalities/turbine/year reported at the facility at Buffalo Mountain, Tennessee.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
INTRODUCTION 1
STUDY AREA 1
METHODS 1
RESULTS 3
Spatial Variation 3
Seasonal Variation 3
Species Composition 3
DISCUSSION 4
Potential Impacts 4
Activity 4
Seasonal Variation 4
Species Composition 5
REFERENCES 5

LIST OF TABLES

Table 1. Results of bat acoustic surveys conducted at SWRA, August 20 – October 21, 2007 8
Table 2. Wind-energy facilities in the US with both pre-construction Anabat sampling data and post-construction mortality data for bat species (adapted from Kunz et al. 2007b). 9
Table 3. Bat species determined from range-maps (Harvey et al. 1999; BCI website) as likely to occur within the SWRA, sorted by call frequency. 10

LIST OF FIGURES

Figure 1. Study area map showing project area and Anabat sampling stations at the SWRA. 11
Figure 2a. Number of bat passes per detector-night by location at the SWRA. 12
Figure 2b. Number of nightly bat passes, grouped by Anabat location, at the SWRA. 13
Figure 3. Number of bat passes and noise files detected per detector–night, presented nightly, at the SWRA. 14
Figure 4a. Weekly activity by high- and low-frequency bats at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.) 15
Figure 4b. Nightly activity by high- and low-frequency bats at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.) 16
Figure 5. Number of passes per detector–night by hoary bats, presented nightly, at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.) 17

INTRODUCTION

SDS Lumber Company is proposing to develop a wind-energy facility, the Saddleback Wind Energy Project (SWRA), in Skamania County, Washington (Figure 1). SDS Lumber requested Western EcoSystems Technology, Inc. (WEST) to develop and implement a standardized protocol for baseline studies of bat use in the project area for the purpose of estimating the impacts of the wind-energy facility on bats, and to assist with siting turbines to minimize impacts to bats. The protocol for the baseline study is similar to protocols used at other wind-energy facilities in the US. The protocol has been developed based on WEST's experience studying wildlife and wind turbines at projects throughout the US and included passive AnaBat® II (Anabat) ultrasonic detectors sampling from fixed stations to quantify bat use in the study area.

The purpose of this report is to summarize and describe the results of Anabat surveys during the fall of 2007, and to bring any items of biological interest, such as changes in seasonal bat use, to the attention of SDS Lumber. The scope of the surveys for bats included only acoustic bat surveys at fixed stations.

STUDY AREA

The proposed project area is in southeast Skamania County, approximately four miles northwest of White Salmon, Washington (Figure 1). The specific project area is just north of Underwood Mountain and includes Sections 5, 6, 7, and 8, Township 3N, Range 10E. The project area consists of hilltops, dominated by coniferous forests with some clearcuts, and linear clearings associated with powerline rights-of-way. Elevation of the project area ranges from approximately 1,700 – 2,400 feet (ft; 518 – 732 meters (m)) above sea level..

METHODS

The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the SWRA by bats. Bats were surveyed using AnaBat® II ultrasonic detectors coupled with Zero Crossing Analysis Interface Modules (ZCAIM; Titley Electronics Pty Ltd., NSW, Australia). Bat detectors are widely used to index and compare habitat use by bats. The use of bat detectors for calculating an index to bat impacts has been used at several wind-energy facilities (Kunz et al. 2007a), and is a primary and economically feasible bat risk assessment tool (Arnett 2007). Bat activity was surveyed using two detectors from August 20 to October 21, 2007, a period corresponding to likely fall bat migration at this site.

Detectors were placed at two locations (Figure 1). The detector at the north location was placed on the ground at the base of a meteorological tower on August 20, but on September 7 was elevated on the tower at a height of approximately 130 ft (40 m). The detector at the south location was placed on the ground on September 7, and remained there for the duration of the study. It was placed just outside the project area, but in an area representative of the project area in terms of habitat and topography.

Anabat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of eight was used for the study. Bat echolocation detectors also detect other ultrasonic sounds made by insects, raindrops hitting vegetation, and other sources. A sensitivity level of six was used to reduce interference from these other sources of ultrasonic noise. The calls were recorded via the ZCAIM, which uses a CompactFlash memory card with large storage capacity. The Anabat detectors were placed inside weather-tight containers (plastic tubs for ground units, a polypropylene dry bag for the elevated unit) with a hole cut in the side of the container for the microphone to extend through. Microphones were encased in PVC tubing with drain holes that curved vertically outside the container to minimize the potential for water damage due to weather. Anabat units situated on the ground were raised approximately 3 ft (1 m) to minimize echo interference and to elevate the unit above vegetation. The elevated Anabat unit was raised approximately 130 ft (40 m) up the meteorological tower using a pulley system. All units were programmed to turn on approximately ½ hour before sunset and turn off approximately ½ hour after sunrise each night.

Incoming echolocation calls were digitally processed by the detector and passed to the ZCAIM for further processing and data storage. Each series of echolocation calls was saved to a file on a high-capacity CompacFlash card, and these files were then transferred to a computer for analysis. Computer software was used to view digital "sonograms" of the echolocation calls showing change in frequency over time. During analysis, these frequency versus time displays were used to separate bat calls from other types of ultrasonic noise (e.g. wind, rain, insects, etc.) and to assign calls to a high- or low-frequency group.

The units of activity were number of bat passes (Hayes 1997). The absolute abundance of bats within a study area cannot be determined through acoustic sampling, and bat pass data represent levels of bat activity rather than numbers of individuals. A pass was defined as a continuous series of two or more call notes produced by an individual bat, with no pauses between call notes of more than one second (White and Gehrt 2001; Gannon et al. 2003). In this report, the terms bat pass and bat call are used interchangeably. The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights. Bat passes were classified as either high-frequency calls (≥ 35 kHz), which are generally given by small bats (e.g. *Myotis* spp. and western red bat (*Lasiurus blossevillii*)), or low-frequency (< 35 kHz), which are generally given by larger bats (e.g. Townsend's big-eared bat (*Corynorhinus townsendii*), and hoary bat (*Lasiurus cinereus*)). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis. To establish which species may have produced the high- and low-frequency calls recorded, a list of species expected to occur in the study area was compiled from range maps (Harvey et al. 1999; BCI website).

The total number of bat passes per detector night was used as an index for bat use at the SWRA. Bat pass data represent levels of bat activity, rather than the numbers of individuals present, because individuals cannot be differentiated by their calls. Bat activity was summarized by location and by weekly and nightly intervals from August 20 to October 21, 2007. To predict potential for bat mortality (i.e. low, moderate, high), the mean number of bat passes per detector

night across locations (i.e., the mean of ratios) was compared to existing data from wind-energy facilities where both bat activity and mortality levels have been measured.

RESULTS

Bat activity was monitored at three sampling locations on a total of 63 nights during the period August 20 – October 21, 2007. Equipment failures compromised data collection for the northern unit between September 17 and October 14, and for the southern unit between September 17 and October 21. Anabat units were operable for 24% of the sampling period, recording 348 bat passes on 45 detector-nights (Table 1). Averaging bat passes per detector-night across locations gave a mean of 7.91 bat passes per detector-night.

Spatial Variation

Bat activity was similar between the ground Anabat units in the north (mean = 11.67 ± 2.0 bat passes per detector-night) and south (mean = 9.60 ± 4.1; Figure 2a) locations. At both locations, the number of high-frequency (HF) bat passes per detector-night was approximately one and a half times greater than the number of low-frequency (LF) passes. Bat activity was much lower at the north elevated location (mean = 2.47 ± 1.1), and LF bat passes greatly outnumbered HF bat passes. Patterns of nightly activity were similar among detector locations (Figure 2b), although data from the north ground detector were not collected concurrently with data from the other two detectors, making direct comparisons difficult.

Seasonal Variation

From the start of the acoustic bat surveys on August 20, bat activity increased to a peak on September 1, and then decreased through September 13, 2007 (Figure 3). Bat detectors were largely inoperable past September 17, preventing detection of bats for the entire duration of the study, except for a one-week period at the end of the study for the north elevated station, during which no bats were detected. Patterns of activity for HF and LF bats were congruent with the overall trend (Figure 4a), with the number of HF bat passes per detector-night peaking between August 30 and September 1 (26% of all HF passes), and LF bat activity at its highest on September 6 and 9 (29% of all LF passes; Figure 4b).

Species Composition

Species identification for specific bat passes was possible for the hoary bat; therefore, passes by this species could be separated from passes by all other low-frequency bats. Hoary bats comprised 5.7% of the total passes detected within the SWRA (20 of 348 bat passes; Table 1). Most passes by hoary bats occurred at the south location (mean = 1.2 ± 0.7 passes per detector-night), with several being detected at the north elevated location (mean = 0.2 ± 0.1) as well. No hoary bat passes were detected at the north ground location. Activity for hoary bats was highest on September 9 (44% of total hoary passes; Figure 5).

DISCUSSION

Potential Impacts

Assessing the potential impacts of wind energy development to bats at the SWRA is complicated by our current lack of understanding of why bats collide with wind turbines (Kunz et al. 2007b), combined with the inherent difficulties of monitoring elusive, night-flying animals (O'Shea et al. 2003). To date, monitoring studies of wind-energy facilities suggest that a) migratory tree-roosting species (eastern red bat (*Lasiurus borealis*), hoary bat, and silver-haired bat (*Lasionycteris noctivagans*)) comprise almost 75% of reported bats killed (Kunz et al. 2007b); b) the majority of collisions occur during the post-breeding or fall migration season (roughly August and September; Gruver 2002; Johnson et al. 2003); and c) the highest reported fatalities occur at wind facilities located along forested ridge tops in the eastern US (Kunz et al. 2007b), although recent studies report relatively high fatalities as well in agricultural regions of Iowa (Jain 2005) and Alberta, Canada (Baerwald 2006).

Some studies at wind-energy facilities have recorded both pre-construction Anabat detections per night and bat mortality once the facility is operational (Table 2). The number of bat calls per night as determined from bat detectors shows a rough correlation with bat mortality, but may be misleading because effort, timing of sampling, species recorded, and detector settings (equipment and locations) varies among studies (Kunz et al. 2007b). The best available estimate of mortality levels at a proposed wind-energy facility involves the evaluation of on-site acoustic bat data, in terms of activity levels, seasonal variation, and species composition, and the topographic features of the project area.

Activity

Bat activity at the SWRA (mean = 7.91 bat passes per detector-night; Table 1) was relatively high compared to that observed at wind-energy facilities in Minnesota and Wyoming, where bat collision mortality was low, but it was much lower than activity recorded at facilities in West Virginia and Tennessee, where bat mortality rates were high (Table 2). Based on the presumed relationship between pre-construction bat activity and post-construction fatalities, we expect bat mortality rates at the SWRA to be greater than the 2.2 bat fatalities/turbine/year reported at Buffalo Ridge, Minnesota, but much lower than the 20.8 fatalities/turbine/year reported at Buffalo Mountain, Tennessee.

Seasonal Variation

The number of bat calls detected per night at the SWRA peaked in late-August/early-September. Activity by hoary bats appeared to peak in mid-September, suggesting that migration of this species through the area occurs at this time of year. However, given the lack of Anabat coverage between September 17 and October 14, it is unknown whether bat activity would continue to abate, or whether subsequent pulses of activity were missed. The absence of bat calls from the detector at the north elevated station between October 15 and 21 suggests that bat activity is low at this time of year. Fatality studies of bats at wind-energy facilities in the US have shown a peak in mortality in August and September, and generally lower mortality earlier in the summer

(Johnson 2005). While survey efforts vary among different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007b). Based on the available data, it is expected that bat mortality at the SWRA will be highest in late August/early September, with an undetermined potential for mortality in late September/early October.

Species Composition

Of the fourteen species of bat likely to occur in the study area, five are known fatalities at wind-energy facilities (Table 3). Acoustic bat surveys were unable to determine bat species present in the study area (except for hoary bat), but they were able to distinguish high-frequency from low-frequency species. Bat passes at the SWRA were fairly evenly distributed between high- and low-frequency species. Fifty-five percent of passes were by high-frequency bats, suggesting higher relative abundance of species such as western red bat and *Myotis* species. High-frequency species were detected more often than low-frequency species at the ground stations, whereas the reverse was true at the north elevated station. This pattern may reflect different foraging strategies among species. Many of the low-frequency species likely to be present at the SWRA (e.g., hoary bat, silver-haired bat, and big brown bat (*Eptesicus fuscus*)) tend to forage at higher altitudes than most high-frequency species, due to their wing morphology and echolocation call structure (Norberg and Rayner 1987). Hoary bats made up 10% of all low-frequency passes at the SWRA, and were most active in mid-September, suggesting fall migration through the area.

REFERENCES

Arnett, E.B. 2007. Report from BWEC on Collaborative Work & Plans. Presentation at the NWCC Wildlife Workgroup Meeting, Boulder Colorado. November 14th, 2007. Conservation International. Information available at [www.nationwind.org].

Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships Between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Prepared for the Bats and Wind Energy Cooperative. March 2005.

Baerwald, E. 2006. Bat Fatalities in Southern Alberta. Presented at the Wildlife Research Meeting VI, San Antonio, Texas. National Wind Coordinating Collaborative. November 2006.

Bat Conservation International, Inc. (BCI). 2002. Bat Species: U.S. Bats. Bat Conservation International, Inc., Austin, Texas. Information available at [www.batcon.org].

Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. Thesis. University of Tennessee, Knoxville, Tennessee.

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the Importance of Articulating Assumptions When Conducting Acoustic Studies of Habitat Use by Bats. Wildlife Society Bulletin 31: 45-61.

Gruver, J.C. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas Game & Fish Commission and US Fish and Wildlife Service, Arkansas.

Hayes, J.P. 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78: 514-524.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis., Iowa State University, Aimes, Iowa.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2003. Mortality of Bats at a Large-Scale Wind Power Development at Buffalo Ridge, Minnesota. The American Midland Naturalist 150: 332-342.

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32: 1278-1288.

Koford, R., A. Jain, G. Zenner. 2005. Avian Mortality Associated with the Top of Iowa Wind Farm. Progress Report, Calendar Year 2004. Iowa State University and Iowa Department of Natural Resources.

Kunz, T. H., E. B. Arnett, B. M. Cooper, W. P. Erickson, R. P. Larkin, T. Mabee, M. L. Morrison, M. D. Strickland, and J. M. Szewczak. 2007a. Assessing Impacts of Wind-energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management 71:2449-2486.

Kunz, T. H., E.B Arnett, W P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007b. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecology and the Environment 5:315-324.

Norberg, U.M. and J.M.V. Rayner. 1987. Ecological Morphology and Flight in Bats (Mammalia: Chiroptera): Wing Adaptations, Flight Performance, Foraging Strategy and Echolocation. Philosophical Transactions of the Royal Society of London B 316:335-427.

O'Shea, T.J., M.A. Bogan, and L.E. Ellison. 2003. Monitoring Trends in Bat Populations of the United States and Territories: Status of the Science and Recommendations for the Future. Wildlife Society Bulletin 31:16-29.

White, E.P. and S.D. Gehrt. 2001. Effects of Recording Media on Echolocation Data from Broadband Bat Detectors. Wildlife Society Bulletin 29: 974-978.

Table 1. Results of bat acoustic surveys conducted at SWRA, August 20 – October 21, 2007.

Anabat Location	# of HF Bat Passes	# of LF Bat Passes*	# of Hoary Bat Passes	Total Bat Passes	Detector-Nights	Bat Passes/ Night
North ground	126	84	0	210	18	11.67
North elevated	4	38	4	42	17	2.47
South ground	60	36	16	96	10	9.60
Total	**126**	**239**	**66**	**348**	**45**	**7.91**

*Passes by hoary bats are included in low-frequency numbers

Table 2. Wind-energy facilities in the US with both pre-construction Anabat sampling data and post-construction mortality data for bat species (adapted from Kunz et al. 2007b).

Wind-Energy Facility	Activity (#/Detector Night)	Mortality (Bats/Turbine/Year)	Reference
Saddleback, WA	7.91		This study
Foote Creek Rim, WY	2.2	1.3	Gruver 2002
Buffalo Ridge, MN	2.1	2.2	Johnson et al 2004
Buffalo Mountain, TN	23.7	20.8	Fiedler 2004
Top of Iowa, IA	34.9	10.2	Koford et al. 2005
Mountaineer, WV	38.3	38.0	Arnett et al. 2005

Table 3. Bat species determined from range-maps (Harvey et al. 1999; BCI website) as likely to occur within the SWRA, sorted by call frequency.

High-Frequency (≥ 35 kHz)		**Low Frequency (< 35 kHz)**	
western red bat†	*Lasiurus blossevillii*	pallid bat	*Antrozous pallidus*
California bat	*Myotis californicus*	Townsend's big-eared bat	*Corynorhinus townsendii*
western small-footed bat	*Myotis ciliolabrum*	big brown bat†	*Eptesicus fuscus*
western long-eared bat	*Myotis evotis*	hoary bat*†	*Lasiurus cinereus*
Keen's bat	*Myotis keenii*	silver-haired bat*†	*Lasionycteris noctivagans*
little brown bat†	*Myotis lucifugus*		
fringed bat	*Myotis thysanodes*		
long-legged bat	*Myotis volans*		
Yuma bat	*Myotis yumanensis*		

*long-distance migrant; †species known to have been killed at wind-energy facilities

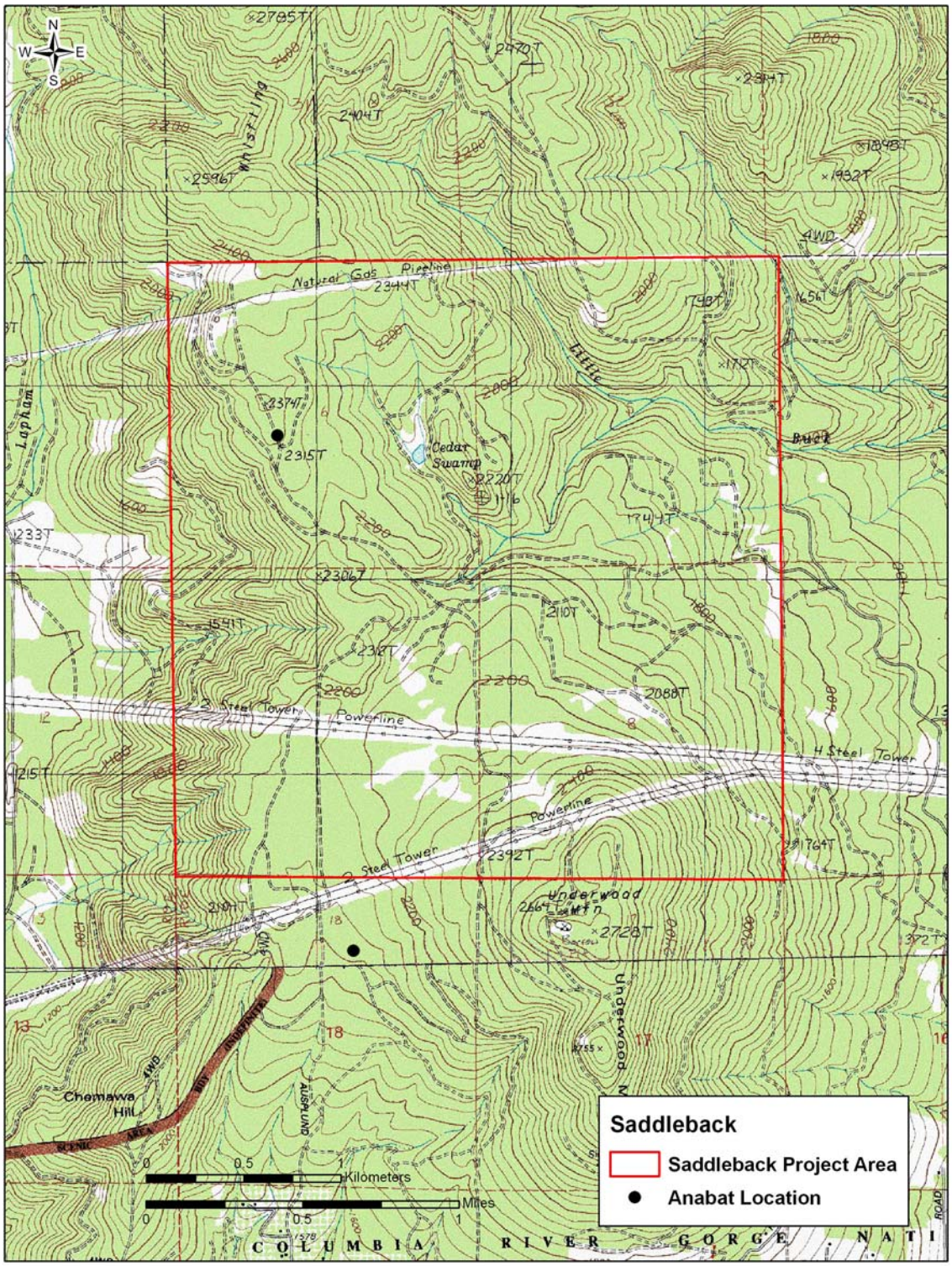


Figure 1. Study area map showing project area and Anabat sampling stations at the SWRA.

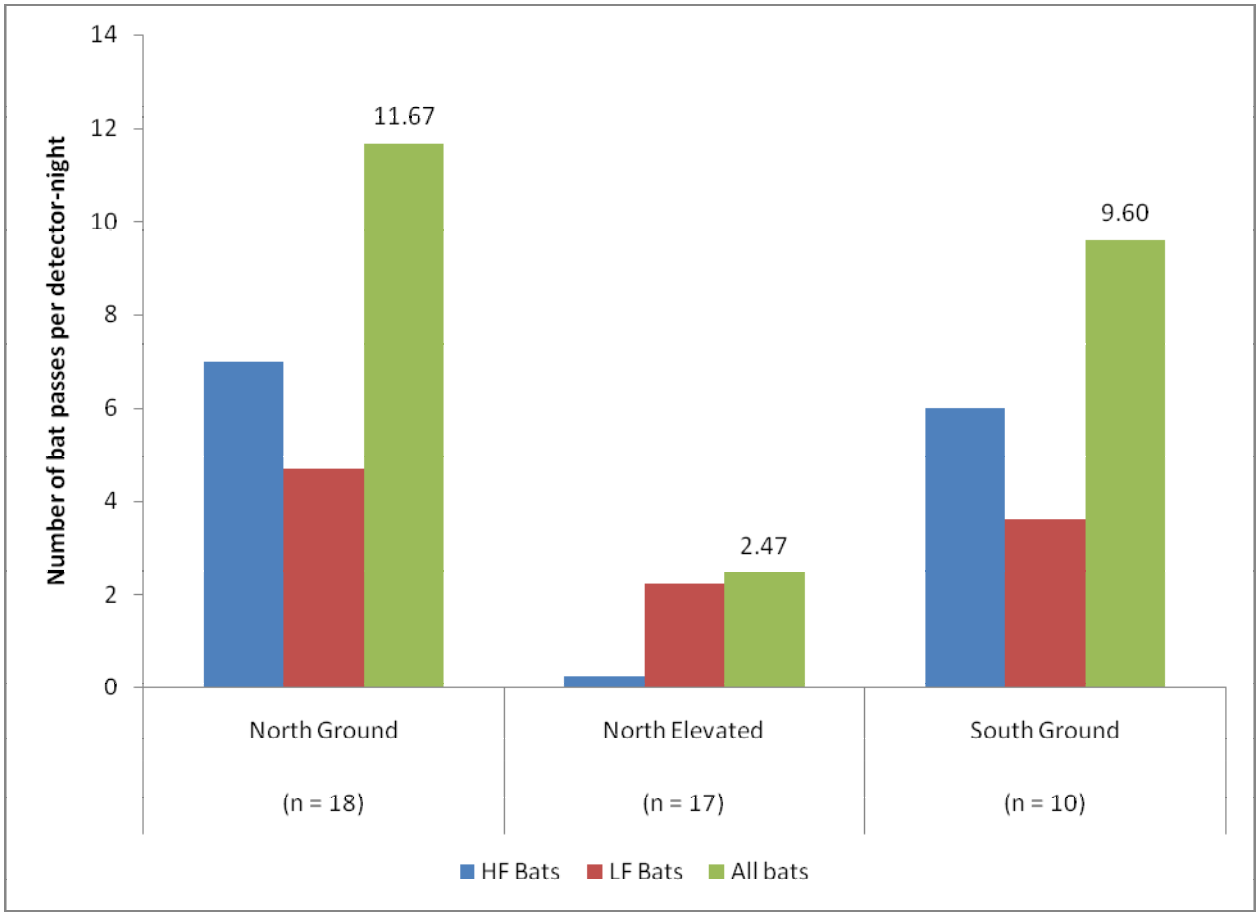


Figure 2a. Number of bat passes per detector-night by location at the SWRA.

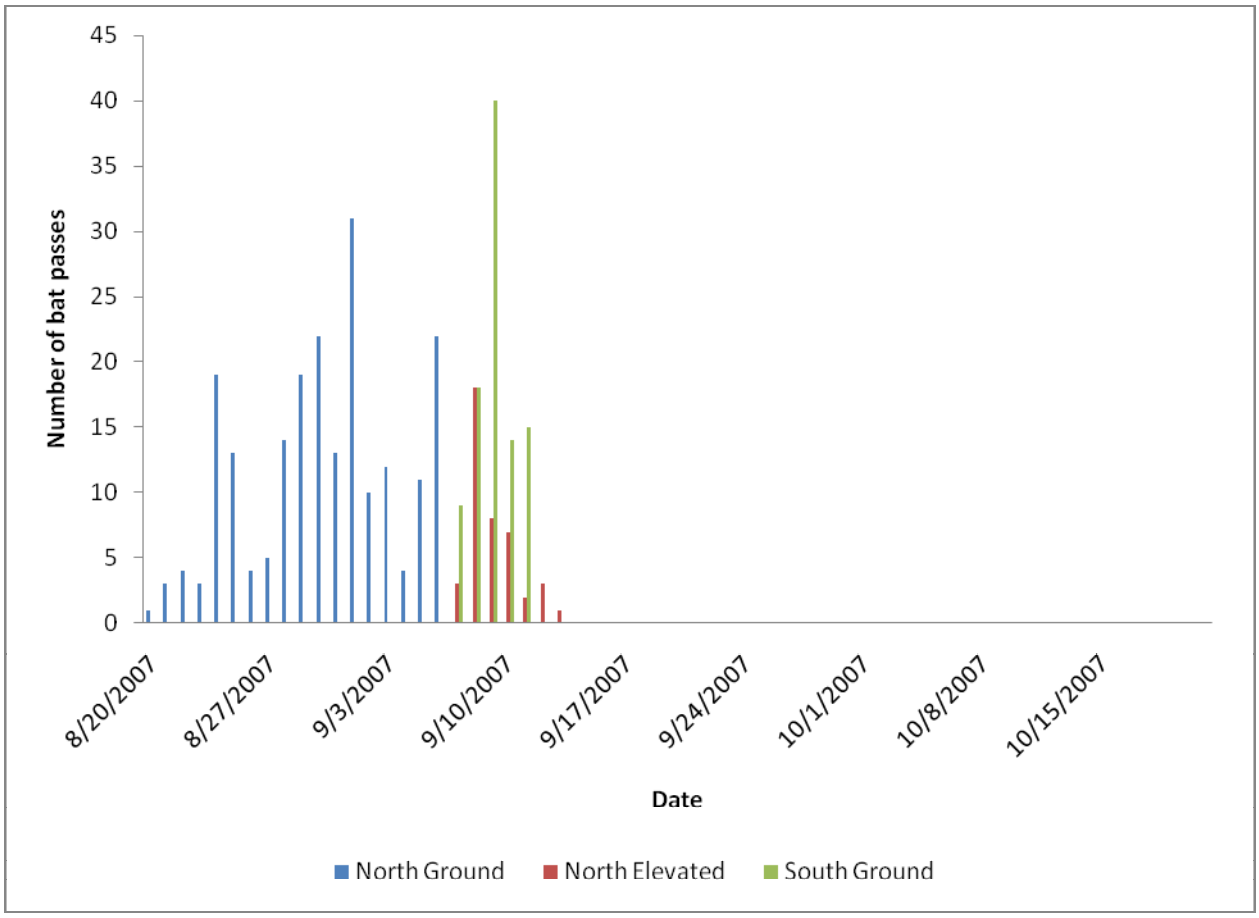


Figure 2b. Number of nightly bat passes, grouped by Anabat location, at the SWRA.

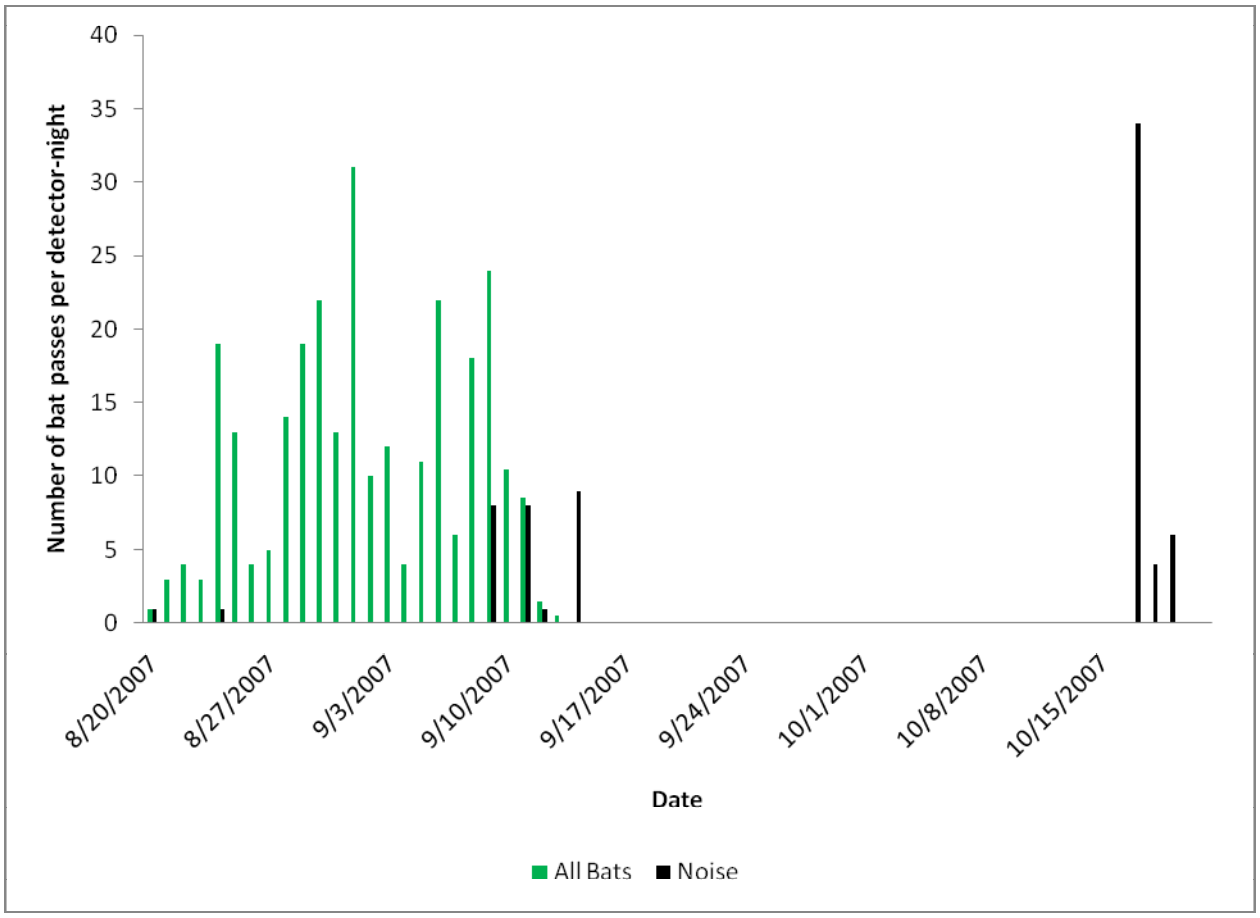


Figure 3. Number of bat passes and noise files detected per detector–night, presented nightly, at the SWRA.

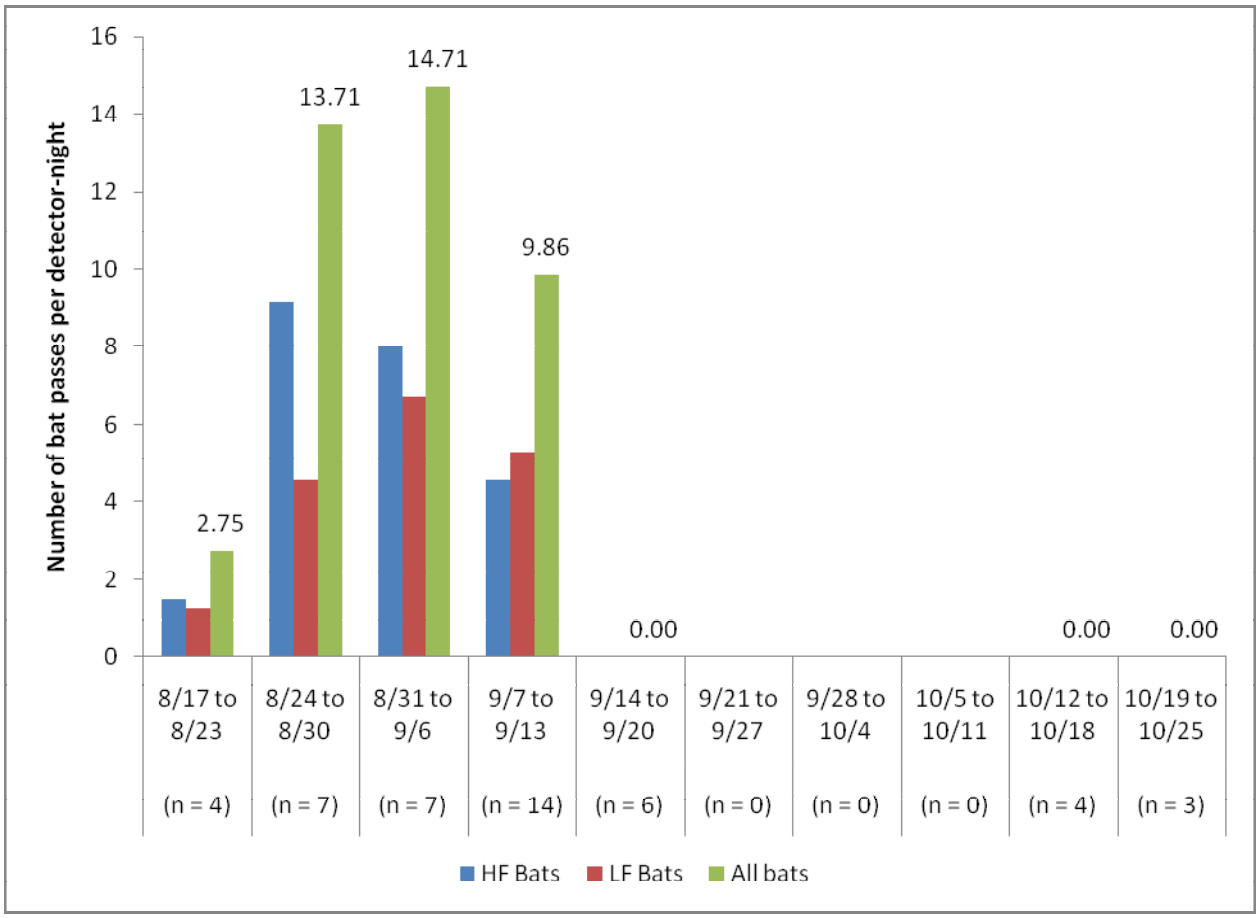


Figure 4a. Weekly activity by high- and low-frequency bats at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.)

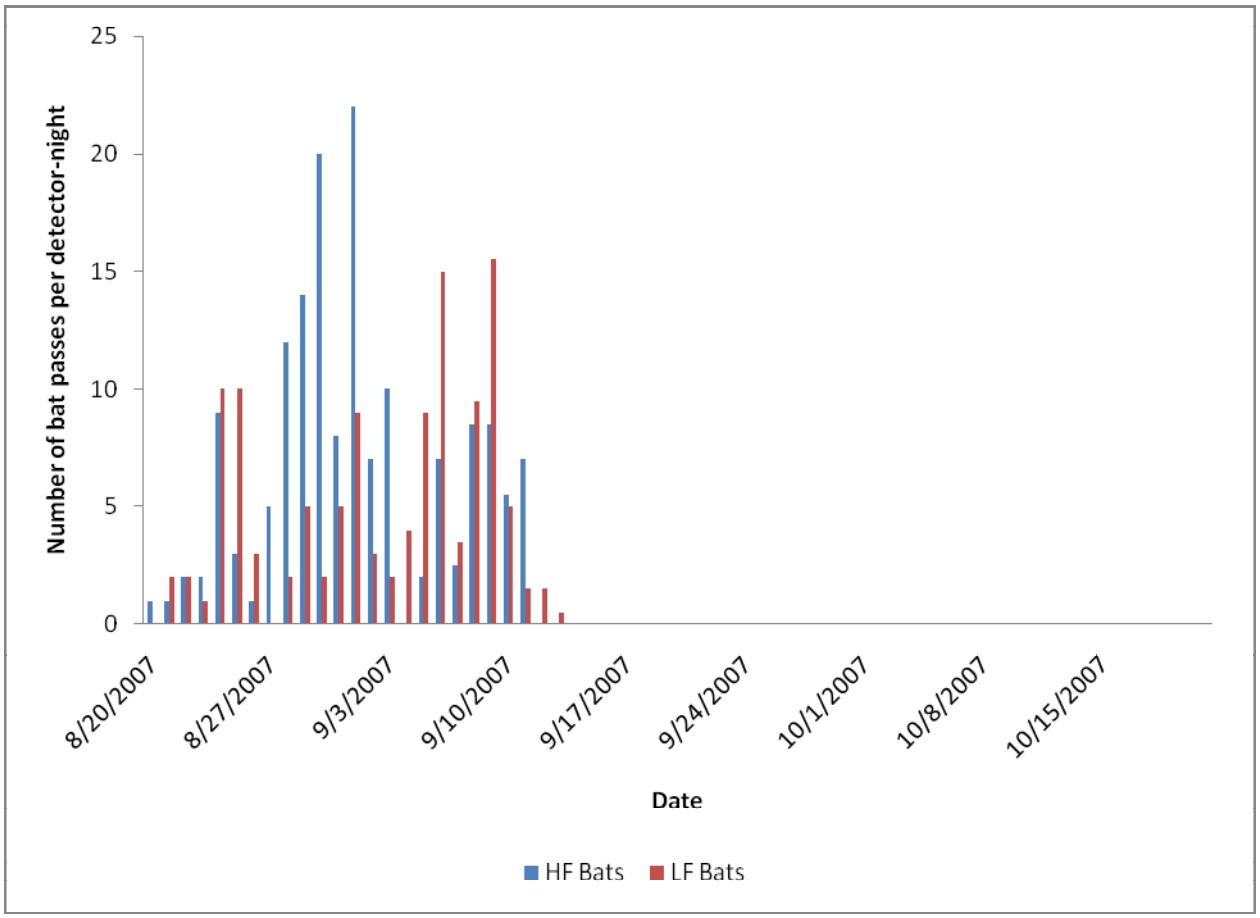


Figure 4b. Nightly activity by high- and low-frequency bats at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.)

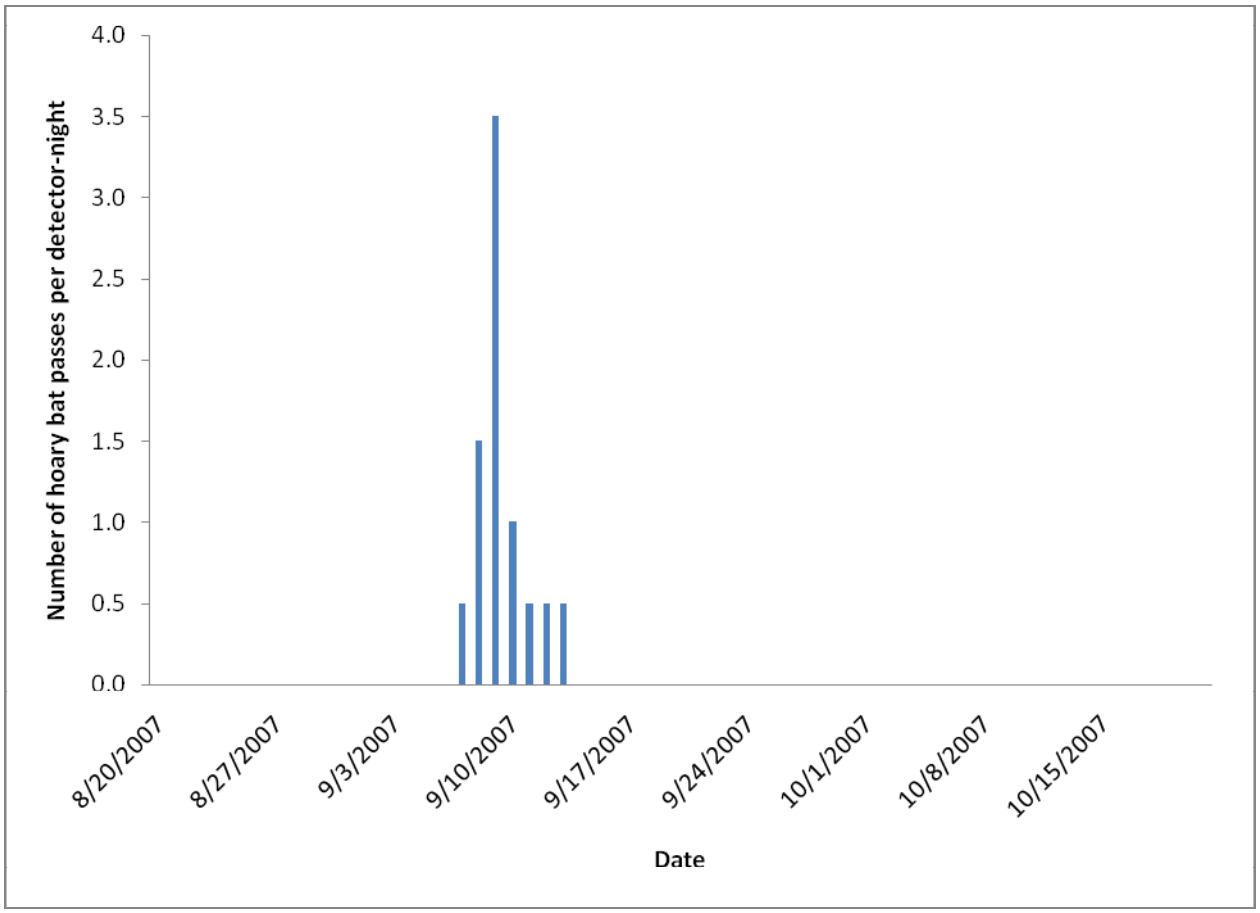


Figure 5. Number of passes per detector–night by hoary bats, presented nightly, at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.)

C-9

Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, July 3 – October 7, 2008. Prepared for SDS Lumber Company

WEST, Inc. 2009.

Final Report

Bat Acoustic Studies for the Saddleback Wind Resource Area Skamania County, Washington

July 3 – October 7th, 2008

Prepared for:

SDS Lumber Company
P.O. Box 266
Bingen, WA 98605

Prepared by:

Greg Johnson, Jeff Gruver, Tamara Enz and Jerry Baker

Western **E**co**S**ystems **T**echnology, Inc.
2003 Central Avenue
Cheyenne, Wyoming

WEST, Inc.

January 28, 2009

EXECUTIVE SUMMARY

Western EcoSystems Technology, Inc. initiated surveys in July 2008 designed to assess bat use within the proposed Saddleback Wind Resource Area, Skamania County, Washington. Acoustic surveys for bats using Anabat® SD-1 ultrasonic detectors at four fixed stations were conducted from July 3 to October 7, 2008. The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the study area by bats. A total of 56,595 bat passes were recorded during 97 detector nights. Averaging bat passes per detector-night across locations, we detected a mean of 148.34 bat passes per detector-night across all stations.

Three stations were placed in upland areas typical of those likely to contain wind turbines. Data from these three detectors were used to assess risk of bat collision mortality. A fourth detector was placed adjacent to a pond in the local area to assess levels bat activity and composition of primarily breeding bats in the project area.

At the three upland stations, over 65% of the calls were <35 kHz in frequency (e.g., big brown bat, silver-haired bat, hoary bat), and the remaining calls were >35 kHz (e.g., *Myotis* bat species). Species identification was only possible for the hoary bat, which made up 6.0% of all passes at the upland stations. At the wetland station (SB2), 69.7% of all passes were >35 kHz and hoary bats composed 2.0% of all recorded bat passes. Activity levels for bat passes both the upland stations and wetland station peaked in July and early August. Activity levels for hoary bats were highest in July, suggesting the project area is used more for breeding by this species than as a migration corridor.

The mean number of bat passes per detector per night was compared to existing data at five wind-energy facilities where both bat activity and mortality levels have been measured. The level of bat activity documented at the Saddleback Wind Resource Area was considerably higher than that at wind facilities in Minnesota and Wyoming, where reported bat mortalities are low, and was also higher than at facilities in the eastern US, where reported bat mortality is highest.

Although high bat activity levels were recorded at the Saddleback Wind Resource Area, the available evidence indicates that these data do not necessarily imply that bat fatality levels will be high. Numerous factors, including the timing of the activity, differences in call rates among the various habitats, and composition of the bat calls suggest that bat mortality may be lower than indicated by the high bat activity recorded. No data on bat mortality levels associated with wind energy developments in western coniferous forests are available to help predict risk to bats at the Saddleback Wind Resource Area. Bat fatality patterns may differ from those in open habitats as well as in eastern deciduous forests.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
INTRODUCTION 4
STUDY AREA 4
METHODS 4
Bat Acoustic Surveys 4
Statistical Analysis 5
Bat Acoustic Surveys 5
RESULTS 5
Bat Acoustic Surveys 5
Spatial Variation 6
Temporal Variation 6
Species Composition 6
DISCUSSION 7
Potential Impacts 7
Activity 7
Spatial Variation 7
Temporal Variation 8
Species Composition 8

LIST OF TABLES

Table 1. Bat species determined from range-maps (Harvey et al. 1999; BCI website) as likely to occur within the SWRA, sorted by call frequency. 14
Table 2. Results of bat acoustic surveys conducted at SWRA, July 3, 2008 - October 7, 2008 15
Table 3. Results of bat acoustic surveys conducted at SWRA, July 3, 2008 - October 7, 2008 15
Table 4. Wind-energy facilities in the U.S. with both pre-construction AnaBat sampling data and post-construction mortality data for bat species (adapted from Kunz et al. 2007*b*). 16

LIST OF FIGURES

Figure 1. Anabat sampling locations at the Saddleback Wind Resource Area. 17
Figure 2. Number of Anabat detectors (n = 3) at the Saddleback Wind Resource Area operating during each night of the study period July 3 – October 7, 2008. 18
Figure 3. Number of Anabat detectors at wetland station SB2, operating during each night of the study period July 3 – October 7, 2008. 19
Figure 4. Number of bat passes per detector-night at upland Anabat locations at the Saddleback Wind Resource Area for the study period July 3 – October 7, 2008 20

Figure 5. Number of bat passes per detector-night at Anabat wetland location SB2 for the study period July 3 – October 7, 2008. 21
Figure 6. Number of nightly bat passes by station for the study period July 3 – October 7, 2008....22
Figure 7. Number of nightly bat passes at wetland station SB2 for the study period July 3 – October 7, 2008....23
Figure 8. Nightly activity by high-frequency (HF) and low-frequency (LF) bats at upland stations at the Saddleback Wind Resource Area for the study period July 3 – October 7, 2008....24
Figure 9. Nightly activity by high-frequency (HF) and low-frequency (LF) bats at wetland station SB2 for the study period July 3 – October 7, 2008. 25
Figure 10. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at upland stations for the study period July 3 – October 7, 2008. 26
Figure 11. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at wetland station SB2 for the study period July 3 – October 7, 2008. 27
Figure 12. Number of passes per detector–night by hoary bats at upland Anabat stations at the Saddleback Wind Resource Area, for the study period July 3 – October 7, 2008....28
Figure 13. Number of passes per detector–night by hoary bats at Anabat wetland station SB2 for the study period July 3 – October 7, 2008....29
Figure 14. Number of passes per detector–night by hoary bats at upland stations at the Saddleback Wind Resource Area, presented nightly for the study period July 3 – October 7, 2008....30
Figure 15. Number of passes per detector–night by hoary bats at wetland station SB2, presented nightly for the study period July 3 – October 7, 2008....31

INTRODUCTION

SDS Lumber Company is proposing to develop a wind-energy facility in Skamania County, Washington. SDS Lumber requested Western EcoSystems Technology, Inc. (WEST) to develop and implement a standardized protocol for baseline studies of bat use in the project area for the purpose of estimating the impacts of the wind-energy facility on bats, and to assist with siting turbines to minimize impacts to bats. The protocol for the baseline study is similar to protocols used at other wind-energy facilities in the United States. The protocol has been developed based on WEST's experience studying wildlife and wind turbines at projects throughout the US and included passive acoustic sampling using Anabat bat detectors at fixed stations to quantify bat use in the study area.

STUDY AREA

The proposed project area is in southeast Skamania County approximately four miles northwest of White Salmon, Washington (Figure 1). The specific project area is just north of Underwood Mountain and includes Sections 5, 6, 7, & 8, Township 3N, Range 10E. The project area consists of hilltops dominated by coniferous forests with some clearcuts and linear clearings associated with powerline rights-of-way. Elevation of the project area ranges from approximately 1700′ – 2400′.

METHODS

Bat Acoustic Surveys

The objective of the bat use surveys was to estimate the seasonal and spatial use of the SWRA by bats. Bats were surveyed using Anabat® SD-1 bat detectors (Titley Electronics Pty Ltd., NSW, Australia). Bat detectors are a recommended method to index and compare habitat use by bats. The use of bat detectors for calculating an index to bat impacts has been used at several wind-energy facilities (Kunz et al. 2007*a*), and is a primary and economically feasible bat risk assessment tool (Arnett 2007). Bat activity was surveyed using four detectors from July 3 to October 7, 2008, a period corresponding to summer breeding and fall bat migration at this site. Detectors were placed at four locations (Figure 1).

One detector (SB2) was placed at a wetland in the project area to assess activity levels and composition of local, breeding bats in the project area. This is a standard practice for evaluating local bat use of a project area when bat concentration areas such as wetlands or ponds are present. These data were not, however, used to assess risk to bats of collision mortality. The other three detectors were placed in upland areas typical of proposed turbine locations in the project area. One of these detectors (SB3) was placed at a linear clearing created for a road through coniferous forest, and the other two (SB1 and SB4) were placed within clear cuts in the project area.

Anabat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a

predetermined ratio. A division ratio of 16 was used for the study. Bat echolocation detectors also detect other ultrasonic sounds made by insects, raindrops hitting vegetation, and other sources. A sensitivity level of six was used to reduce interference from these other sources of ultrasonic noise. Calls were recorded to a compact flash memory card with large storage capacity. The Anabat detectors were placed inside plastic weather-tight containers with a hole cut in the side of the container for the microphone to extend through. Microphones were encased in PVC tubing with drain holes that curved skyward at 45 degrees outside the container to minimize the potential for water damage due to rain. Containers were raised approximately 1 m off the ground to minimize echo interference and lift the unit above vegetation. All units were programmed to turn on each night approximately one half-hour before sunset and to turn off approximately one half-hour after sunrise.

Statistical Analysis

Bat Acoustic Surveys

The units of activity were number of bat passes (Hayes, 1997). A pass was defined as a continuous series of less than or equal to two call notes produced by an individual bat with no pauses between call notes of less than one second (White and Gehrt 2001, Gannon et al. 2003). In this report, the terms bat pass and bat call are used interchangeably. The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights. Bat calls were classified as either high-frequency calls ($\geq$ 35 kHz) that are generally given by small bats (e.g. *Myotis* spp.) or low-frequency calls (< 35 kHz) that are generally given by larger bats (e.g. silver-haired bat [*Lasionycteris noctivagans*], big brown bat [*Eptesicus fuscus*], hoary bat [*Lasiurus cinereus*]). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis. To establish which species may have produced the high- and low-frequency calls recorded, a list of species expected to occur in the study area was compiled from range maps (Table 1; Harvey et al. 1999, BCI website).

The total number of bat passes per detector night was used as an index of bat use in the SWRA. Bat pass data represented levels of bat activity rather than the numbers of individuals present because individuals could not be differentiated by their calls. To predict potential for bat mortality (i.e. low, moderate, high), the mean number of bat passes per detector night (averaged across those monitoring stations placed in upland habitats) was compared to existing data from wind-energy facilities where both bat activity and mortality levels have been measured.

RESULTS

Bat Acoustic Surveys

For the combined upland locations, bat activity was monitored at three sampling locations over a total of 97 nights during the period July 3 to October 7, 2008. Anabat units were operable for 95.5% of the sampling period (Figure 2), recording 39,326 bat passes on 278 detector-nights (Table 2). Bat activity at the wetland location (SB2) was also monitored for a total of 97 nights

during the period of July 3 to October7, 2008. This unit was operable for 100% of the sample period (Figure 3), recording 17,269 bat passes on 97 detector nights (Table 3). Averaging bat passes per detector-night across the upland locations (SB1, SB3, and SB4), we detected a mean of 138.44 bat passes per detector-night. The wetland station (SB2) recorded an average of 178.03 bat passes per detector-night.

Spatial Variation

Bat activity varied among upland Anabat units SB1, SB3 and SB4 in the SWRA (mean = 138.44 bat passes per detector-night; Figures 1, 4). A total of 80.7% of all bat passes (mean = 327.25 bat passes per detector-night) was recorded at station SB3, located along a linear clearing in a forested situation, while activity recorded at stations SB1 and SB4, located in clear cuts, comprised only 19.1% of all bat passes (mean = 14.30 and 73.76, respectively). AnaBat wetland station SB2 recorded a mean of 178.03 bat passes per detector-night (Figures 1, 5).

Temporal Variation

Bat activity was highest at the three upland stations throughout the months of July and August, with peak activity occurring between July 10 and July 16 (Figure 6). The greatest activity on a single night occurred on August 4 (1,445 passes). After the third week of August, activity dropped off to much lower levels and remained low for the duration of the study period. Temporal patterns were largely consistent among stations SB3 (road clearing) and SB4 (clear-cut), although SB3 recorded much greater levels of bat activity (Figure 6). The level of bat activity at station SB1 (clear-cut) was relatively consistent across the entire study period. Bat activity at wetland station SB2 was highest during the month of July (Figure 7), with an activity peak on July 5. Bat activity from July 3 through mid-August (mean = 218.6/detector night) was over four times higher than activity from mid-August through October 7 (mean = 52.3; Figures 10 and 11).

Species Composition

At the combined upland stations, passes by low-frequency bats (LF; 67.0%) outnumbered passes by high-frequency bats (HF; 33.0%). The proportion of HF and LF bat passes was similar among Anabat stations (Figure 8). At wetland station SB2, passes by HF bats (69.7%) outnumbered passes by LF bats (30.3%; Figure 9).

Species identification for specific passes was possible only for the hoary bat; therefore, passes by this species could be separated from passes by other low-frequency bats. Hoary bats comprised 6.0% of total passes detected at the combined upland points, and use among the three stations was similar (Figure 12). Hoary bats comprised 2.0% of total bat passes at the wetland station SB2 (Figure 13). Patterns of hoary bat activity were similar to other bats, with most bat passes occurring in July and early August (Figures 14 and 15).

DISCUSSION

Potential Impacts

Assessing the potential impacts of wind energy development to bats at the SWRA is complicated by our current lack of understanding of why bats die at wind turbines (Kunz et al. 2007b; Baerwald et al. 2008), combined with the inherent difficulties of monitoring elusive, night-flying animals (O'Shea et al. 2003). To date, monitoring studies of wind projects suggest that a) migratory tree-roosting species (eastern red, hoary, and silver-haired bats) comprise almost 75% of reported bats killed, b) the majority of fatalities occur during the post-breeding or fall migration season (roughly August and September), and c) the highest reported fatalities occur at wind facilities located along forested ridge tops in the eastern US (Arnett et al. 2008, Gruver 2002, Johnson et al. 2003, Kunz et al. 2007b), although recent studies in agricultural regions of Iowa and Alberta, Canada, report relatively high fatalities as well (Jain 2005, Baerwald 2006).

Some studies of wind projects have recorded both Anabat detections per night and bat mortality (Tables 4 and 5). The number of bat calls per night as determined from bat detectors shows a rough correlation with bat mortality, but may be misleading because effort, timing of sampling, species recorded, and detector settings (equipment and locations) varies among studies (Kunz et al. 2007*b*). Thus, our best available estimate of mortality levels at a proposed wind project involves evaluation of our on-site bat acoustic data in terms of activity levels, seasonal variation, species composition, and topographic features of the project area.

Activity
Bat activity within the SWRA (mean = 138.4 bat passes per detector-night at combined upland points, 178.0 at the wetland site) was very high compared to that observed at facilities in Minnesota and Wyoming, where bat mortality was low, and it was higher than activity recorded at sites in West Virginia and Tennessee, where bat mortality rates were high (Tables 4 and 5). Thus, based solely on the presumed relationship between pre-construction bat activity and post-construction fatalities, bat mortality rates at SWRA may be higher than many other wind resource areas in the U.S.

Spatial Variation
The proposed wind-energy facility is not located near any large, known bat colonies or other features that are likely to attract large numbers of bats. The nearest known bat hibernaculum is near Trout Lake, located nearly 20 miles north of the SWRA (B. Weiler, WDFW, pers. commun.). The SWRA also does not contain unique topographic features that may funnel migrating bats. The highest bat mortality rates documented at wind energy facilities have been on forested ridgetops in the eastern US. However, the relatively large numbers of bat fatalities recently reported in northern Iowa (Jain 2005) and southwestern Alberta (Baerwald 2006) indicate that an open landscape is also no guarantee of low mortality.

Activity was relatively high at stations SD2 and SD3 compared to other stations, accounting for the majority of the calls recorded during this study. Station SD2 was located adjacent to a wetland, which likely attracts bats for drinking and foraging opportunities. Station SD3 was located in a road clearing through coniferous forest. The linear clearing is likely used as a travel

corridor by local bats in the project area. Bat activity was much lower at the two stations placed within clear cuts.

Temporal Variation

The number of bat calls detected per night at the SWRA was highest during July and early August, with activity peaks between July 10 and July 16. Activity in July and early August likely reflects use of the SWRA by local bats during the reproductive season, when pups are being weaned and foraging rates are high. Activity beyond mid-August likely represents movement of migrating bats through the area. Activity by hoary bats was also substantially higher in July, and dropped off significantly beginning in early August. After August 31, activity for all bats was very low relative to earlier dates, indicating that most bats had left the area for winter hibernacula or warmer climates. This suggests higher use of the project area by resident populations of hoary bats as well as other bats, rather than bats migrating through the area. Based on these data, it does not appear that migratory bats are concentrating in the project area.

Fatality studies of bats at wind projects in the US have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (Johnson 2005; Arnett et al. 2008). While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007*b*). The highest use of the SWRA occurred in July and early August, prior to the time that most bat mortality occurs at wind resource areas in the Pacific Northwest as well as throughout the US.

Species Composition

Of the fourteen species of bat likely to occur in the study area, three are known fatalities at wind-energy facilities (Table 1). Acoustic bat surveys were unable to determine bat species present in the study area (except for hoary bats), but they were able to distinguish high frequency from low-frequency species. Roughly 65% percent of passes at the combined upland stations were by low-frequency bats, suggesting higher relative abundance of species such as hoary bat, silver-haired bat, or big brown bat, while nearly 70% of bat passes at the wetland station were by high-frequency bats, suggesting a higher relative abundance of species such as *Myotis* spp.

CONCLUSIONS

Although the data collected during this study indicate relatively high use of the project area by bats, bat activity at the SWRA is not uniquely high among wind resource areas. During a recent Anabat echolocation study conducted at the proposed Grayland Wind Resource Area in Pacific County, Washington during the period August 26 – September 12, 2008, a mean of 219.8 bat passes were recorded per detector night (McGraw et al. 2008). At a proposed wind energy facility at Maple Ridge, New York, Reynolds (2004) recorded an average of approximately 165 bat passes per detector night from late June through early July. The Grayland wind energy project has not been constructed, so post-construction fatality estimates are not available. Bat mortality at the Maple Ridge, New York project was estimated at 11.23/MW/year (Jain et al. 2008), much lower than the pre-construction bat activity levels would suggest. The highest bat

mortality recorded at a wind energy facility in North America was at Mountaineer, West Virginia, where it averaged 38 bats/turbine/year. Pre-construction bat activity levels at Mountaineer as determined by Anabat sampling averaged 38.3 bat passes per detector night. These data suggest that high bat activity levels as determined by Anabat sampling may not necessarily equate to high bat mortality levels.

There are several other factors to suggest that even though bat activity is relatively high at the SWRA, this does not necessarily equate to high risk of bat mortality at the site. No turbines will be constructed near wetlands or ponds, and the cleared corridors along turbine strings will not resemble the narrow road path through the timber that also had high bat activity levels. Bat activity levels recorded at clear cuts in the project area were the lowest, averaging 14.3 and 73.8 bat passes/detector-night at these two locations. These areas most closely resemble what the habitat adjacent to turbines will resemble, because vegetation removal would occur in forested areas where the proposed roadway and turbine alignment is planned. The cleared area would extend 50 feet in all directions from each turbine. From a distance of 50 feet to 150 feet from the base of the turbines, tree heights will be limited to 15 feet above the elevation of the base of the turbine. Areas where trees are permanently removed would be replanted with native grasses and low-growing shrubs, and would therefore resemble habitat at existing clear cuts in the project area.

A substantial proportion of the bat calls recorded at the SWRA were made by high frequency species, including 33% of passes at the upland stations and 69.7% of passes at the wetland station. Although some of these calls may have been made by western red bat (*Lasiurus blossevillii*), most of these calls were likely made by *Myotis* species. *Myotis* species are rarely killed at wind energy facilities. At numerous wind resource areas throughout the US, these species have comprised from 0-13.5% of the fatalities, except at one site each in Iowa and Canada, where little brown bats (*Myotis lucifugus*) made up nearly 25% of the fatalities (Arnett et al. 2008). *Myotis* species are rarely found at other projects in the Pacific Northwest. Of 337 bat fatalities collected at existing wind-energy facilities in eastern Oregon and Washington, 320 (95.8%) were low frequency species, including 152 hoary bats, 163 silver-haired bats, and five big brown bats. Only one species that emits high frequency calls, the little brown bat, has been found as a turbine fatality in the Pacific Northwest, and the eight little brown bats found comprised only 2.4% of the fatalities (Johnson and Erickson 2008). These data indicate that *Myotis* bats are much less susceptible to turbine collisions than species that emit low frequency calls, which are primarily the foliage roosting long-distance migrants (i.e., hoary bat and silver-haired bat).

Another important factor to take into consideration is the timing of bat activity recorded at the SWRA. Bat activity from early July through mid-August 2008 was over four times higher than activity from mid-August through early October. Bat activity was also monitored at three sampling locations in the SWRA during the period August 20 – October 21, 2007 (Solick et al. 2008). Anabat units recorded 348 bat passes on 45 detector-nights, resulting in a mean of 7.91 bat passes per detector-night. Both of these stations were located in upland habitats characteristic of proposed turbine locations. These data support the conclusion that bat activity in the SWRA is low from mid August through October. Therefore, much lower activity levels were documented during the time frame that most bat mortality occurs at wind energy facilities

in the Pacific Northwest, where the peak mortality levels occur from mid-August through September. This time period corresponds with fall migration of the tree bats and dispersal from summer breeding areas to hibernacula for the other species. Bat mortality at wind energy projects throughout the US during the breeding season has been low, as only 4.1% of the fatalities have occurred between May 15 and July 15 (Johnson 2005). At several wind farms studied, low mortality has been documented during the breeding season even though relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003). These data suggest that high bat activity levels during the breeding season do not equate to high bat fatality rates.

Although high bat activity levels were recorded at the SWRA, the available evidence indicates that these data do not necessarily imply that bat fatality levels will be high. Numerous factors, including the timing of the activity, differences in call rates among the various habitats, and species composition of the bat calls suggest that bat mortality may be lower than indicated by the high bat activity recorded. No data on bat mortality levels associated with wind energy developments in western coniferous forests are available to help predict risk to bats at the SWRA. Bat fatality patterns may differ from those in open habitats as well as in eastern deciduous forests.

REFERENCES

Anderson, R.L., M. Morrison, K. Sinclair, and M.D. Strickland. 1999. Studying Wind Energy/Bird Interactions: A Guidance Document. Prepared for Bird Subcommittee and National Wind Coordinating Committee. December 1999 [online]. Available: http://www.nationalwind.org/publications/wildlife/bird99/Bird_booklet.pdf.

Arnett, E. 2007. Report from BWEC on Collaborative Work & Plans. Presentation at the NWCC Wildlife Workgroup Meeting, Boulder Colorado. November 14th, 2007. Conservation International. Information at www.nationwind.org.

Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships Between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Prepared for the Bats and Wind Energy Cooperative. March 2005.

Arnett, E.B., W.K. Brown, W.P. Erickson, J.K. Fieldler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R. Koford, C.P. Nicholson, T.J. O'Connell, M.D. Piorkowski, and R.D. Tankersley, Jr. 2008. Patterns of bat fatalities at wind energy facilities in North America. *Journal of Wildlife Management* 72(1):61-78.

Baerwald, E. 2006. Bat Fatalities in Southern Alberta. Presented at the Wildlife Research Meeting VI, San Antonio, Texas. National Wind Coordinating Collaborative. November 2006.

Baerwald, E.F., G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18(16): R695-R696.

Bat Conservation International, Inc. (BCI). 2002. Bat Species: US Bats. Bat Conservation International, Inc., Austin, Texas. www.batcon.org.

Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. Thesis. University of Tennessee, Knoxville, Tennessee.

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the Importance of Articulating Assumptions When Conducting Acoustic Studies of Habitat Use by Bats. Wildlife Society Bulletin 31: 45-61.

Gruver, J.C. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (Lasiurus cinereus) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas Game & Fish Commission and US Fish and Wildlife Service, Arkansas.

Hayes, J.P. 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78: 514-524.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis., Iowa State University, Aimes, Iowa.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2008. Annual report for the Maple Ridge Wind Power Project: Postconstruction bird and bat fatality study – 2007. Prepared for PPM Energy and Horizon Energy by Curry and Kerlinger, LLC.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D. and W.P. Erickson. 2008. Final report: Avian and bat cumulative impacts associated with wind energy development in the Columbia Plateau Ecoregion of eastern Washington and Oregon. Prepared by WEST, Inc. for the Klickitat County Planning Department, Goldendale, WA.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2003. Mortality of Bats at a Large-Scale Wind Power Development at Buffalo Ridge, Minnesota. The American Midland Naturalist 150: 332-342.

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32: 1278-1288.

Koford, R., A. Jain, G. Zenner. 2005. Avian Mortality Associated with the Top of Iowa Wind Farm. Progress Report, Calendar Year 2004. Iowa State University and Iowa Department of Natural Resources.

Kunz, T. H., E. B. Arnett, B. M. Cooper, W. P. Erickson, R. P. Larkin, T. Mabee, M. L. Morrison, M. D. Strickland, and J. M. Szewczak. 2007a. Assessing Impacts of Wind-energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management, 71:2449-2486.

Kunz, T. H., E.B Arnett, W P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007b. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecology and the Environment 5:315-324.

McGraw, M., T. Dennis, and W. Erickson. 2008. Wildlife baseline study for Grayland Wind Power Project, Pacific County, Washington. Prepared for Coastal Community Action Program by Ecological Land Services and WEST, Inc.

Norberg, U.M. and J.M.V. Rayner. 1987. Ecological Morphology and Flight in Bats (Mammalia: Chiroptera): Wing Adaptations, Flight Performance, Foraging Strategy and Echolocation. Philosophical Transactions of the Royal Society of London B 316:335-427.

O'Shea, T.J., M.A. Bogan, and L.E. Ellison. 2003. Monitoring Trends in Bat Populations of the United States and Territories: Status of the Science and Recommendations for the Future. Wildlife Society Bulletin 31:16-29.

Reynolds, D.S. 2004. Draft report for bat activity and population survey, summer 2004, Flat Rock Wind Power Project. North East Ecological Services, Concord, New Hampshire

Schmidt, E., A.J. Piaggio, C.E. Bock, and D.M. Armstrong. 2003. National Wind Technology Center site environmental assessment: bird and bat use and fatalities – final report NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, Colorado. 21pp.

Solick, D., G. Johnson and J. Baker. 2008. Bat Acoustic Studies for the Saddleback Wind Energy Project, Skamania County, Washington, August 20th – October 21st, 2007. Prepared by WEST, Inc. for SDS Lumber Company.

White, E.P. and S.D. Gehrt. 2001. Effects of Recording Media on Echolocation Data from Broadband Bat Detectors. Wildlife Society Bulletin 29: 974-978.

Table 1. Bat species determined from range-maps (Harvey et al. 1999; BCI website) as likely to occur within the SWRA, sorted by call frequency.

High-frequency (≥ 35 kHz)		Low-frequency (< 35 kHz)	
western red bat	*Lasiurus blossevillii*	big brown bat†	*Eptesicus fuscus*
western long-eared bat	*Myotis evotis*	silver-haired bat*†	*Lasionycteris noctivagans*
long-legged bat	*Myotis volans*	hoary bat*†	*Lasiurus cinereus*
little brown bat†	*Myotis lucifugus*	pallid bat	*Antrozous pallidus*
western pipistrelle	*Parastrellus hesperus*	Townsend's big-eared bat	*Corynorhinus townsendii*
Yuma myotis	*Myotis yumanensis*	fringed myotis**	*Myotis thysanodes*
western small-footed bat**	*Myotis ciliolabrum*		
California bat	*Myotis californicus*		

*long-distance migrant
†species known to have been killed at wind-energy facilities
**species distribution on the edge or just outside project area

Table 2. Results of bat acoustic surveys conducted at SWRA, July 3, 2008 - October 7, 2008.

AnaBat Location	# of HF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night
SB1	677	710	31	1,387	97	14.30
SB3	12,273	19,470	1,856	31,743	97	327.25
SB4	23	6,173	489	6,196	84	73.76
Total	**12,973**	**26,353**	**2,376**	**39,326**	**278**	**138.44**

***Data for hoary bat passes is included in LF bat passes**

Table 3. Results of bat acoustic surveys conducted at SWRA, July 3, 2008 - October 7, 2008.

AnaBat Location	# of HF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night
SB2	12,030	5,239	338	17,269	97	178.03
Total	**12,030**	**5,239**	**338**	**17,269**	**97**	**178.03**

*Data for hoary bat passes is included in LF bat passes

Table 4. Wind-energy facilities in the U.S. with both pre-construction AnaBat sampling data and post-construction mortality data for bat species (adapted from Kunz et al. 2007*b*).

Wind-Energy Facility	Activity (#/detector night)	Mortality (bats/turbine/year)	Reference
Saddleback, WA (upland stations)	138.4		This study
Foote Creek Rim, WY	2.2	1.3	Gruver 2002
Buffalo Ridge, MN	2.1	2.2	Johnson et al 2004
Buffalo Mountain, TN	23.7	20.8	Fiedler 2004
Top of Iowa, IA	34.9	10.2	Jain 2005
Mountaineer, WV	38.3	38	Arnett et al. 2005

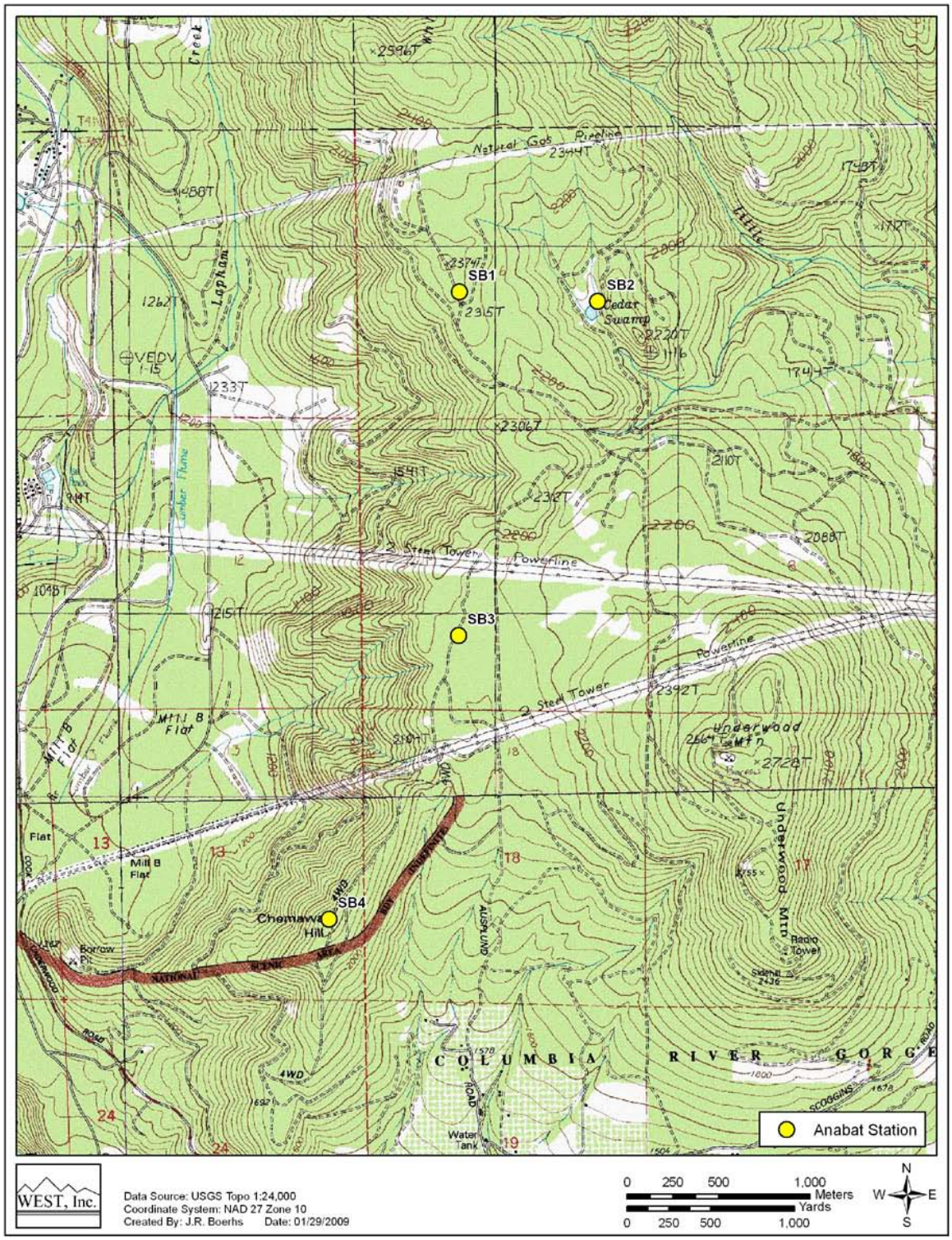


Figure 1. Anabat sampling locations at the Saddleback Wind Resource Area.

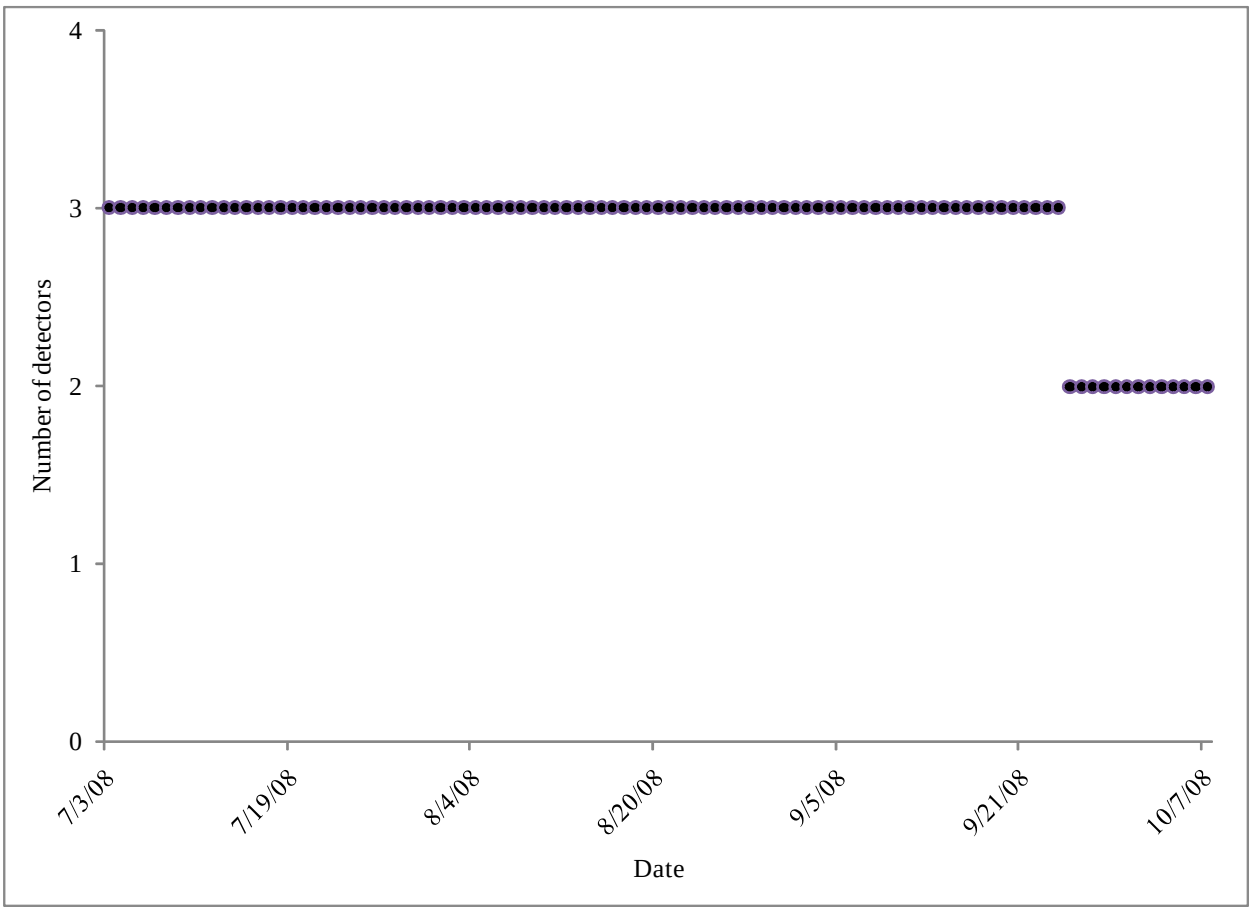


Figure 2. Number of Anabat detectors (n = 3) at the Saddleback Wind Resource Area operating during each night of the study period July 3 – October 7, 2008.

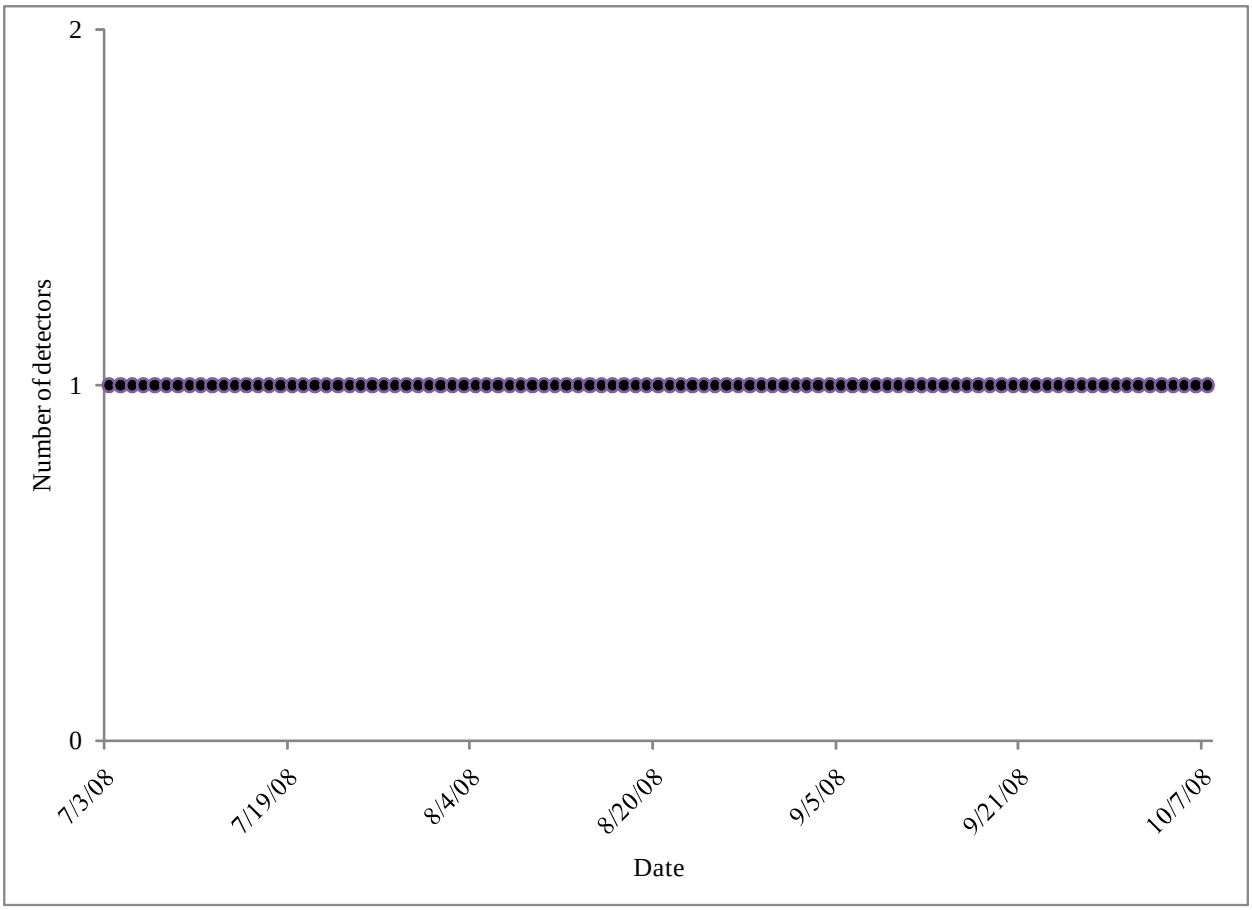


Figure 3. Number of Anabat detectors at wetland station SB2, operating during each night of the study period July 3 – October 7, 2008.

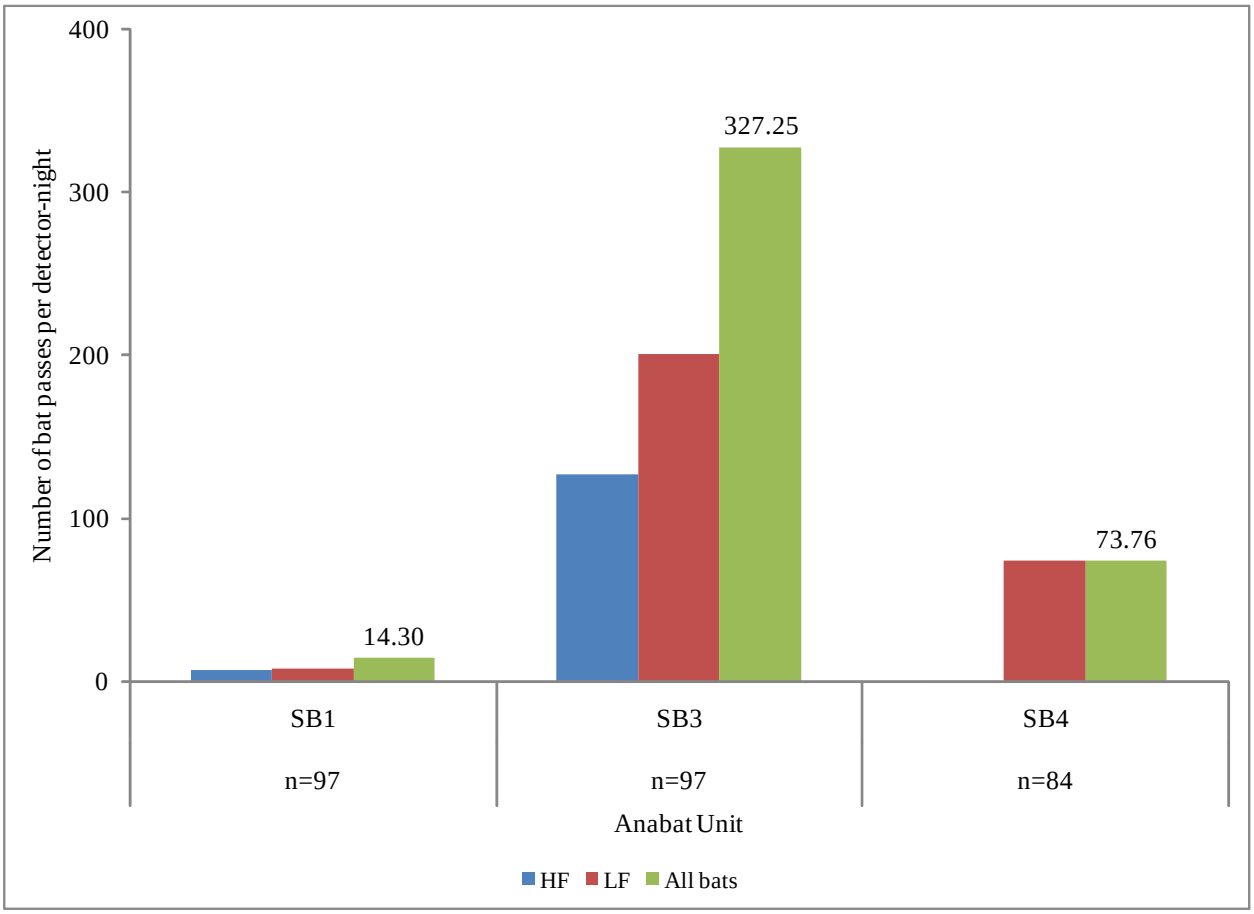


Figure 4. Number of bat passes per detector-night at upland Anabat locations at the Saddleback Wind Resource Area for the study period July 3 – October 7, 2008.

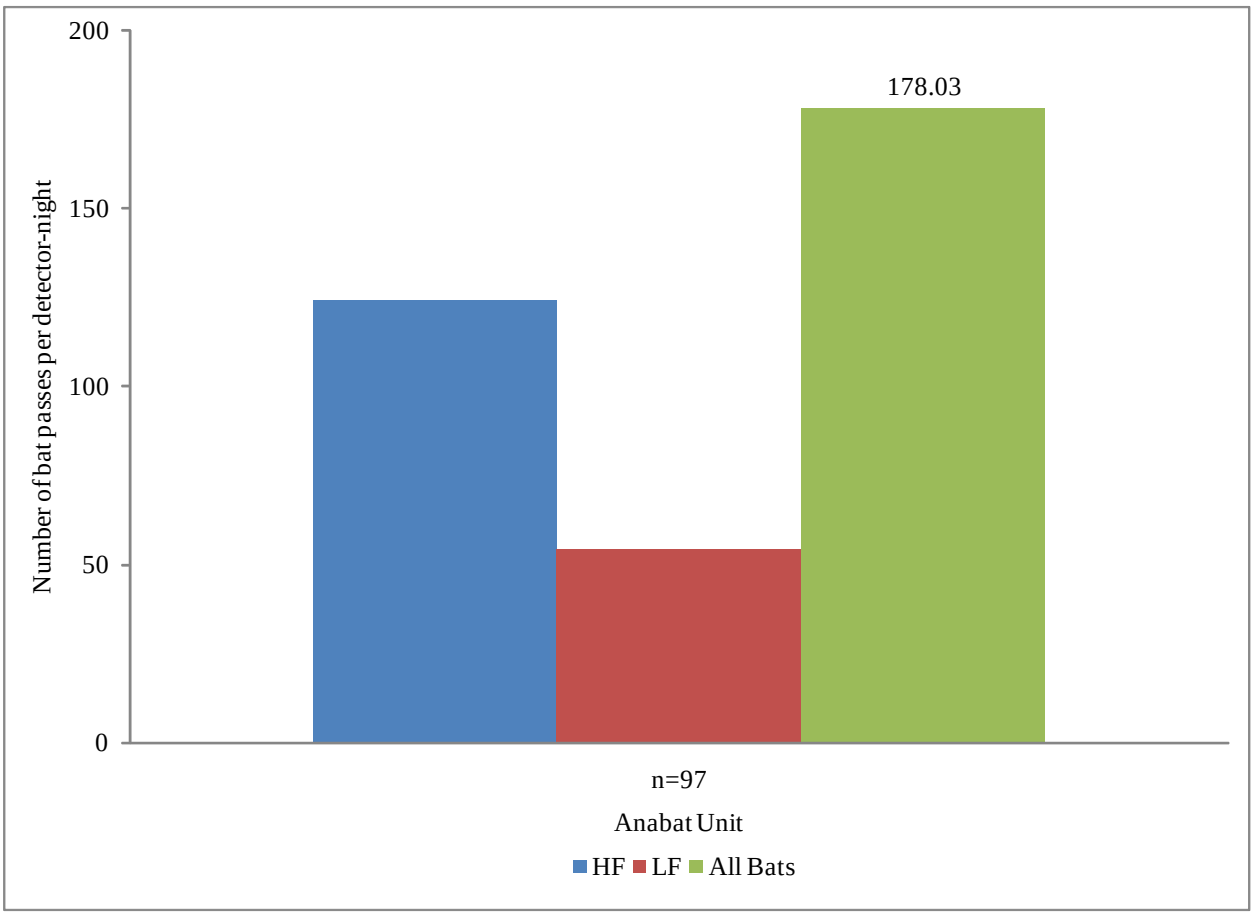


Figure 5. Number of bat passes per detector-night at Anabat wetland location SB2 for the study period July 3 – October 7, 2008.

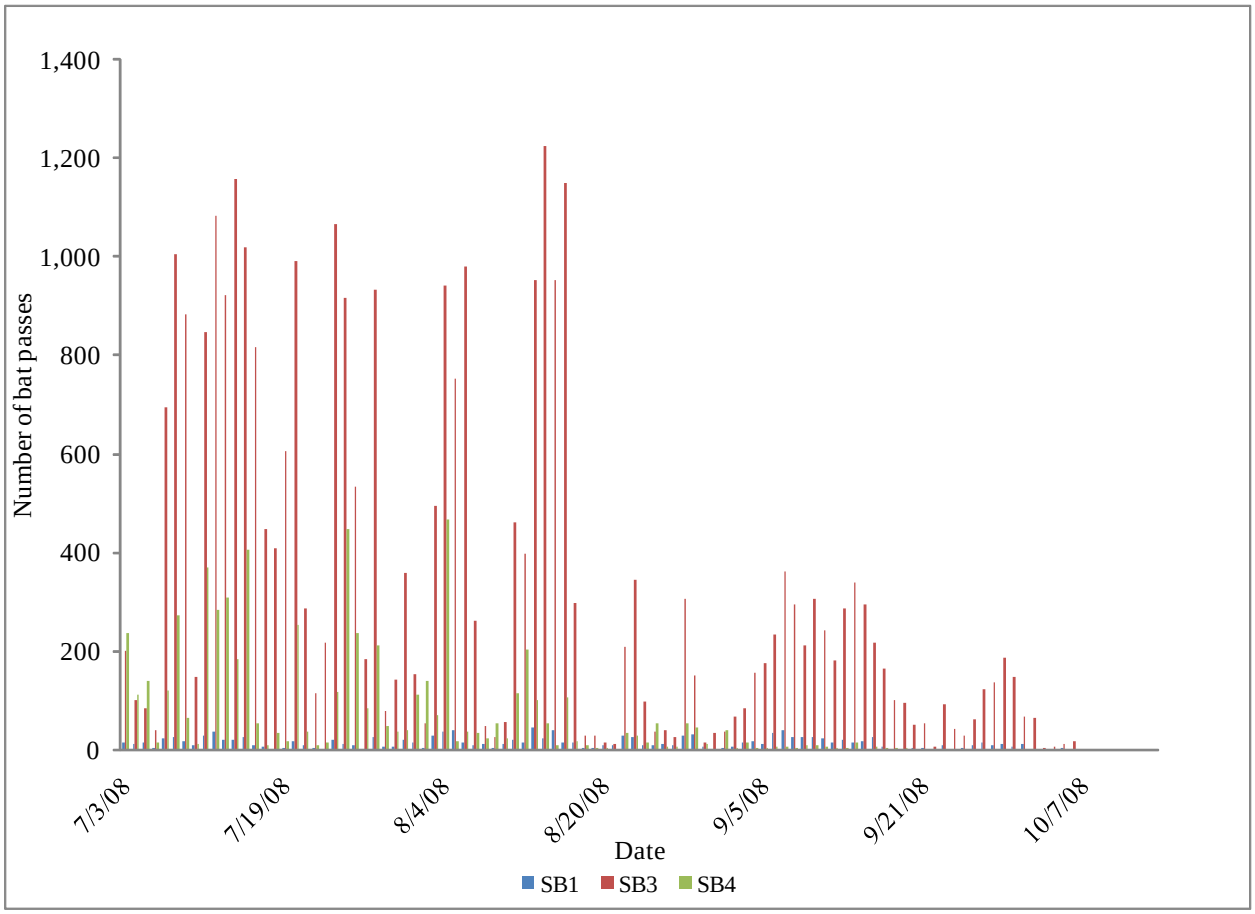


Figure 6. Number of nightly bat passes by station for the study period July 3 – October 7, 2008.

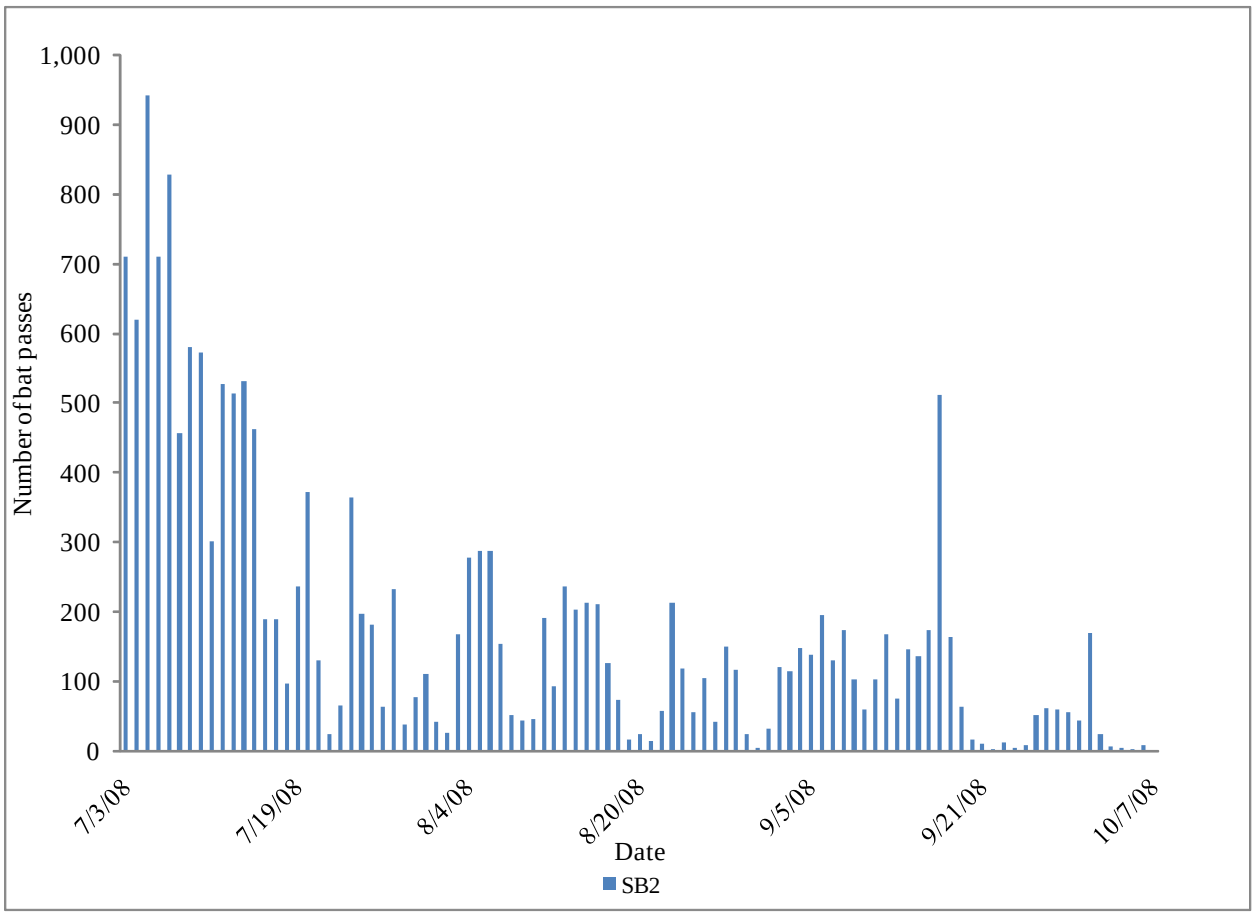


Figure 7. Number of nightly bat passes at wetland station SB2 for the study period July 3 – October 7, 2008.

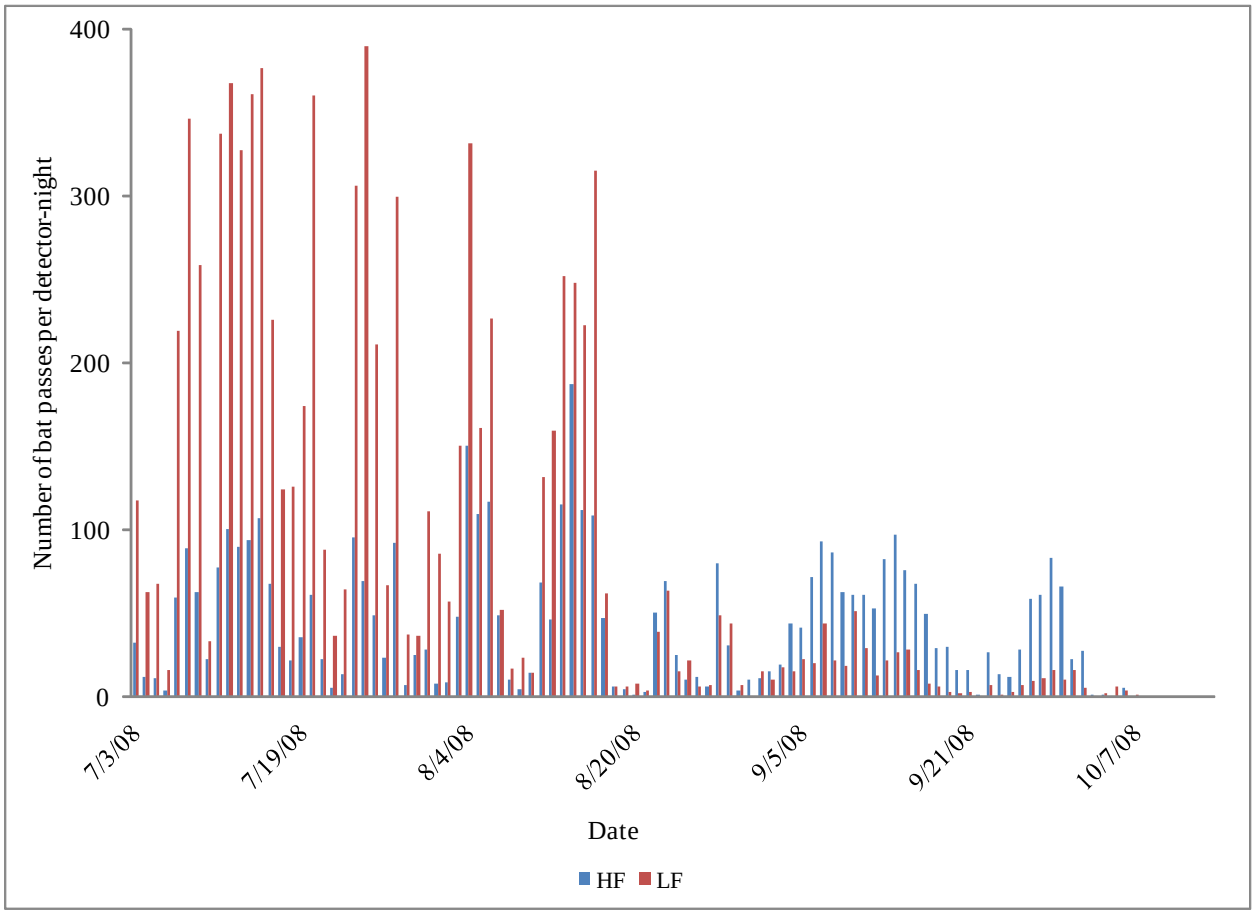


Figure 8. Nightly activity by high-frequency (HF) and low-frequency (LF) bats at upland stations at the Saddleback Wind Resource Area for the study period July 3 – October 7, 2008.

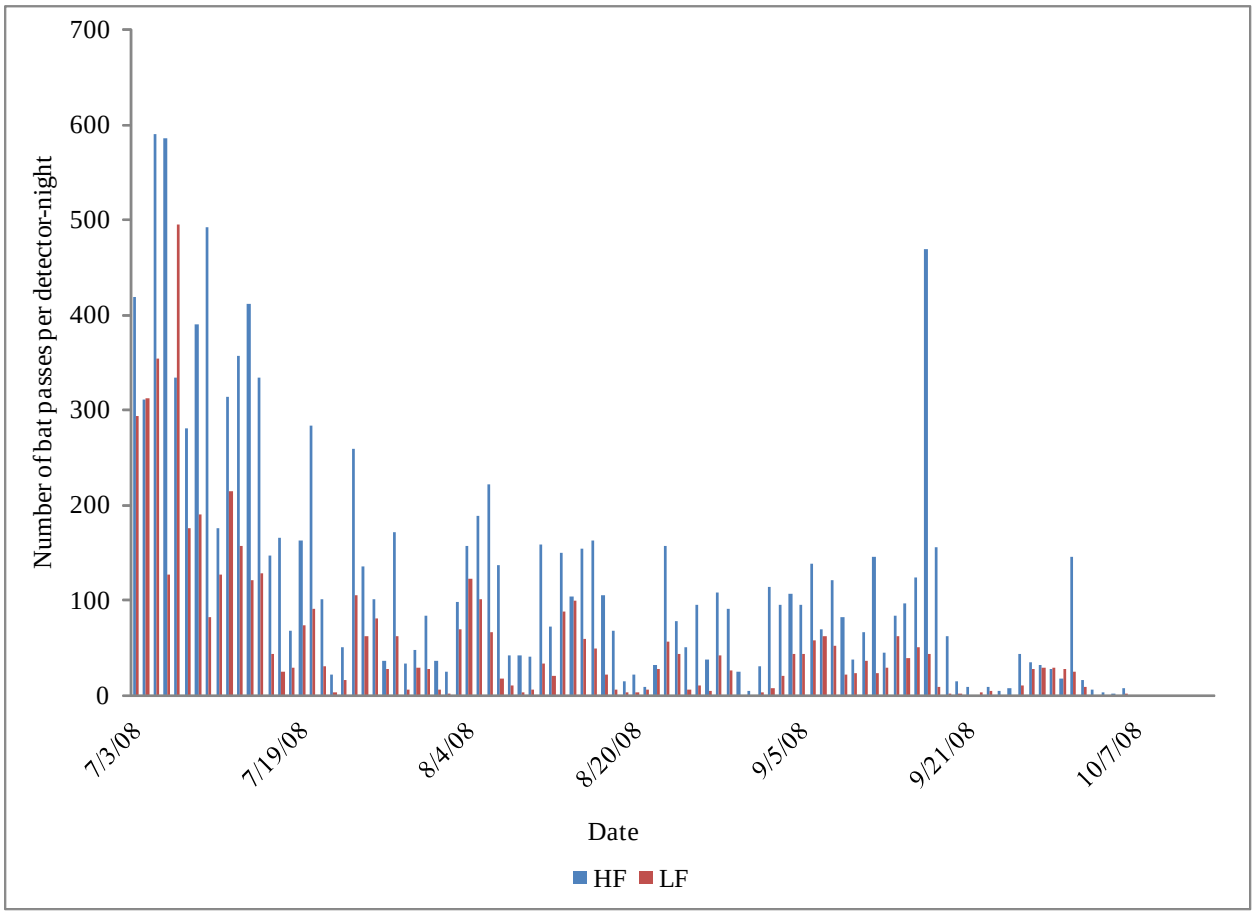


Figure 9. Nightly activity by high-frequency (HF) and low-frequency (LF) bats at wetland station SB2 for the study period July 3 – October 7, 2008.

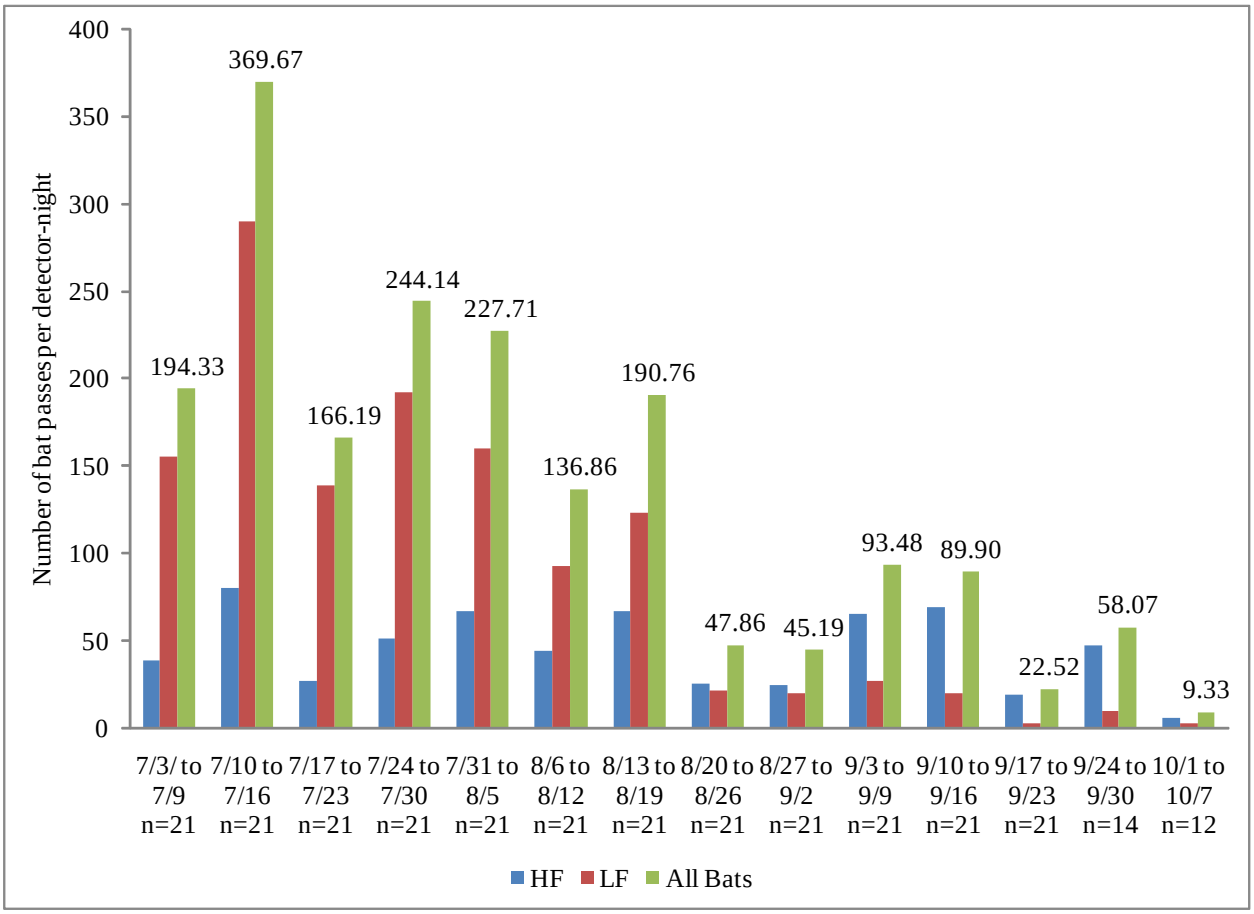


Figure 10. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at upland stations for the study period July 3 – October 7, 2008.

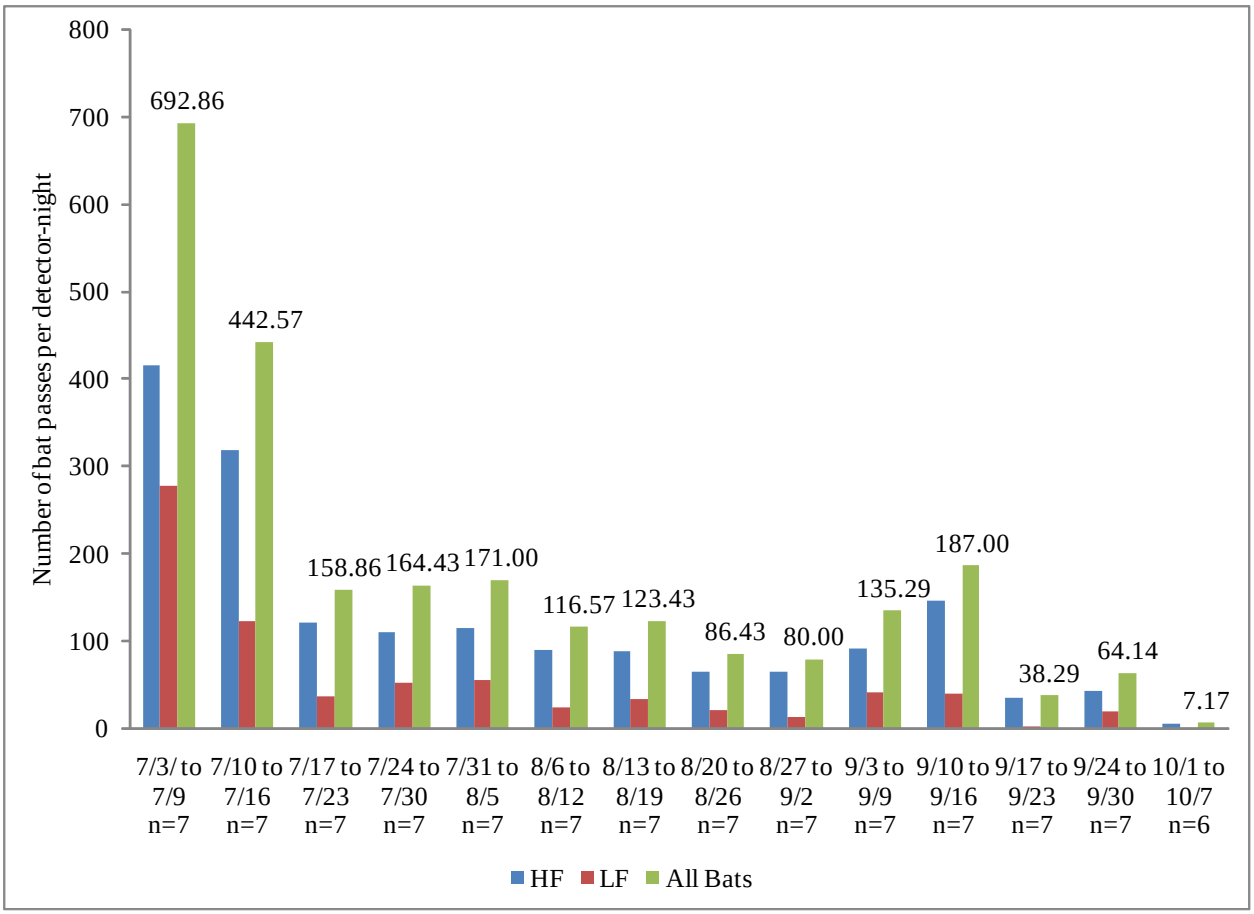


Figure 11. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at wetland station SB2 for the study period July 3 – October 7, 2008.

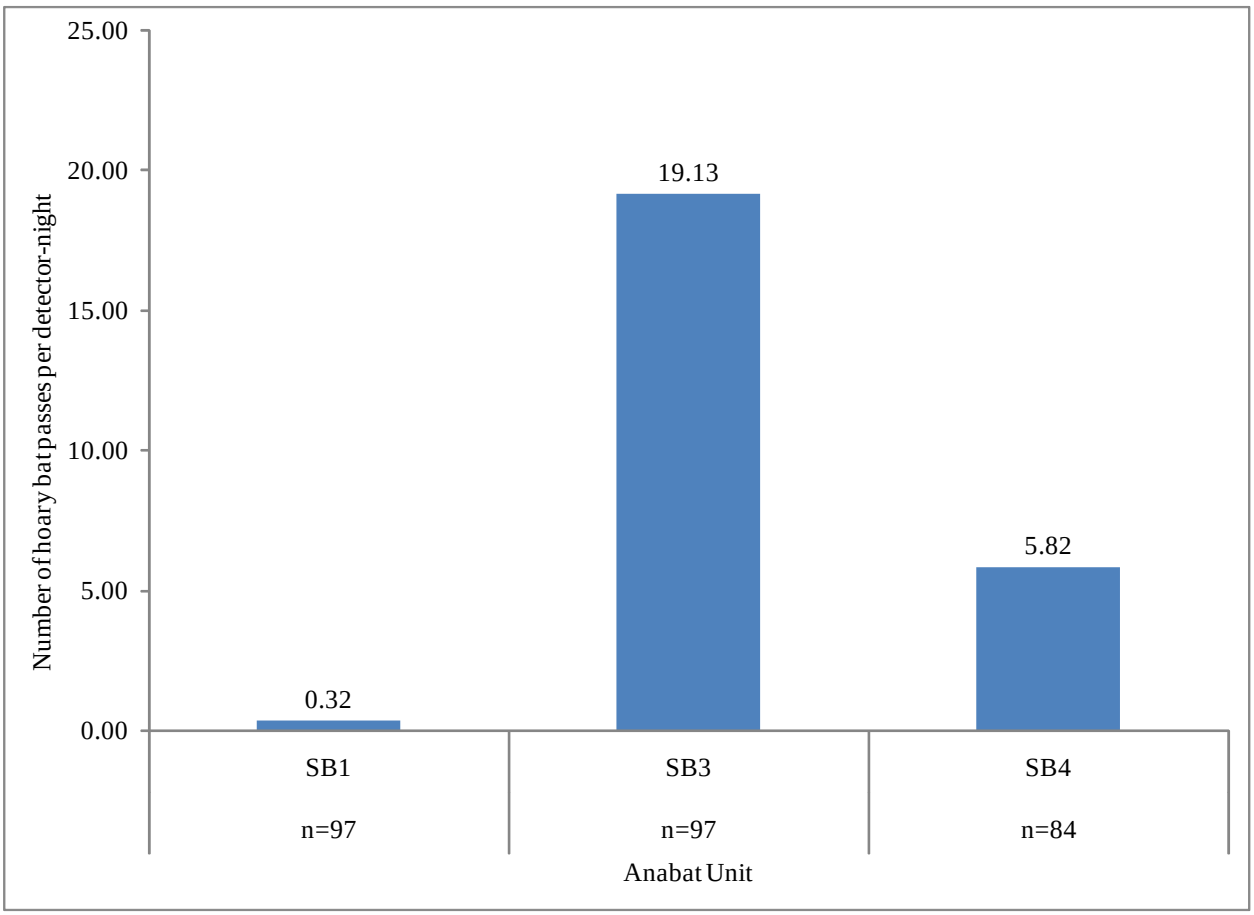


Figure 12. Number of passes per detector–night by hoary bats at upland Anabat stations at the Saddleback Wind Resource Area, for the study period July 3 – October 7, 2008.

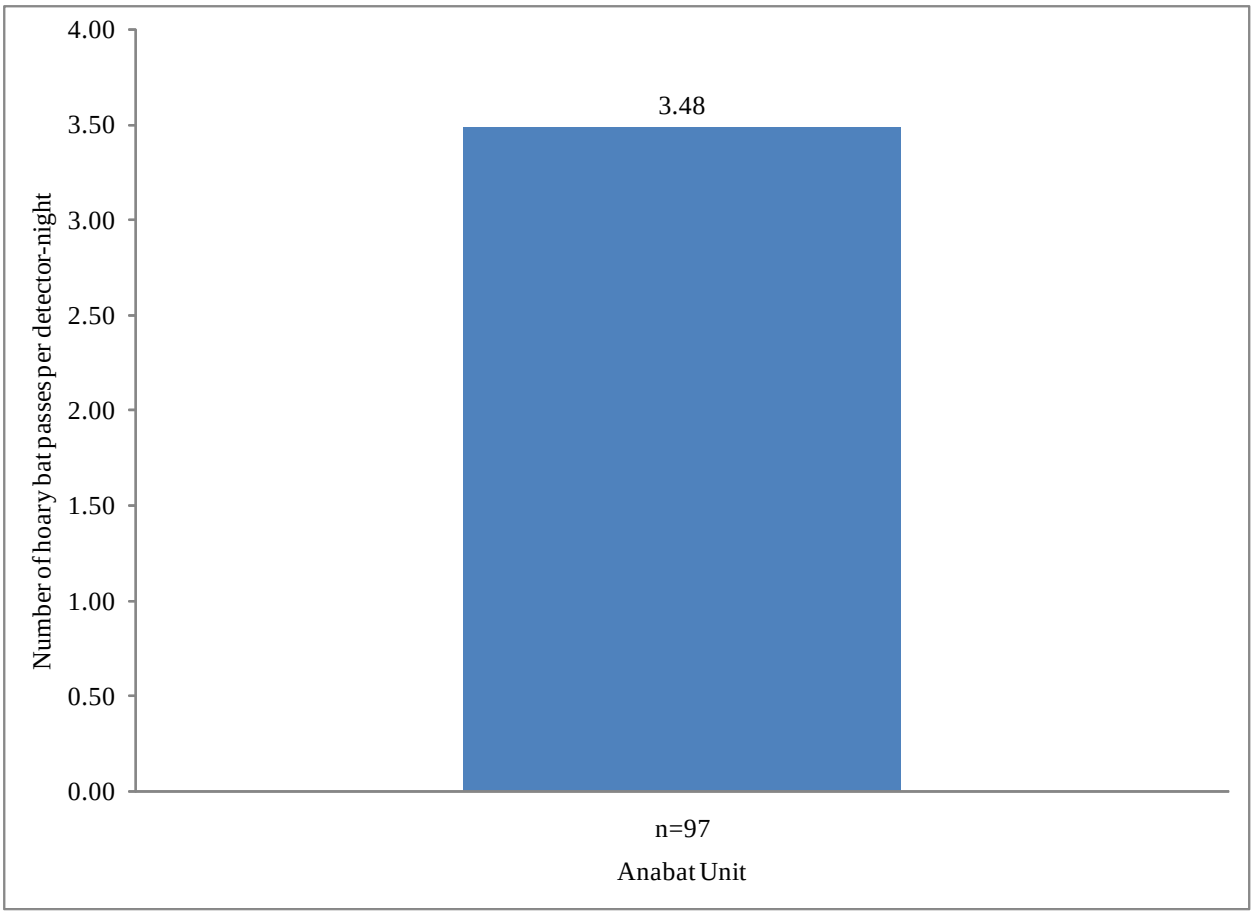


Figure 13. Number of passes per detector–night by hoary bats at Anabat wetland station SB2 for the study period July 3 – October 7, 2008.

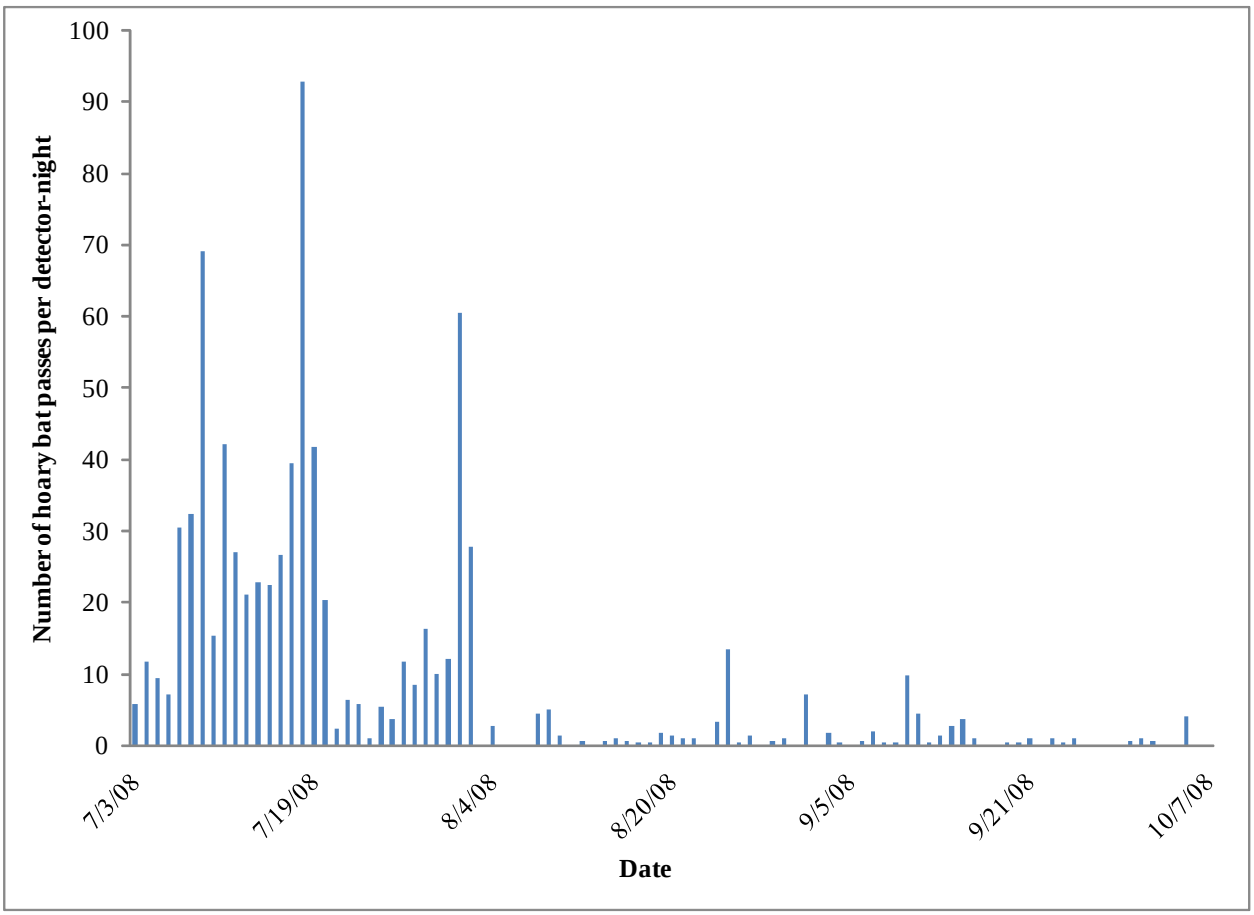


Figure 14. Number of passes per detector–night by hoary bats at upland stations at the Saddleback Wind Resource Area, presented nightly for the study period July 3 – October 7, 2008.

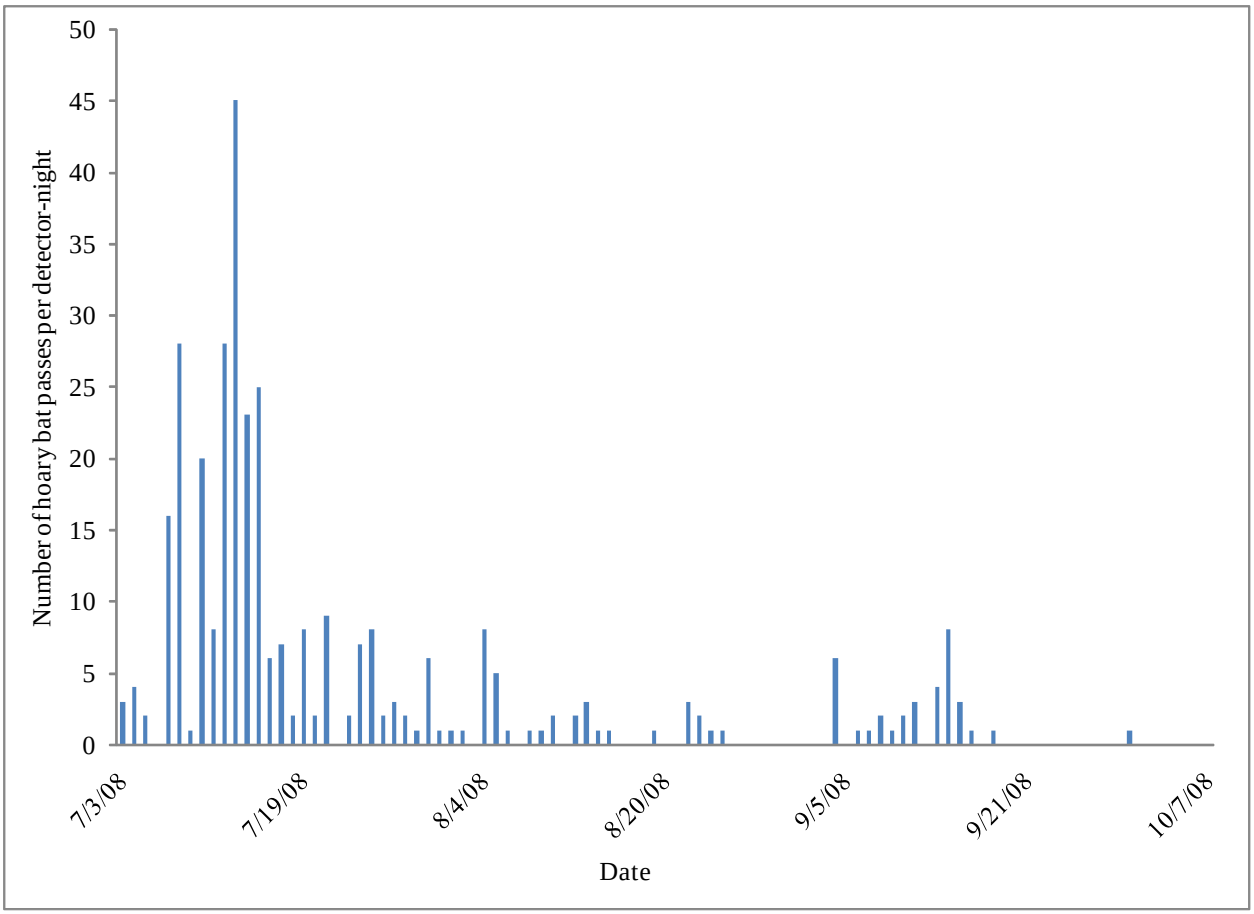


Figure 15. Number of passes per detector–night by hoary bats at wetland station SB2, presented nightly for the study period July 3 – October 7, 2008.

C-10

Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, June 4 – October 25, 2009. Prepared for SDS Lumber Company

WEST, Inc. 2009.

Bat Acoustic Studies for the Whistling Ridge Wind Resource Area Skamania County, Washington

June 4th – October 25th, 2009

Prepared for:

SDS Lumber Company

P.O. Box 266
Bingen, Washington 98605

Prepared by:

Greg Johnson, Jeff Gruver, Tamara Enz, Jerry Baker and Kimberly Bay

Western **E**co**S**ystems **T**echnology, Inc.

2003 Central Avenue
Cheyenne, Wyoming



December 1, 2009

EXECUTIVE SUMMARY

Western EcoSystems Technology, Inc. initiated surveys in June 2009 designed to assess bat use within the proposed Whistling Ridge Wind Resource Area, Skamania County, Washington. Acoustic surveys for bats using Anabat™ SD1 ultrasonic detectors at three fixed paired (ground and elevated) stations were conducted from June 4 to October 25, 2009. The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the Whistling Ridge Wind Resource Area by bats. Anabat units recorded 6,805 bat passes during 770 detector nights. Averaging bat passes per detector-night across locations, a mean of 8.09 bat passes per detector-night was recorded.

The majority (71.6%) of the calls were less than 35 kilohertz in frequency (e.g., big brown bat, silver-haired bat, hoary bat), and the remaining calls were greater than 35 kilohertz (e.g., *Myotis* bat species). Species identification was only possible for the hoary bat, which made up 5.9% of all passes. Activity levels for bat passes peaked in early July, and again in mid-August. Activity levels for hoary bats were highest in mid-August, suggesting this species migrates through the Whistling Ridge Wind Resource Area at this time of year.

The mean number of bat passes per detector per night was compared to existing data from six wind-energy facilities where both bat activity and mortality levels have been measured. The level of bat activity documented at the Whistling Ridge Wind Resource Area was higher than that at wind-energy facilities in Minnesota and Wyoming, where reported bat mortalities are low, but was much lower than at facilities in the eastern US, where reported bat mortality is highest. Assuming that a relationship between bat activity and bat mortality exists, and that it extends to the northwestern US, relatively low levels of bat mortality would be expected to occur in the Whistling Ridge Wind Resource Area; most likely during early July to mid-August.

Based on fatality rates at wind-energy facilities in the western US, the bat call rates observed at this project and habitat of the project area, we expect that the potential risk to bats from turbine operations to be somewhat higher than the rates observed at other western facilities placed in non-forested environments, but not nearly as high as the rates observed at eastern ridgeline facilities. The post-construction monitoring program should be designed to accurately estimate the level of bat mortality.

STUDY PARTICIPANTS

Western EcoSystems Technology

Greg Johnson	Senior Project Manager
Tamara Enz	Project Manager
Jeff Gruver	Bat Biologist
Andrea Chatfield	Bat Data Compiler
Kimberly Bay	Data Analyst and Report Manager
Saif Nomani	Statistician
JR Boehrs	GIS Technician
Melissa Nicholas	Report Compiler
Andrea Palochak	Technical Editor
Jerry Baker	Field Technician

REPORT REFERENCE

Johnson, G.D., J. Gruver, T. Enz, J. Baker and K. Bay. Bat Acoustic Studies for the Whistling Ridge Wind Resource Area, Skamania County, Washington: June 4th – October 25th, 2009. Prepared for SDS Lumber Company, Bingen, Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
INTRODUCTION 1
STUDY AREA 1
METHODS 1
Bat Acoustic Surveys 1
Statistical Analysis 2
RESULTS 3
Bat Acoustic Surveys 3
Spatial Variation 3
Temporal Variation 4
Species Composition 4
DISCUSSION 4
Potential Impacts 4
Overall Activity 5
Spatial Variation 5
Temporal Variation 6
Species Composition 6
Regional Fatality Studies 7
CONCLUSIONS 7
REFERENCES 8

LIST OF TABLES

Table 1. Bat species determined from range-maps (Harvey et al. 1999, BCI website) as likely to occur within the Whistling Ridge Wind Resource Area, sorted by call frequency 15

Table 2. Results of bat acoustic surveys conducted at the Whistling Ridge Wind Resource Area, June 4, 2009 - October 25, 2009. 16

Table 3. Weekly bat activity and the contribution of each week (%) to total recorded activity for high-frequency (HF), low-frequency (LF), and all bats within the Whistling Ridge Wind Resource Area. 17

Table 4. Wind-energy facilities in North America, with both Anabat sampling and bat mortality data, grouped by geographic region. To date, no results from southwestern or southeastern wind-energy facilities have been made public. 18

LIST OF FIGURES

Figure 1. Study area map and Anabat sampling stations at the Whistling Ridge Wind Resource Area. 20

Figure 2. Number of Anabat detectors (n = 6) at the Whistling Ridge Wind Resource Area operating during each night of the study period, June 4 – October 25, 2009. 21

Figure 3. Number of bat passes and noise files detected per detector-night at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009, presented nightly. Noise files are indicated on the second axis. 22

Figure 4. Number of bat passes per detector-night by Anabat location at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009. 23

Figure 5. Number of high-frequency (HF) and low-frequency (LF) bat passes per detector-night recorded at paired ground and high Anabat unit stations at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009. 24

Figure 6. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009 25

Figure 7. Empirical cumulative distribution of bat passes at ground and raised stations within the Whistling Ridge Wind Resource Area, June 4 – October 25, 2009. Dashed vertical lines indicate the point at which 50% of the calls occurred, an indication of the median date of bat activity. 26

Figure 8. Number of passes per detector–night by hoary bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009. 27

Figure 9. Weekly number of passes per detector–night by hoary bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009. 28

INTRODUCTION

SDS Lumber Company is proposing to develop a wind-energy facility in Skamania County, Washington. SDS Lumber requested that Western EcoSystems Technology, Inc. (WEST) develop and implement a standardized protocol for baseline studies of bat use in the Whistling Ridge Wind Resource Area (WRWRA) for the purpose of estimating the impacts of the wind-energy facility on bats, and to assist with siting turbines to minimize impacts to bats. The protocol for the baseline study is similar to protocols used at other wind-energy facilities in the United States. The protocol has been developed based on WEST's experience studying wildlife and wind turbines at projects throughout the US and included passive acoustic sampling using Anabat™ bat detectors to quantify bat use in the WRWRA.

The following is a final report describing the results of Anabat surveys during the 2009 study season within the proposed WRWRA. This represents the third consecutive year that bat acoustical studies have been conducted at the WRWRA. We are not aware of any other proposed wind energy facilities with this extensive level of pre-construction bat activity monitoring. In addition to site-specific data, this report presents existing information and results of bat monitoring studies conducted at other wind-energy facilities. Where possible, comparisons with regional and local studies were made.

STUDY AREA

The proposed WRWRA is in southeast Skamania County approximately four miles (6.44 kilometers [km]) northwest of White Salmon, Washington (Figure 1). The specific project area is just north of Underwood Mountain and includes Sections 5, 6, 7, & 8, Township 3N, Range 10E. The project is located in a forested environment managed for commercial timber production. Topography of the WRWRA consists of hilltops dominated by coniferous forests with some clear cuts and linear clearings associated with power line rights-of-way. Elevation ranges from approximately 1700 – 2400 feet (ft; 518 – 732 meters [m]).

METHODS

Bat Acoustic Surveys

The objective of the bat use surveys was to estimate the seasonal and spatial use of the WRWRA by bats. Bats were surveyed using Anabat™ SD1 bat detectors (Titley Scientific™, Australia). Bat detectors are a recommended method to index and compare use by bats. The use of bat detectors for calculating an index to bat impacts is a primary bat risk assessment tool for baseline wind development surveys (Arnett 2007, Kunz et al. 2007a). Bat activity was surveyed using six detectors from June 4 to October 25, 2009, a period corresponding to summer breeding and fall bat migration at this site. Detectors were placed near the ground at three fixed stations (Figure 1). At each of these stations, ground detectors (WR1, WR3, and WR5) were paired with detectors raised (WR2, WR4, and WR6) on meteorological (met) towers to compare bat activity at different heights (ground versus raised) and monitor bat activity in the rotor-swept zone. Pair

WR1 and WR2 were placed next to an area where timber was being harvested, WR3 and WR4 were placed in an area of regeneration, and WR5 and WR6 were in a clear cut on a ridge with open water at the base of the ridge.

Anabat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of 16 was used for the study (Messina 2004). Bat echolocation detectors also detect other ultrasonic sounds made by insects, raindrops hitting vegetation, and other sources. A sensitivity level of six was used to reduce interference from these other sources of ultrasonic noise. Calls were recorded to a compact flash memory card with large storage capacity. The detection range of Anabat detectors depends on a number of factors (e.g., echolocation call characteristics, microphone sensitivity, habitat, the orientation of the bat, atmospheric conditions; Limpens and McCracken 2004), but is generally less than 30 m (98 ft) due to atmospheric absorption on echolocation pulses (Fenton 1991). To ensure similar detection ranges among detectors, microphone sensitivities were calibrated using a BatChirp (Tony Messina, Las Vegas, Nevada) ultrasonic emitter as described in Larson and Hayes (2000). All units were programmed to turn on each night approximately one half-hour before sunset and to turn off approximately one half-hour after sunrise.

Anabat detectors were placed inside plastic weather-tight containers with a hole cut in the side of the container through which the microphone extended. Microphones were encased in PVC tubing with drain holes that curved skyward at 45 degrees outside the container to minimize the potential for water damage due to rain. Ground units were raised approximately 3.3 ft (one m) off the ground to minimize echo interference and lift the unit above vegetation. Raised Anabat microphones were elevated 147.6 ft (45 m) on meteorological towers using a pulley system. Microphones were encased in a Bat-Hat weatherproof housing (EME Systems, Berkeley, California), and attached to a coaxial cable that transmitted ultrasonic sounds to an Anabat unit at the base of the tower. The Bat-Hat weatherproof housing was modified by replacing the Plexiglas reflector plate with a 45-degree angle PVC elbow, for better comparability with data collected by detectors on the ground.

Statistical Analysis

The units of activity were number of bat passes (Hayes 1997). A pass was defined as a continuous series of two or more call notes produced by an individual bat with no pauses between call notes of more than one second (White and Gehrt 2001, Gannon et al. 2003). In this report, the terms bat pass and bat call are used interchangeably. The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights.

For each station, bat calls were sorted into two groups, based on their minimum frequency, that correspond roughly to species groups of interest. For example, species such as western red bat (*Lasiurus blossevillii*) and those in the genus *Myotis* generally echolocate at frequencies above 40 kilohertz (kHz), whereas species such as big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*) and hoary bat (*Lasiurus cinereus*) have echolocation frequencies that

fall below 35 kHz. Therefore, we classified calls as high-frequency (HF; > 35 kHz) and low-frequency (LF; <35 kHz) calls. To establish which species may have produced calls in each category, a list of species expected to occur in the study area was compiled from range maps (Table 1; Harvey et al. 1999, BCI website). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis.

Within these categories, an attempt was made to identify calls made by hoary bats. Calls that had a distinct U-shape and that exhibited variability in the minimum frequency across the call sequence were identified as belonging to the *Lasiurus* genus (C. Corben, pers comm.). Hoary bats were distinguished based on minimum frequency; hoary bats typically produce calls with minimum frequencies between 18 and 24 kHz (J. Szewczak, pers comm.). Only sequences containing three or more calls were used for species identification. Given the high intraspecific variability of *Lasiurus* calls, and the number of call files that were too fragmented for proper identification, it is likely that more hoary bat calls were recorded than were positively identified.

The total number of bat passes per detector night was used as an index of bat use in the WRWRA. Bat pass data represented levels of bat activity rather than the numbers of individuals present because individuals could not be differentiated by their calls. To assess potential for bat mortality, the mean number of bat passes per detector night (averaged across ground-based monitoring stations) was compared to existing data from wind-energy facilities where both bat activity and mortality levels have been measured.

RESULTS

Bat Acoustic Surveys

Bat activity was monitored at three fixed, paired sampling locations over a total of 144 nights during the period June 4 to October 25, 2009. Anabat units operated correctly for the entire night for 89.1% of the sampling period (Figure 2). Levels of wind and insect noise were relatively low throughout the study period (Figure 3). Anabat units recorded 6,805 bat passes on 770 detector-nights (Table 2). Averaging bat passes per detector-night across the locations, a mean of 8.09 ± 0.55 bat passes per detector-night was recorded. The average pass rate was 11.58 ± 0.70 bat passes per detector-night for ground stations and 4.59 ± 0.43 bat passes per detector-night for stations raised on met towers to a height of 45 m.

Spatial Variation

Bat activity varied among the Anabat unit pairs in the WRWRA (mean of 8.09 bat passes per detector-night; Figures 1 and 4; Table 2). Most (59.0%) bat calls were recorded at stations WR1 and WR2 (mean of 17.28 and 10.59 bat passes per detector-night, respectively), which were located at the southern-most met tower. Detections were lowest at paired stations WR5 and WR6 (mean of 6.43 and 1.64, respectively), located at the eastern-most met tower. Detections at stations WR3 and WR4, located at the northern-most met tower, were moderate (mean 11.40 and 1.59, respectively; Figure 1 and 4; Table 2).

Comparing paired stations on just the nights that both ground and raised detectors were operating, bat activity was consistently higher at ground stations (Figure 5). The difference in bat activity levels between ground and raised units was much less between WR5 and WR6 than at other detector pairs.

Temporal Variation
Bat activity increased from early June through early July, and then peaked during early- to mid-July and again in mid-August (Table 3, Figure 6). Activity decreased through September and October, with small spikes in activity occurred in some weeks. Bat passes were recorded during every week of the survey period, but over half (54.1%) of all bat passes were recorded between July 2 and August 19 (Table 3).

Bat activity levels over time were similar at ground and raised stations (Figure 7). Raised and ground stations recorded similar levels of activity through late June, but ground stations recorded much more activity through the remainder of the study period.

Species Composition
Overall, passes by low-frequency bats (LF; 71.6% of all bat passes) outnumbered passes by high-frequency bats (HF; 28.4%; Table 2). Ground units had a similar pattern, with 62.0% of all passes being LF (Table 2; Figures 4 and 5). Among raised stations, LF bats comprised about 98% of all bat passes (Table 2; Figures 4 and 5). Patterns of activity varied slightly between species groups, with the majority (70.0%) of passes by LF species occurring between June 25 and August 26, whereas most (70.7%) passes by HF species occurred between July 23 and September 23 (Table 3; Figures 6 and 7).

Hoary bats comprised 5.9% of total passes detected within the WRWRA, and 8.2% of all low frequency passes (Table 2). Eighty-seven percent of hoary bat passes were detected at raised stations (Table 2; Figure 8). Station WR2 recorded most of the hoary bat activity (77.9% of 399 hoary bat passes). Most of the hoary bat activity was recorded between August 6 and August 26 (Figure 9).

DISCUSSION

Potential Impacts

Assessing the potential impacts of wind-energy development to bats at the WRWRA is complicated by the current lack of understanding of why bats die at wind turbines (Kunz et al. 2007b, Baerwald et al. 2008), combined with the inherent difficulties of monitoring elusive, night-flying animals (O'Shea et al. 2003). In addition, while installed capacity for wind energy has increased rapidly in recent years, the availability of well-designed studies from existing projects lags development of proposed projects (Kunz et al. 2007b). To date, monitoring studies of wind projects suggest that:

a) bat mortality shows a rough correlation with bat activity as measured by Anabat units (Table 4);

b) the majority of fatalities occur during the post-breeding or fall migration season (roughly August and September);

c) migratory tree-roosting species (eastern red, hoary, and silver-haired bats) comprise almost 75% of reported bat fatalities, and;

d) the highest reported numbers of fatalities occur at wind-energy facilities located along forested ridge tops in the eastern and northeastern US; however, recent studies in agricultural regions of Iowa and Alberta, Canada, report relatively high fatalities as well (Table 4).

Based on these patterns, current guidance to estimate potential mortality levels at a proposed wind project involves evaluation of the on-site bat acoustic data in terms of activity levels, seasonal variation, and species composition (Kunz et al. 2007b), as well as comparison to regional patterns.

Overall Activity

To date, six studies of wind energy projects have concurrently recorded both Anabat detections per night and bat mortality (Table 4). Because these concurrent studies show correlation between bat activity and fatality rates, it is assumed that a similar relationship holds for pre-construction activity and post-construction fatalities. The addition of data sets like this one will contribute to our understanding of the relationship between bat activity near wind turbines and bat fatalities. To our knowledge, data for those studies in Table 4 were collected using Anabat detectors placed near the ground (i.e., none raised on metrological towers) and none of the detectors were located near features attractive to bats. Thus, this report relies on the mean activity rate for ground-based detectors placed near metrological towers and/or potential turbine locations to assess potential risk of bat fatality at the WRWRA relative to the six studies with similar data.

Bat activity recorded by ground detectors within the WRWRA (11.58 bat passes per detector-night) was somewhat higher than that observed at facilities in Minnesota and Wyoming, where bat mortality was relatively low, but was much lower than activity levels recorded at sites in West Virginia, Iowa, and Tennessee, where bat mortality rates were higher (Table 3). Thus, based solely on the expected relationship between pre-construction bat activity and post-construction fatalities, bat mortality rates at the WRWRA would be expected to be greater than the 2.4 bat fatalities/MW/year reported at Buffalo Ridge Minnesota, but much lower than the 31.5 fatalities/MW/year reported at Buffalo Mountain, Tennessee.

Spatial Variation

The proposed WRWRA is not located near any large, known bat colonies. However, the proposed project is located on forested ridges. In the eastern US, the highest bat fatality rates have been recorded at wind-energy facilities located on forested ridges (Table 4). However, the relatively large numbers of bat fatalities recently reported in northern Iowa (Jain 2005) and southwestern Alberta (Baerwald 2006) indicate that an open landscape does not guarantee low mortality.

Activity at the southern-most met tower (stations WR1 and WR2) was relatively higher compared to other stations, accounting for the majority (59.0%) of the calls recorded during this study. These stations were located next to an area currently being cut, which may have offered bats more foraging opportunities, relative to Anabats stationed in an area undergoing regeneration or in a previously clear cut area. Bat activity was lowest at the paired stations (WR5 and WR6) placed in a clear cut.

Temporal Variation

The number of bat calls detected per night at the WRWRA was highest from early June through mid-August. Activity in July likely corresponds with the reproductive season, when pups are being weaned and foraging rates are high. August activity may represent movement of migrating bats through the area. By October, activity dropped to lower rates though a small spike in late October suggests a late migratory wave during that time period.

Fatality studies of bats at wind-energy facilities in the US have shown a peak in mortality in August and September, with generally lower mortality levels earlier in the summer (Johnson 2005, Arnett et al. 2008). Bat mortality at wind energy projects throughout the US during the breeding season has been low, as only 4.1% of the fatalities have occurred between May 15 and July 15 (Johnson 2005). At several wind farms studied, low mortality has been documented during the breeding season even though relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003). These data suggest that high bat activity levels during the breeding season do not equate to high bat fatality rates.

While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the late summer and early fall.

Species Composition

Of the 14 species of bat likely to occur in the study area, four are known fatalities at wind-energy facilities (Table 1). Acoustic bat surveys were able to classify bat calls to frequency groups that roughly correspond to groups of relative risk. Approximately 72% of passes were by low-frequency bats, suggesting higher relative abundance of species such as big brown and silver-haired bats, and hoary bats made up 8.2% of all low-frequency passes. These species are known to occur as fatalities at wind turbine operations in the Pacific Northwest and elsewhere (Table 1). Based on data from 10 wind energy facilities in the Pacific Northwest, hoary bats and silver-haired bats have comprised the majority (93.5%) of fatalities, while big brown bats are relatively uncommon wind turbine fatalities, comprising only 1.5% of the fatalities (Johnson and Erickson 2008).

Passes by LF species were more common than those by HF species every week of the study except for a two-week period in mid-September. The relative increase in HF passes at this time may reflect movement of HF species through the area. The high-frequency group at WRWRA would be comprised of the *Myotis* bats, western red bats (*Lasiurus blossevillii*), and the canyon bat (*Parastrellus hesperus*). Bats in the HF group are not typically found during fatality studies,

although little brown bat (*Myotis lucifugus*) fatalities were as common as red bat fatalities in Iowa, 1.7 times as common as silver-haired bats in Alberta, and comprised 10% of fatalities discovered at the Vansycle facility in Oregon (Arnett et al. 2008).

At raised stations, low-frequency passes greatly outnumbered high-frequency passes, which most likely reflects different migration flight heights or foraging patterns among species. Generally, low-frequency species tend to forage in less cluttered conditions (e.g., at greater heights) than high-frequency species due to their wing morphology and echolocation call structure (Norberg and Rayner 1987). To date, hoary and silver-haired bats have been found as fatalities in higher relative proportions than have big brown bats, and are therefore considered to be at greater risk for collision with wind turbines (e.g., Arnett et al. 2008).

Regional Fatality Studies

Bat mortality studies at wind-energy facilities across North America show a wide range of bat mortality rates, ranging from none to 39.70 bat fatalities/MW/year (Table 4). In general, fatality rates have been highest in the Northeast and lowest in the Northwest, although a high degree of variation in fatality rates is present for most regions. To date, bat fatality estimates in the Northwest region have ranged from 0.39 to 2.46 bat fatalities/MW/year, and averaged 1.18 (Johnson and Erickson 2008). However, all of these projects are located in the more arid eastern portions of the region, and it is not clear if similar results can be expected in the more forested western parts of the region.

CONCLUSIONS

The data collected in 2009 represent the third year of bat acoustical studies conducted at the WRWRA. In 2007, bat activity was monitored at two ground stations and one elevated station on a met tower during the period August 20 – October 21 (Solick et al. 2008). Both of these stations were located in upland habitats characteristic of proposed turbine locations. Bat activity levels were similar to those measured in 2009, as the mean number of bat passes per detector night was 7.91. In 2008, Anabat surveys were conducted at four ground stations from July 3 to October 7 (Johnson et al. 2009). Two stations were placed in clear cuts, one was placed along a logging road through a forest, and the fourth was placed adjacent to a pond in the study area to assess levels of bat activity and composition of primarily breeding bats in the project area. For all four units combined, a mean of 148.34 bat passes per detector-night was recorded. However, 80.7% of all calls were recorded at the detector set on the logging road, which was likely used as a travel corridor by bats and was not representative of cleared areas where turbines would be placed. The detector placed near the pond also recorded relatively high activity levels (178.03 bat passes/detector night). Bat activity at the two stations placed in clear cuts comprised only 19.1% of all bat passes recorded during the study (14.30 and 73.76 bat passes/detector night, respectively).

The data collected in 2009 were collected entirely at met tower locations, which were most representative of proposed turbine locations. In addition, the three units elevated on the met towers to a height of 45 m, within the rotor swept zone, likely provide the best data for assessing

risk to bats in the project area (Baerwald 2008). Based on results of the 2009 study, it does not appear that construction of a wind energy facility at the WRWRA would result in high bat mortality levels. However, no data on bat mortality levels associated with wind energy developments in western coniferous forests are available to help predict risk to bats at the WRWRA. Bat fatality patterns may differ from those in open habitats as well as in eastern deciduous forests. Post-construction monitoring of the Whistling Ridge wind energy facility would provide valuable data on bat collision mortality in this environment that would be useful for assessing risk to bats of future proposed wind energy developments in western coniferous forests.

REFERENCES

Arnett, E. 2007. Report from the Bats and Wind Energy Cooperative (BWEC) on Collaborative Work and Plans. Presentation at the NWCC Wildlife Workgroup Meeting, Boulder Colorado. Conservation International. November 14th, 2007. Information available at www.nationwind.org

Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley, Jr. 2008. Patterns of Fatality of Bats at Wind Energy Facilities in North America. Journal of Wildlife Management 72: 61-78.

Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Prepared for the Bats and Wind Energy Cooperative. March 2005.

Arnett, E.B., M. Schirmacher, M.M.P. Huso, and J.P. Hayes. 2009. Effectiveness of Changing Wind Turbine Cut-in Speed to Reduce Bat Fatalities at Wind Facilities: 2008 Annual Report. Prepared for the Bats and Wind Energy Cooperative (BWEC) and the Pennsylvania Game Commission. April 2009. http://www.batsandwind.org/pdf/Curtailment_2008_Final_Report.pdf

Baerwald, E. 2006. Bat Fatalities in Southern Alberta. Presented at the Wildlife Research Meeting VI, San Antonio, Texas. National Wind Coordinating Collaborative. November 2006.

Baerwald, E.F. 2008. Variation in the Activity and Fatality of Migratory Bats at Wind Energy Facilities in Southern Alberta: Causes and Consequences. Thesis. University of Calgary, Alberta, Canada.

Baerwald, E.F., G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. 2008. Barotrauma is a Significant Cause of Bat Fatalities at Wind Turbines. Current Biology 18(16): R695-R696.

Bat Conservation International (BCI) website. Bat Species: US Bats. Bat Conservation International, Inc., Austin, Texas. Accessed 2009. Homepage: http://www.batcon.org Species Profiles: http://batcon.org/index.php/education/article-and-information/species-profiles.html

Brown, W.K. and B.L. Hamilton. 2006. Monitoring of Bird and Bat Collisions with Wind Turbines at the Summerview Wind Power Project, Alberta: 2005-2006. Prepared for Vision Quest Windelectric, Calgary, Alberta by TEAM Ltd., Calgary, Alberta, and BLH Environmental Services, Pincher Creek, Alberta. September 2006. http://www.batsandwind.org/pdf/Brown2006.pdf

Burba, E.A., G.D. Schnell, and J.A. Grzybowski. 2008. Post-Construction Avian/Bat Fatality Study for the Blue Canyon II Wind Power Project, Oklahoma: Summary of Preliminary Findings for 2006-2007. Interim Report to Horizon Wind Energy. Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma. August 2004.

Derby, C., A. Dahl, W. Erickson, K. Bay, and J. Hoban. 2007. Post-Construction Monitoring Report for Avian and Bat Mortality at the NPPD Ainsworth Wind Farm. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for the Nebraska Public Power District.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. Technical report for and peer-reviewed by FPL Energy, Stateline Technical Advisory Committee, and the Oregon Energy Facility Siting Council, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. December 2004. http://www.west-inc.com

Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington. Prepared for Puget Sound Energy, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 2008.

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 Study Year. Technical report prepared by WEST, Inc. for Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 21pp. http://www.west-inc.com/reports/vansyclereportnet.pdf

Erickson, W.P., K. Kronner, and B. Gritski. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. October 2003. http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

Fenton, M.B. 1991. Seeing in the Dark. BATS (Bat Conservation International) 9(2): 9-13.

Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. Thesis. University of Tennessee, Knoxville, Tennessee.

Fiedler, J.K., T.H. Henry, R.D. Tankersley, and C.P. Nicholson. 2007. Results of Bat and Bird Mortality Monitoring at the Expanded Buffalo Mountain Windfarm, 2005. Tennessee Valley Authority, Knoxville, Tennessee. https://www.tva.gov/environment/bmw_report/results.pdf

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the Importance of Articulating Assumptions When Conducting Acoustic Studies of Habitat Use by Bats. Wildlife Society Bulletin 31: 45-61.

Gruver, J.C. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (Lasiurus cinereus) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas Game and Fish Commission and US Fish and Wildlife Service, Arkansas.

Hayes, J.P. 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78: 514-524.

Howe, R.W., W. Evans, and A.T. Wolf. 2002. Effects of wind turbines on birds and bats in northeastern Wisconsin. Wisconsin Public Service Corporation, Madison, Wisconsin.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2007. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study – 2006. Final Report. Prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2008. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study - 2007. Final report prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, A. Fuerst, and C. Hansen. 2009a. Annual Report for the Noble Ellenburg Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Histed, and J. Meacham. 2009b. Annual Report for the Noble Clinton Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Quant, and D. Pursell. 2009c. Annual Report for the Noble Bliss Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

James, R.D. 2008. Erie Shores Wind Farm Port Burwell, Ontario: Fieldwork Report for 2006 and 2007 During the First Two Years of Operation. Report to Environment Canada, Ontario Ministry of Natural Resources, Erie Shores Wind Farm LP - McQuarrie North American and AIM PowerGen Corporation. January 2008.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D. and W.P. Erickson. 2008. Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Final Report prepared for Klickitat County Planning Department, Goldendale Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. October 30, 2008.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. March 2003. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. http://www.west-inc.com

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32: 1278-1288.

Johnson, G., J. Gruver, T. Enz and J. Baker. 2009. Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, July 3 – October 7th, 2008. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Kerlinger, P. 2002. An Assessment of the Impacts of Green Mountain Power Corporation's Wind Power Facility on Breeding and Migrating Birds in Searsburg, Vermont: July 1996-July 1998. NREL/SR-500-28591. Prepared for Vermont Public Service, Montpelier, Vermont. US Department of Energy, National Renewable Energy Laboratory, Golden, Colorado. March 2002. 95 pp. http://www.nrel.gov/docs/fy02osti/28591.pdf

Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.

Kerlinger, P., R. Curry, A. Hasch, and J. Guarnaccia. 2007. Migratory Bird and Bat Monitoring Study at the Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006. Final draft prepared for Orrick Herrington and Sutcliffe, LLP. May 2007.

Kerns, J. and P. Kerlinger. 2004. A Study of Bird and Bat Collisions at the Mountaineer Wind Energy Facility, Tucker County, West Virginia: Annual Report for 2003. Prepared for FPL Energy and the Mountaineer Wind Energy Center Technical Review Committee. February 14, 2004. Technical report prepared by Curry and Kerlinger, LLC. for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee. Curry and Kerlinger, LLC. 39 pp. http://www.wvhighlands.org/Birds/MountaineerFinalAvianRpt-%203-15-04PKJK.pdf

Kronner, K., B. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Fatality Monitoring Study: 2006−2007. Final report prepared for PPM Energy and the Big Horn Wind Project Technical Advisory Committee by Northwest Wildlife Consultants, Inc. (NWC), Mid-Columbia Field Office, Goldendale, Washington. June 1, 2008.

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M.D. Strickland, and J.M. Szewczak. 2007a. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management 71(8): 2449-2486.

Kunz, T.H., E.B. Arnett, W.P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007b. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecology and the Environment 5(6): 315-324.

Larson, D.J. and J.P. Hayes. 2000. Variability in Sensitivity of Anabat II Detectors and a Method of Calibration. Acta Chiropterologica 2: 209-213.

Limpens, H.J.G.A. and G.F. McCracken. 2004. Choosing a Bat Detector: Theoretical and Practical Aspects. *In*: Bat Echolocation Research: Tools, Techniques, and Analysis. R. M. Brigham, E. K. V. Kalko, G. Jones, S. Parsons, and H. J. G. A. Limpens, eds. Bat Conservation International, Austin, Texas. Pp. 28-37.

Messina, T. 2004. The Nevada Bat Technical Notes Archive: Remote Transducers for Anabats.

Nicholson, C.P., J. R.D. Tankersley, J.K. Fiedler, and N.S. Nicholas. 2005. Assessment and Prediction of Bird and Bat Mortality at Wind Energy Facilities in the Southeastern United States. Final Report. Tennessee Valley Authority, Knoxville, Tennessee.

Norberg, U.M. and J.M.V. Rayner. 1987. Ecological Morphology and Flight in Bats (Mammalia; Chiroptera): Wing Adaptations, Flight Performance, Foraging Strategy and Echolocation. Philosophical Transactions of the Royal Society of London 316: 335-427.

Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. (WEST). 2007. Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, Oregon. Analysis conducted by WEST, Cheyenne, Wyoming. July 17, 2007.

O'Shea, T.J., M.A. Bogan, and L.E. Ellison. 2003. Monitoring Trends in Bat Populations of the US and Territories: Status of the Science and Recommendations for the Future. Wildlife Society Bulletin 31: 16-29.

Piorkowski, M.D. 2006. Breeding Bird Habitat Use and Turbine Collisions of Birds and Bats Located at a Wind Farm in Oklahoma Mixed-Grass Prairie. M.S. Thesis. Oklahoma State University, Stillwater, Oklahoma. 112 pp. July 2006. http://www.batsandwind.org/pdf/Piorkowski_2006.pdf

Schmidt, E., A.J. Piaggio, C.E. Bock, and D.M. Armstrong. 2003. National Wind Technology Center site environmental assessment: bird and bat use and fatalities – final report NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, Colorado. 21pp.

Solick, D., G. Johnson and J. Baker. 2008. Bat Acoustic Studies for the Saddleback Wind Energy Project, Skamania County, Washington, August 20th – October 21st, 2007. Prepared by WEST, Inc. for SDS Lumber Company.

Stantec Consulting Inc. (Stantec). 2008. 2007 Spring, Summer, and Fall Post-Construction Bird and Bat Mortality Study at the Mars Hill Wind Farm, Maine. Prepared for UPC Wind Management, LLC, Cumberland, Maine, by Stantec Consulting, formerly Woodlot Alternatives, Inc., Topsham, Maine. January, 2008.

Stantec Consulting Inc. (Stantec). 2009. Post-Construction Monitoring at the Mars Hill Wind Farm, Maine - Year 2, 2008. Prepared for First Wind Management, LLC, Portland, Maine. Prepared by Stantec Consulting, Topsham, Maine. January 2009.

Tierney, R. 2007. Buffalo Gap I Wind Farm Avian Mortality Study: February 2006-January 2007. Final Survey Report. Prepared for AES SeaWest, Inc. TRC, Albuquerque, New Mexico.TRC Report No. 110766-C-01. May 2007.

TRC Environmental Corporation. 2008. Post-Construction Avian and Bat Fatality Monitoring and Grassland Bird Displacement Surveys at the Judith Gap Wind Energy Project, Wheatland County, Montana. Prepared for Judith Gap Energy, LLC, Chicago, Illinois. TRC Environmental Corporation, Laramie, Wyoming. TRC Project 51883-01 (112416). January 2008. http://www.newwest.net/pdfs/AvianBatFatalityMonitoring.pdf

URS, W.P. Erickson, and L. Sharp. 2005. Phase 1 and Phase 1A Avian Mortality Monitoring Report for 2004-2005 for the SMUD Solano Wind Project. Prepared for Sacramento Municipal Utility District (SMUD), Sacramento, California. Co-Authors: Wally Erickson, Western EcoSystems Technology, Inc. (WEST) and Lynn Sharp, Environmental Consultant. August 2005.

White, E.P. and S.D. Gehrt. 2001. Effects of Recording Media on Echolocation Data from Broadband Bat Detectors. Wildlife Society Bulletin 29: 974-978.

Young, D.P. Jr., W.P. Erickson, K. Bay, S. Nomani, and W. Tidhar. 2009. Mount Storm Wind Energy Facility, Phase 1 Post-Construction Avian and Bat Monitoring, July - October 2008. Prepared for NedPower Mount Storm, LLC, Houston, Texas, by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming.

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming, Final Report, November 1998 - June 2002. Prepared for PacifiCorp, Inc. Portland, Oregon, SeaWest Windpower Inc. San Diego, California, and Bureau of Land Management, Rawlins District Office, Rawlins, Wyoming.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Walla Walla, Washington. 25 pp.

Young, D.P. Jr., J. Jeffrey, W.P. Erickson, K. Bay, and V.K. Poulton. 2006. Eurus Combine Hills Turbine Ranch. Phase 1 Post Construction Wildlife Monitoring First Annual Report. Technical report prepared for Eurus Energy America Corporation, San Diego, California, and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon.

Table 1. Bat species determined from range-maps (Harvey et al. 1999, BCI website) as likely to occur within the Whistling Ridge Wind Resource Area, sorted by call frequency.

Common Name	Scientific Name
High Frequency (HF; ≥ 35 kHz)	
western red bat	*Lasiurus blossevillii*
California bat	*Myotis californicus*
western small-footed bat[3]	*Myotis ciliolabrum*
western long-eared bat	*Myotis evotis*
little brown bat[2]	*Myotis lucifugus*
long-legged bat	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
canyon bat	*Parastrellus hesperus*
Low Frequency (LF; < 35 kHz)	
pallid bat	*Antrozous pallidus*
Townsend's big-eared bat	*Corynorhinus townsendii*
big brown bat[2]	*Eptesicus fuscus*
silver-haired bat[1,2]	*Lasionycteris noctivagans*
hoary bat[1,2]	*Lasiurus cinereus*
fringed myotis[3]	*Myotis thysanodes*

[1]long-distance migrant
[2]species known to have been killed at wind-energy facilities
[3]species occurrence based upon a single source

Table 2. Results of bat acoustic surveys conducted at the Whistling Ridge Wind Resource Area, June 4, 2009 - October 25, 2009.

AnaBat Station	Location	# of HF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night
WR1	ground	762	1,726	38	2,488	144	17.28±1.65
WR2	raised	20	1,505	311	1,525	144	10.59±1.15
WR3	ground	763	827	7	1,590	144	11.04±0.75
WR4	raised	13	186	23	199	130	1.53±0.17
WR5	ground	364	524	9	888	138	6.43±0.61
WR6	raised	10	105	11	115	70	1.64±0.22
Total Ground		**1,889**	**3,077**	**54**	**4,966**	**426**	**11.58±0.7**
Total Raised		**43**	**1,796**	**345**	**1,839**	**344**	**4.59±0.43**
Grand Total		**1,932**	**4,873**	**399**	**6,805**	**770**	**8.09±0.55**

*Passes by hoary bat passes is included in low frequency (LF) numbers

Table 3. Weekly bat activity and the contribution of each week (%) to total recorded activity for high-frequency (HF), low-frequency (LF), and all bats within the Whistling Ridge Wind Resource Area.

Week	HF Pass Rate	HF % Composition	LF Pass Rate	LF % Composition	All Bats Pass Rate	All Bats % Composition	Cumulative % Composition
06/04/09 to 06/10/09	0.52	1.0	2.95	2.2	3.48	1.9	1.9
06/11/09 to 06/17/09	1.07	2.0	5.90	4.4	6.98	3.8	5.6
06/18/09 to 06/24/09	1.81	3.4	4.47	3.4	6.28	3.4	9.0
06/25/09 to 07/01/09	2.89	5.5	7.31	5.5	10.20	5.5	14.5
07/02/09 to 07/08/09	2.46	4.6	15.97	12.0	18.43	9.9	24.4
07/09/09 to 07/15/09	2.20	4.2	12.00	9.0	14.20	7.6	32.0
07/16/09 to 07/22/09	2.66	5.0	15.83	11.9	18.49	9.9	41.9
07/23/09 to 07/29/09	3.86	7.3	7.51	5.6	11.37	6.1	48.0
07/30/09 to 08/05/09	3.36	6.3	7.17	5.4	10.52	5.7	53.7
08/06/09 to 08/12/09	2.38	4.5	9.79	7.4	12.17	6.5	60.2
08/13/09 to 08/19/09	5.69	10.8	9.74	7.3	15.43	8.3	68.5
08/20/09 to 08/26/09	5.10	9.6	7.87	5.9	12.97	7.0	75.5
08/27/09 to 09/02/09	3.53	6.7	4.90	3.7	8.43	4.5	80.0
09/03/09 to 09/09/09	3.86	7.3	4.17	3.1	8.02	4.3	84.3
09/10/09 to 09/16/09	5.83	11.0	4.17	3.1	10.00	5.4	89.7
09/17/09 to 09/23/09	3.83	7.2	2.69	2.0	6.51	3.5	93.2
09/24/09 to 09/30/09	0.76	1.4	2.00	1.5	2.76	1.5	94.7
10/01/09 to 10/07/09	0.45	0.9	2.50	1.9	2.95	1.6	96.3
10/08/09 to 10/14/09	0.14	0.3	0.77	0.6	0.91	0.5	96.8
10/15/09 to 10/21/09	0.49	0.9	4.20	3.2	4.69	2.5	99.3
10/22/09 to 10/25/09	0.05	0.1	1.25	0.9	1.30	0.7	100.0

Table 4. Wind-energy facilities in North America, with both Anabat sampling and bat mortality data, grouped by geographic region. To date, no results from southwestern or southeastern wind-energy facilities have been made public.

Geographic Region	Wind-Energy Facility	Activity (#/detector night)	Mortality (bats/MW/year)	Number of Turbines	Total Site MW	Reference
	Whistling Ridge, WA	**8.09**				**This study**
Northwestern	Nine Canyon, WA		2.47	37	48	Erickson et al. 2003
	High Winds, CA		2.02	90	162	Kerlinger et al. 2006
	Big Horn, WA		1.90	133	199.5	Kronner et al. 2008
	Combine Hills, OR		1.88	41	41	Young et al. 2006
	Stateline, WA/OR		1.70	454	300	Erickson et al. 2004
	Vansycle, OR		1.12	38	24.9	Erickson et al. 2000
	Klondike, OR		0.77	16	24	Johnson et al. 2003
	Hopkins Ridge, WA		0.63	83	150	Young et al. 2007
	Klondike II, WA		0.41	50	75	NWC and WEST 2007
	Wild Horse, WA		0.39	127	229	Erickson et al. 2008
	SMUD, CA		0.07		15	URS et al. 2005
Midwest & Rocky Mountains	Summerview, Alberta (2007/2008)		11.42	39	70.2	Baerwald 2008
	Summerview, Alberta (2005/2006)		10.27	39	70.2	Brown and Hamilton 2006
	Judith Gap, MT		8.93	90	135	TRC 2008
	Blue Canyon II, OK (2006/2007)		3.71	84	151.2	Burba et al. 2008
	Crescent Ridge, OK		3.27	33	49.5	Kerlinger et al. 2007
	Foote Creek Rim, WY (Phase I)	2.2	2.23	69	41.4	Young et al. 2003
	NPPD Ainsworth, NE		1.16	36	59.4	Derby et al. 2007
	Oklahoma Wind Energy Center, OK		0.53	68	102	Piorkowski 2006
	Buffalo Gap, TX		0.10	67	134	Tierney 2007
Upper Midwest	Top of Iowa, IA (2004)	34.9	10.27	89	80	Jain 2005
	Top of Iowa, IA (2003)		7.16	89	80	Jain 2005
	Buffalo Ridge, MN (Phase III)		2.72	138	103.5	Johnson et al. 2000
	Buffalo Ridge, MN (Phase II)	2.1	2.37	143	107.25	Johnson et al. 2000
	Buffalo Ridge, MN (Phase I)		0.76	73	25	Johnson et al. 2000

	Buffalo Mountain, TN (Phase II)		39.70	18	29	Fiedler et al. 2007
	Mountaineer, WV	38.3	31.69	44	66	Kerns and Kerlinger 2004
	Buffalo Mountain TN (Phase I)	23.7	31.54	3	2	Nicholson et al. 2005
	Casselman, PA		15.66	23	34.5	Arnett et al. 2009
	Maple Ridge, NY 2006		15.00	195	321.75	Jain et al. 2007
	Mount Storm, WV	35.2	12.21	82	164	Young et al. 2009
	Meyersdale, PA		10.93	20	30	Arnett et al. 2005
Eastern	Maple Ridge, NY 2007		9.42	195	321.75	Jain et al. 2008
	Noble Ellensburg, NY		5.45	54	80	Jain et al. 2009a
	Noble Bliss, NY		5.05	67	100	Jain et al. 2009c
	Noble Clinton, NY		3.63	67	100.5	Jain et al. 2009b
	Mars Hill, ME 2007		2.91	28	42	Stantec 2008
	Erie Shores, Ont.		1.51	66	99	James 2008
	Mars Hill, NY 2008		0.45	28	42	Stantec 2009
	Searsburg, NY		0.00	11	7	Kerlinger 2002

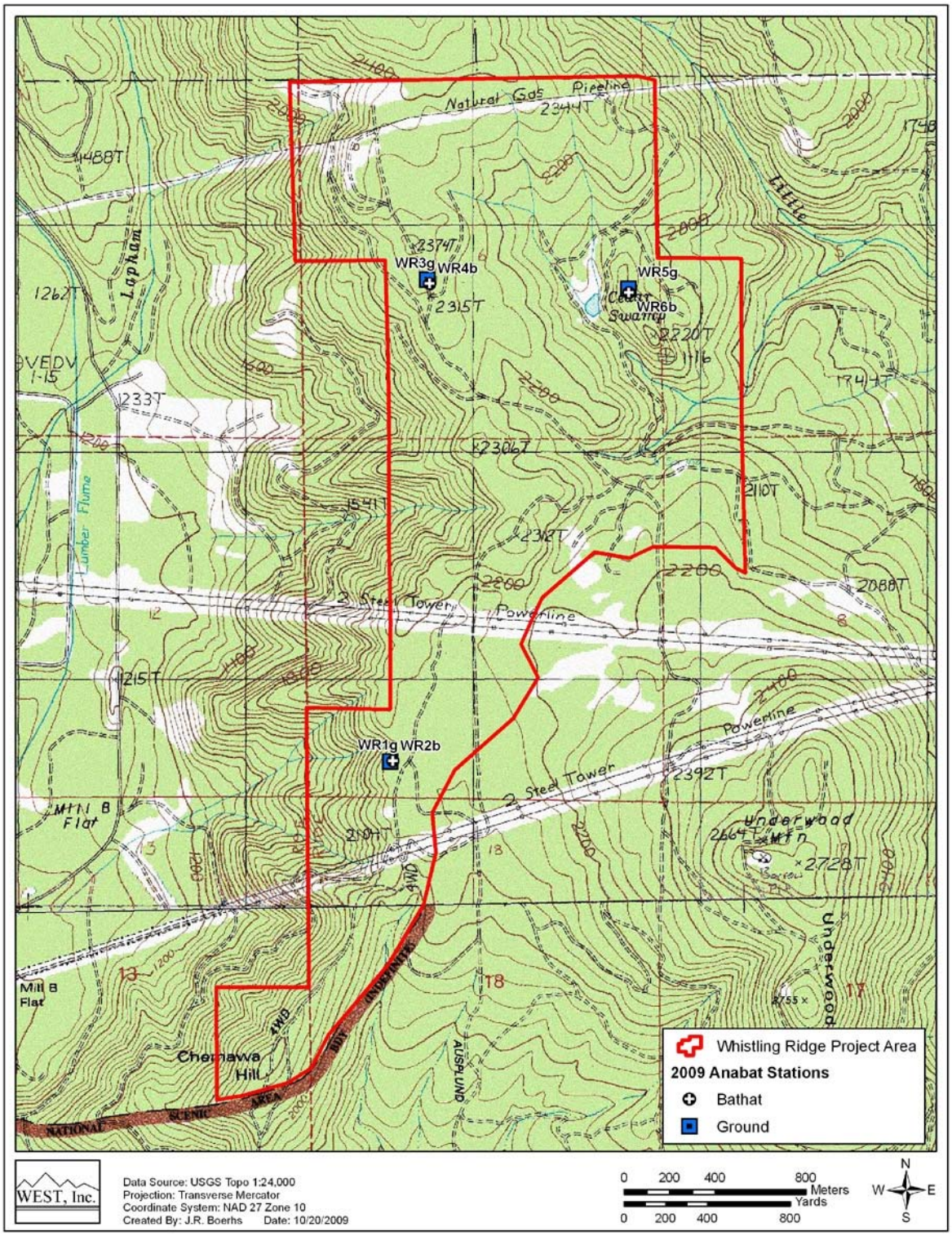


Figure 1. Study area map and Anabat sampling stations at the Whistling Ridge Wind Resource Area.

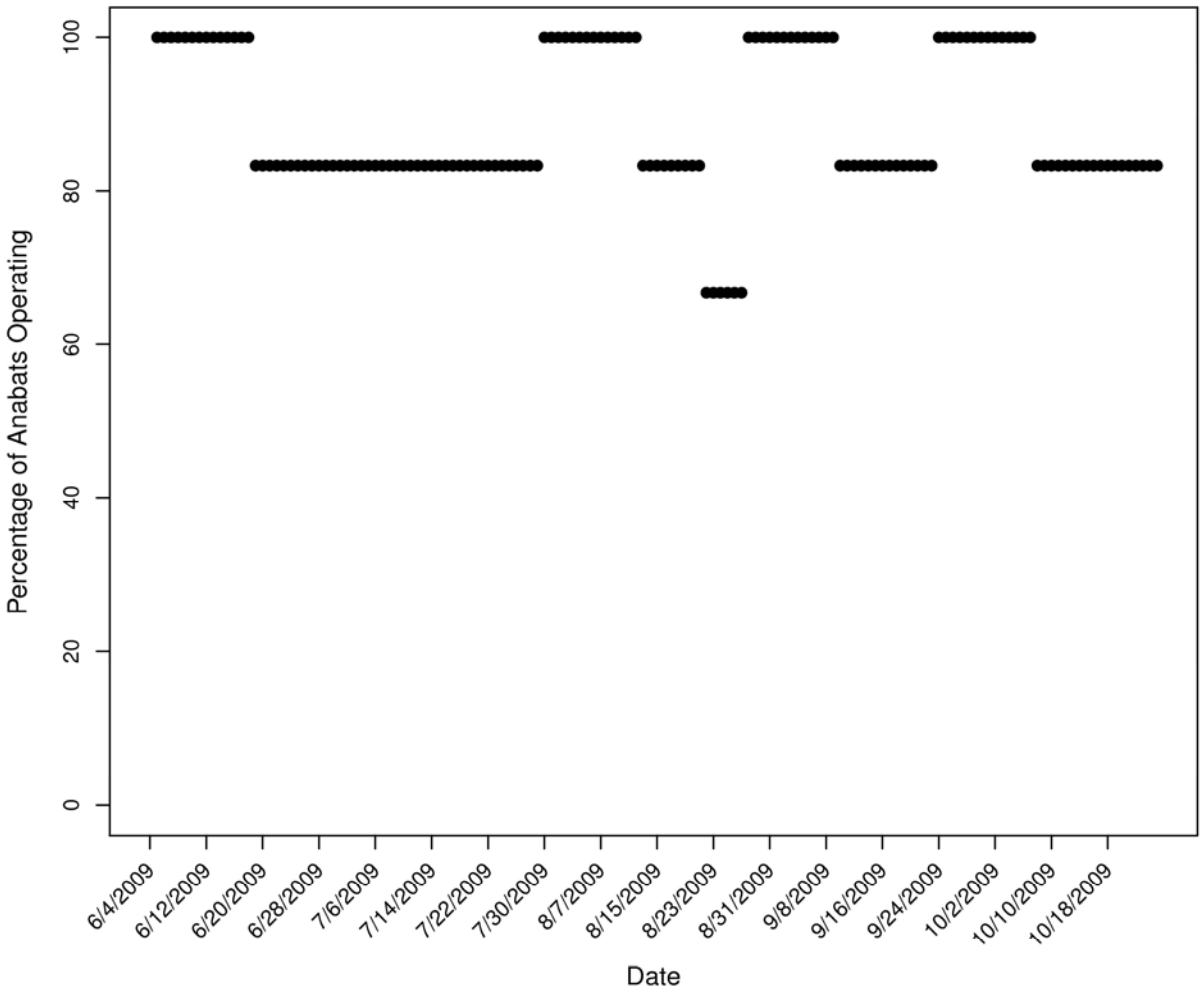


Figure 2. Number of Anabat detectors (n = 6) at the Whistling Ridge Wind Resource Area operating during each night of the study period, June 4 – October 25, 2009.

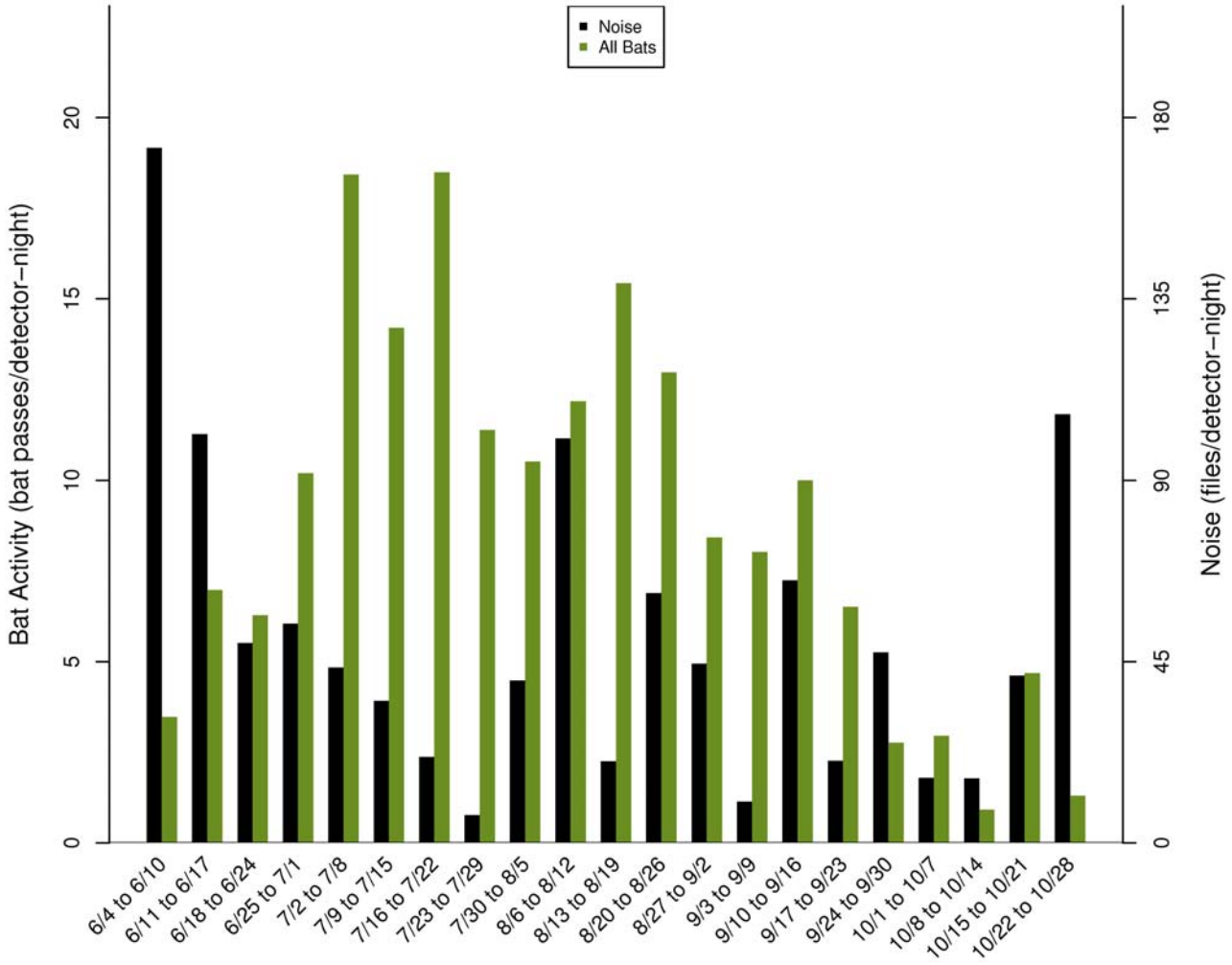


Figure 3. Number of bat passes and noise files detected per detector-night at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009, presented nightly. Noise files are indicated on the second axis.

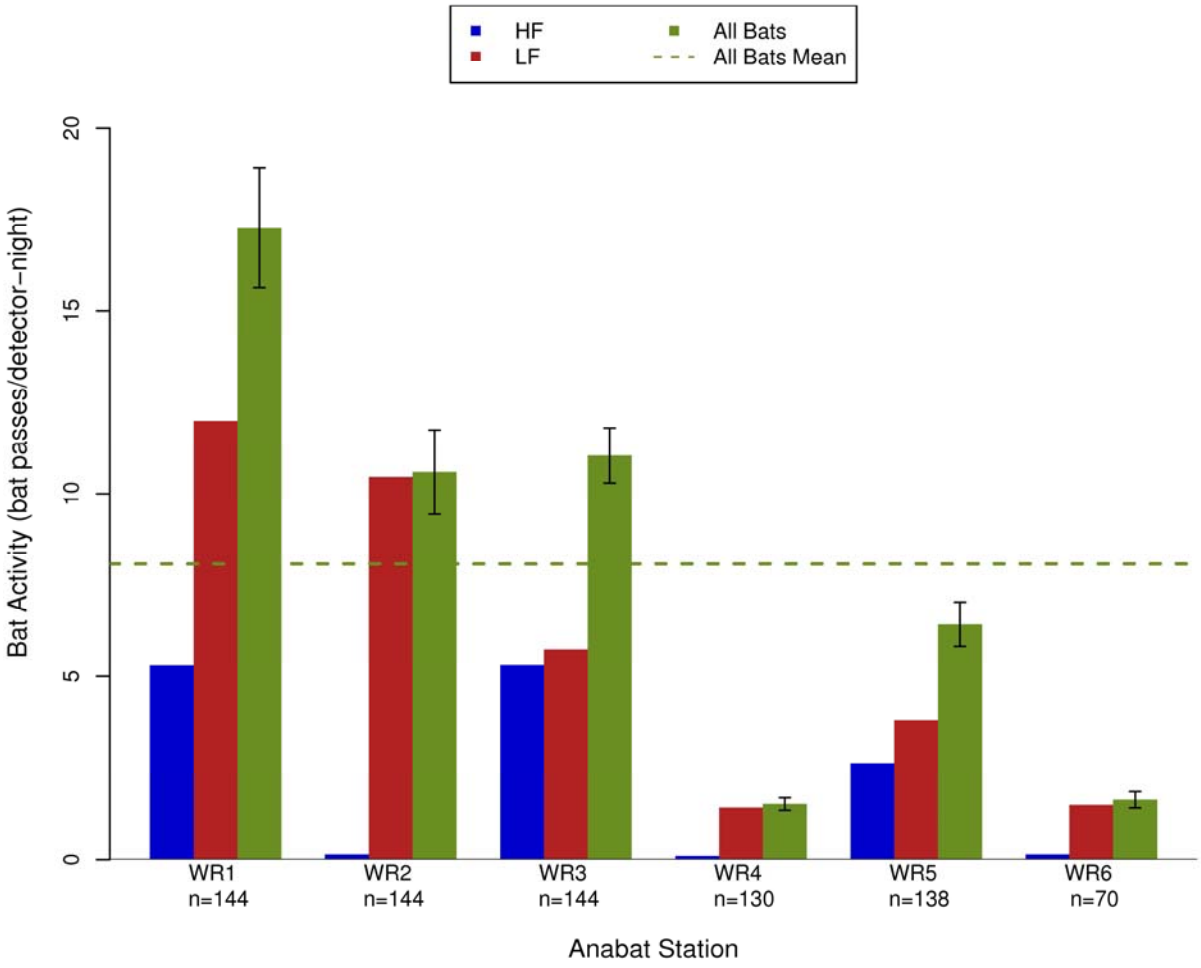


Figure 4. Number of bat passes per detector-night by Anabat location at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

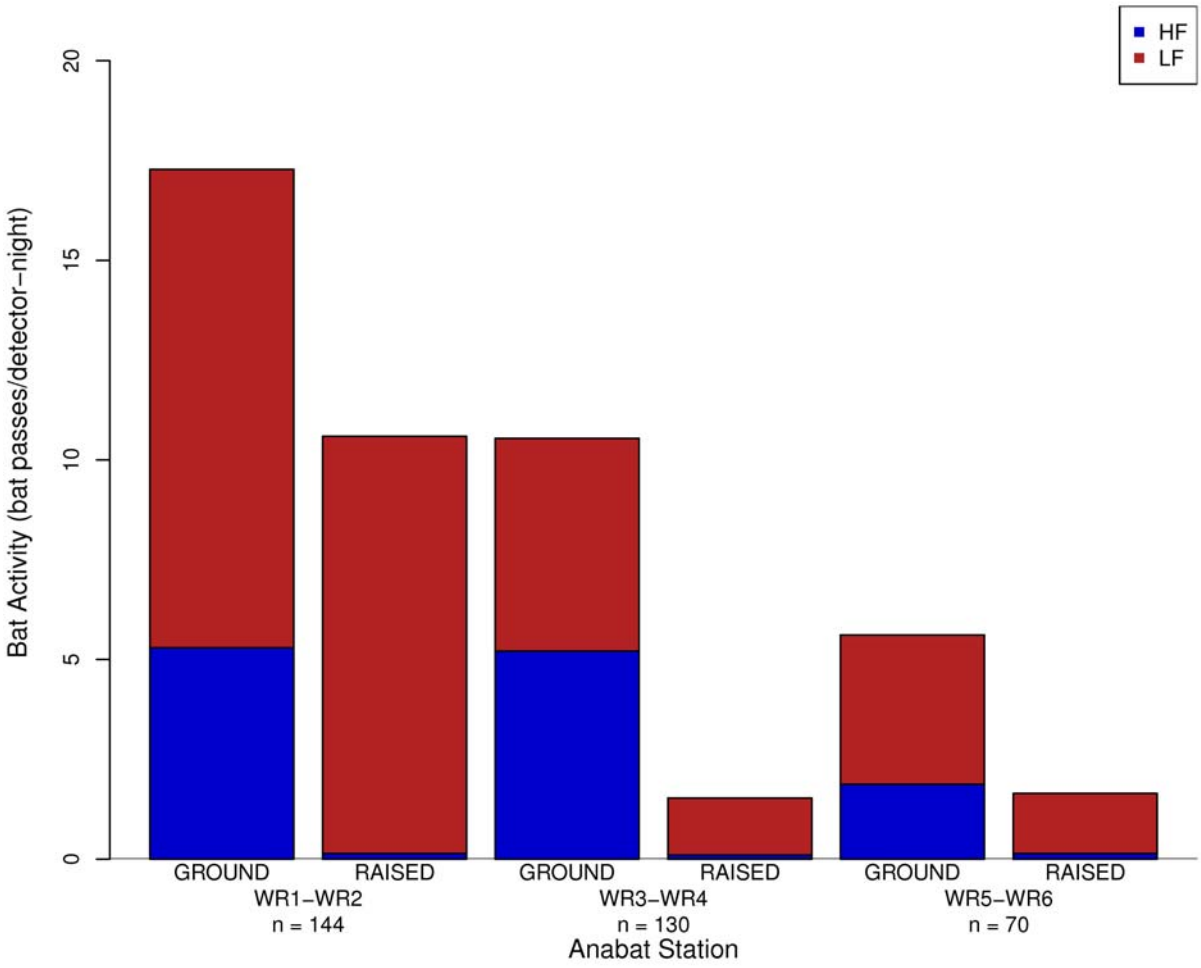


Figure 5. Number of high-frequency (HF) and low-frequency (LF) bat passes per detector-night recorded at paired ground and high Anabat unit stations at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

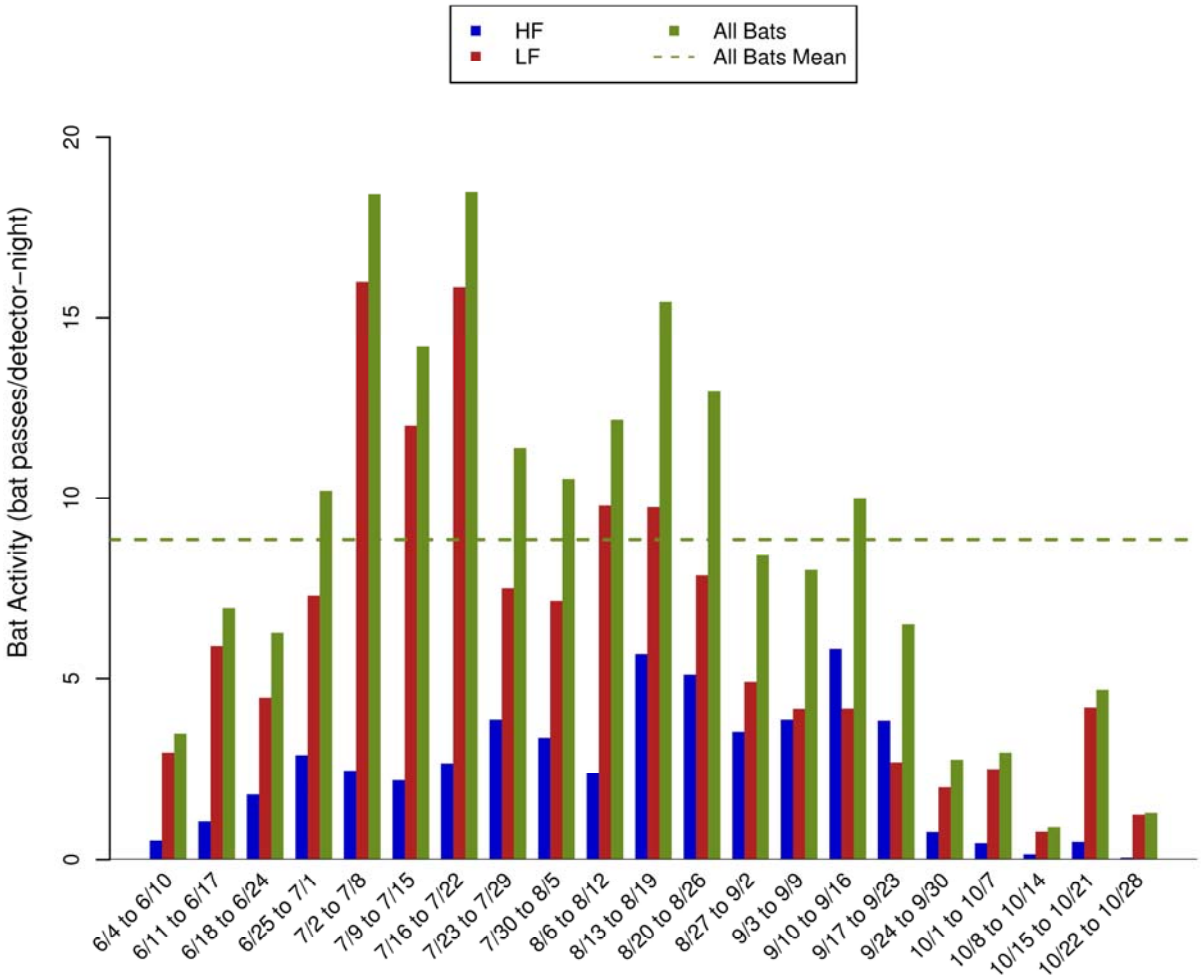


Figure 6. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

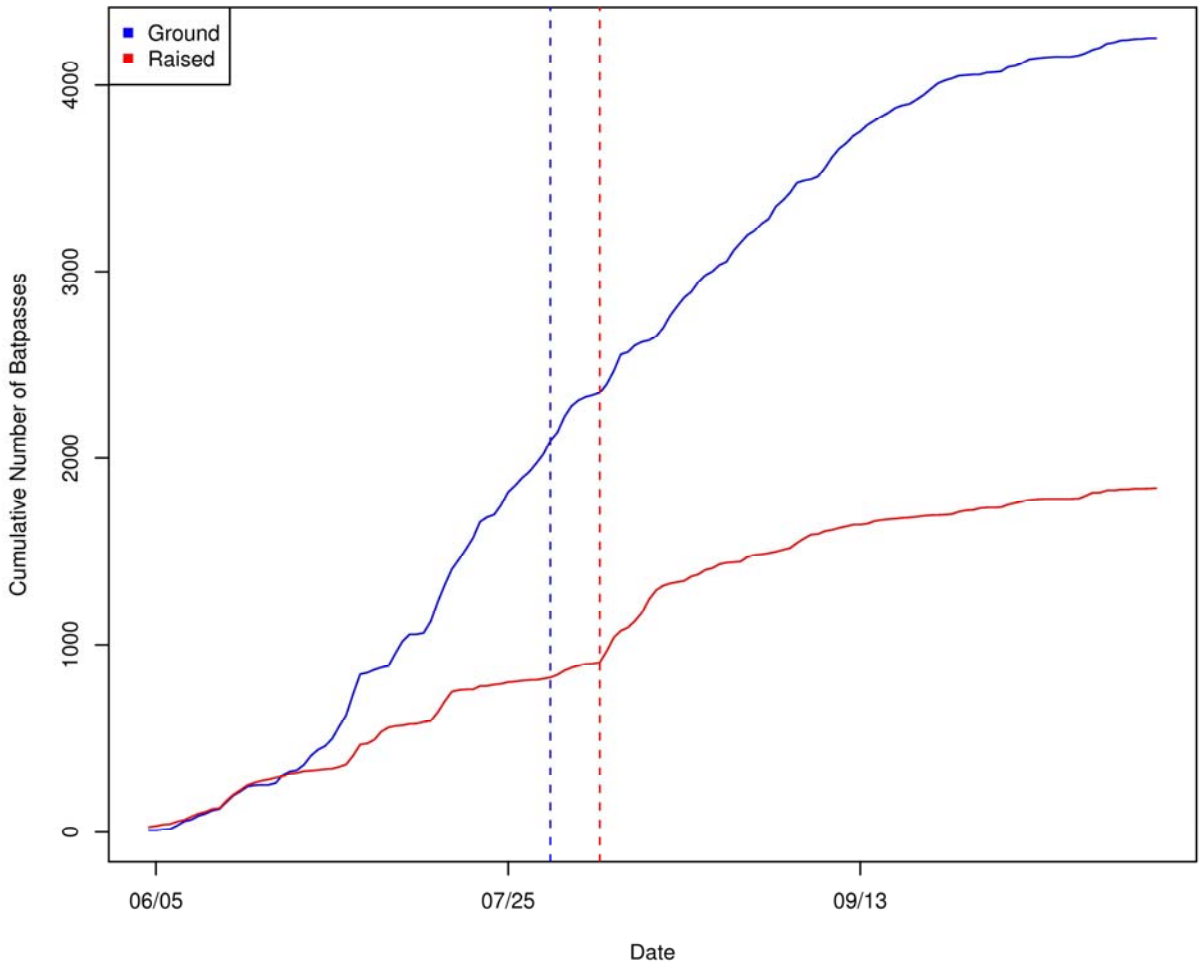


Figure 7. Empirical cumulative distribution of bat passes at ground and raised stations within the Whistling Ridge Wind Resource Area, June 4 – October 25, 2009. Dashed vertical lines indicate the point at which 50% of the calls occurred, an indication of the median date of bat activity.

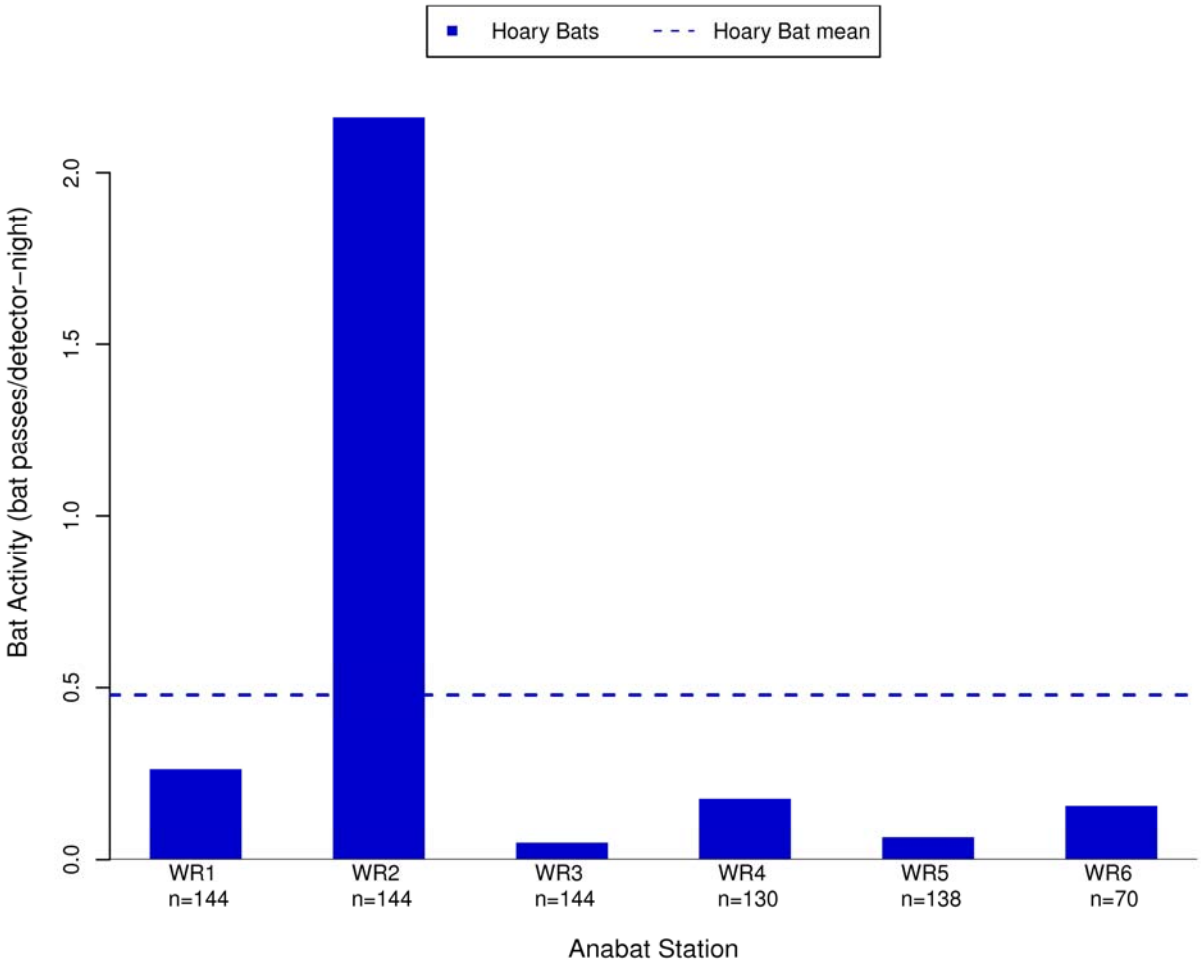


Figure 8. Number of passes per detector–night by hoary bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

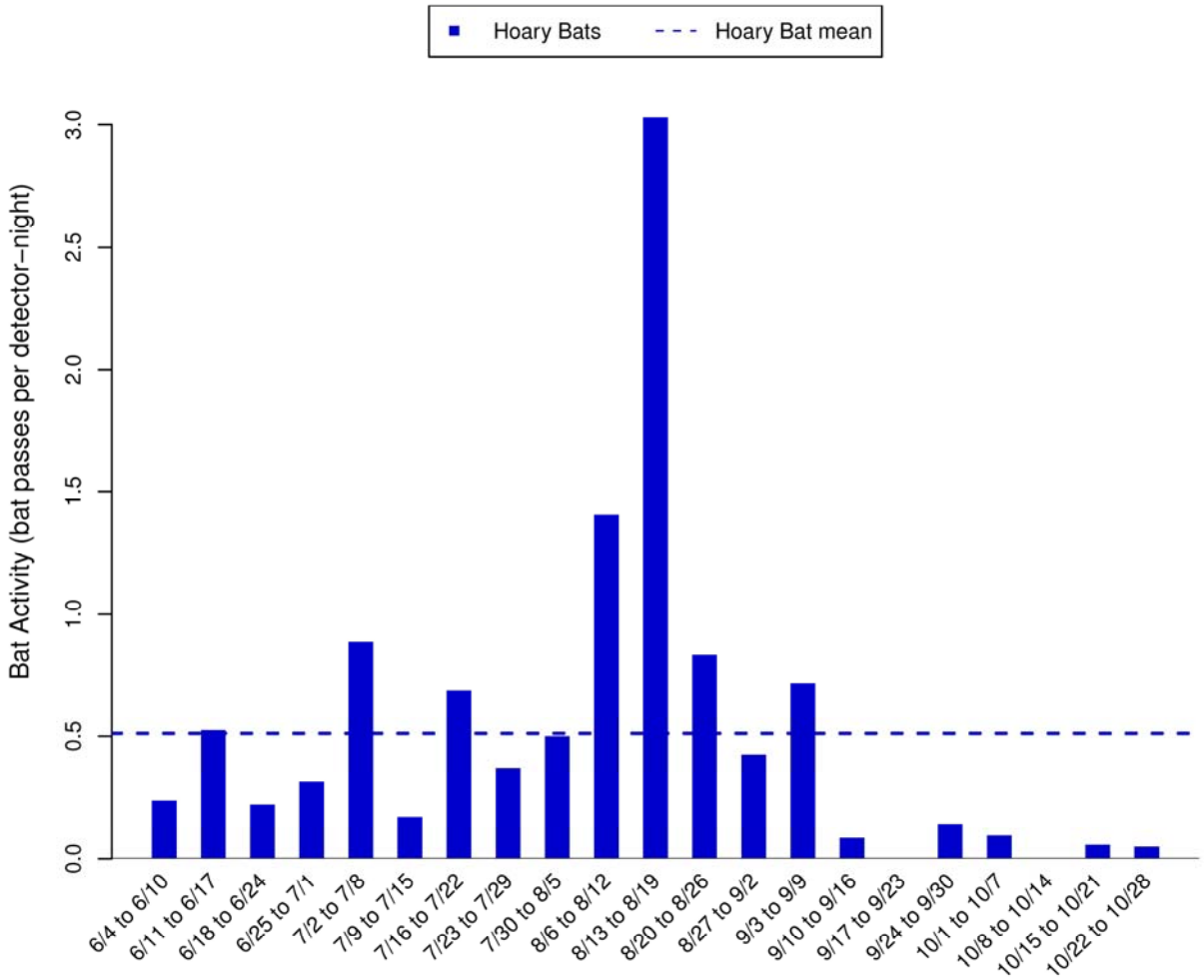


Figure 9. Weekly number of passes per detector–night by hoary bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

C-11

Revised Final Report. Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon.

Prepared for Klickitat County Planning Department.

WEST, Inc. 2010.

AVIAN, BAT AND HABITAT CUMULATIVE IMPACTS ASSOCIATED WITH WIND ENERGY DEVELOPMENT IN THE COLUMBIA PLATEAU ECOREGION OF EASTERN WASHINGTON AND OREGON

Prepared For:

Klickitat County Planning Department

Prepared By:

Gregory D. Johnson and Wallace P. Erickson

Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, Wyoming 82001



February 2010

TABLE OF CONTENTS

INTRODUCTION AND BACKGROUND 3
ANALYSIS AREA AND WIND ENERGY PROJECTS 3
METHODS 4
RAPTORS 5
ALL BIRDS 5
BATS 6
RESULTS 6
EXISTING DATA FOR CPE PROJECTS 6
Raptors 6
All Birds 7
Bats 7
MORTALITY ESTIMATES AND POPULATION CONSEQUENCES 8
Birds (Excluding Raptors) 8
Raptors 8
Upland Gamebirds 11
Waterfowl, Waterbirds and Shorebirds 12
Passerines 12
Sensitive Bird Species 13
Bats 14
INDIRECT EFFECTS 15
DISCUSSION 19
REFERENCES 21

LIST OF TABLES

Table 1. Avian use estimates and avian fatality estimates for existing wind energy projects in the Columbia Plateau Ecoregion. 27

Table 2. Avian use estimates (# observed per 20 minutes per plot with 800-m radius viewshed) for Wind Resource Areas in the Columbia Plateau Ecoregion 28

Table 3. Number and species composition of bird fatalities found at the existing Columbia Plateau Ecoregion wind energy projects. 29

Table 4. Percent composition of avian fatalities by species group for existing Columbia Plateau Ecoregion wind energy projects. 32

Table 5. Summary of bat mortality at existing wind energy projects in the Columbia Plateau Ecoregion. 33

Table 6. Number and species composition of bat fatalities found at eight existing Columbia Plateau wind energy projects. 34

Table 7. Seasonal timing of raptor fatalities at existing wind energy facilities in the Columbia Plateau 35

Table 8. Comparison of avian and bat fatality estimates presented in this report between 6700 and 5577 megawatts of wind energy development in the Columbia Plateau ecoregion 36

LIST OF FIGURES

Figure 1. Location of existing and proposed wind energy facilities in the Columbia Plateau Ecoregion of southeastern Washington and northeastern Oregon, October 2008. 37

Figure 2. Terrestrial vegetative communities within the Columbia Plateau Ecoregion. 38

INTRODUCTION AND BACKGROUND

Over the last decade, wind energy development has been occurring in Oregon and Washington within the Columbia Plateau physiographic region (ecoregion). With this development comes the potential for direct impacts to birds and bats through collision mortality and for indirect effects through habitat fragmentation or displacement of birds and other wildlife. Proposals for wind energy developments are commonly reviewed by natural resource agencies, private conservation groups, permitting authorities and other stakeholders. Frequently, baseline studies are conducted to estimate bird and bat abundance at proposed development sites for use in impact assessments and siting project features, followed by post-construction monitoring studies to measure actual impacts from the wind-energy facility.

With the possible exception of golden eagles (*Aquila chrysaetos*) at the Altamont Pass wind-energy facility, California, where an estimated 40–70 golden eagles are killed each year (Hunt 2002, Smallwood and Thelander 2004), no wind-energy facilities have been documented to cause population declines of any species (Johnson and Stephens 2010). The purpose of this report is to estimate cumulative impacts associated with all existing, permitted, and currently proposed wind-energy facilities within the Columbia Plateau Ecoregion (CPE) of eastern Washington and Oregon. This report updates a previous version (Johnson and Erickson 2008) to account for additional bird and bat fatality estimates from the Leaning Juniper and Klondike III wind energy projects in Oregon, as well as additional raw data on species composition of turbine fatalities from the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon. For the purpose of this analysis, we assumed that for cumulative impacts to occur, there must be a potential for a long-term reduction in the size of a population of birds or bats. When assessing the potential for cumulative impacts, it is necessary to first define the population potentially affected by wind energy development. Because birds and other animals do not recognize geopolitical boundaries, we have defined the affected population as those birds and bats of each species that breed, winter, or migrate through the CPE.

ANALYSIS AREA AND WIND ENERGY PROJECTS

As of September 2009, there were 4159 MW of wind energy either built or under construction in Washington and Oregon (AWEA 2009), most of which has been within the Columbia Plateau Level III Ecoregion (Thorson et al. 2003; Figure 1). In the earlier version of this cumulative effects analysis (Johnson and Erickson 2008), we attempted to contact every county within the CPE in an effort to estimate future wind energy development based on existing permit applications, which resulted in an estimate of 6700 MW of wind energy development in the CPE. However, past experience indicates that not all of the projects that are proposed will ultimately be issued permits for the size originally proposed and not all permitted projects are built, or fully built-out. Consequently, this method can result in significantly over-estimating future wind energy development. However, for consistency, for the purpose of this analysis, we assumed that 6700 MW of wind power would be present in the CPE. We also calculated the numbers of

fatalities that reflect Northwest Power and Conservation Council (NPCC) estimates, which recognize constraints on wind development, such as transmission capacity. NPCC projects that 5,577 MW of wind energy development will be installed by the year 2013 (Jeff King, Senior Resource Analyst, presentation to the Northwest Wind Integration Forum Steering Committee, January 7, 2010).

The Columbia Plateau was historically characterized by open, arid shrub-steppe and grassland-steppe habitats. The current predominant land use of the Ecoregion is dryland agriculture, land enrolled in the Conservation Reserve Program (CRP), and rangeland (Figure 2). Precipitation through the region is 6 to 12 inches (about 15-30 centimeters) per year (Thorson et al. 2003). Surrounding ecoregions are more mountainous, receive more precipitation, and are more forested than the Columbia Plateau.

METHODS

This report provides a broad, qualitative analysis using existing public information about existing and proposed wind-energy facilities in the region, estimated population sizes of birds in the CPE, results of fatality monitoring studies, and published literature to compile a cumulative impact analysis for bird and bat resources. The general approach to the cumulative effects analysis was to summarize results of fatality monitoring studies at operational wind-energy facilities within the CPE, and use those results to estimate impacts for all constructed and proposed wind-energy facilities within the same ecoregion. Habitat and land use throughout the entire CPE are similar.

This cumulative effects analysis relies heavily on data from 12 wind-energy facilities in the CPE where at least one full year of monitoring for fatalities has occurred. Most of the operating facilities have had or will have some sort of bird or casualty monitoring associated with them, and post-construction fatality monitoring data are available from 12 operational wind energy facilities in the CPE (Table 1). For each of the individual study areas from which fatality results are available, the predominant land use was a mosaic of agriculture, mainly dryland wheat farming, and grassland or shrub- steppe rangeland used for livestock grazing. In general, the region where future wind-energy facilities are being planned is similar in vegetation types (Quigley and Arbelbeide 1997), although, for any given facility, the amount of each type varies. It is assumed for the analysis that results from the existing studies would be applicable to new proposed facilities.

With the exception of the Condon, Oregon, wind-energy facility, where no scavenging or searcher efficiency trials were conducted to estimate total mortality, the 11 data sets used in this report were collected using similar methods, where observed fatality rates, calculated from standardized carcass searches, were adjusted for searcher efficiency and carcass removal biases. The analysis operates under the assumption that the bird and bat communities are similar across all wind-energy facilities because of habitat and land use similarities throughout the ecoregion, and thus are applicable to proposed facilities in this same ecoregion. Details about results, methods, and estimates of potential bird and bat impacts from each individual wind-energy facility are available in the referenced facility reports.

To define population sizes of those species most likely to be affected by wind energy development in the CPE, we used data from a recent publication that estimates breeding size of bird species by Bird Conservation Region, and then by that portion of each state within the Bird Conservation Region (see Blancher et al. 2007). Those portions of Washington and Oregon within the Great Basin Bird Conservation Region (see US NABCI Committee (2000) for a description) essentially comprise the same area that we have defined as the CPE. To our knowledge these are the only population estimates available for the entire CPE.

Raptors

Raptor use estimates and post-construction raptor fatality estimates are available for 12 facilities in eastern Washington and Oregon. Based on available data, it is likely that raptor mortality throughout the CPE would be on the same order of magnitude as other wind-energy facilities in the western US outside California, where it ranges from none to 0.15/MW/year (Johnson and Stephens 2010). Raptor use (raptors/survey) at wind resource areas (WRAs) in the CPE ranges from 0.26 to 1.64, and averages 0.68 observations per 20-min survey (Table 2). This use is substantially lower than that at Altamont Pass and High Winds, two facilities in California that have had relatively high levels of raptor mortality. Similar levels of raptor mortality in the CPE would not be expected. To predict raptor mortality for all existing and proposed wind-energy facilities in the CPE, we assumed it would be similar to the other existing wind-energy facilities in the CPE. Mean annual raptor mortality (fatalities/MW/year) at the 12 existing wind-energy facilities in eastern Washington and Oregon ranges from 0 to 0.21/MW/year, with a mean of 0.077/MW/year. Because the 1.5–3.0 MW turbines constructed or proposed for most new-generation wind-energy facilities are larger than turbines used at most of the existing wind-energy facilities, it is likely not appropriate to predict raptor mortality in the CPE using per turbine estimates from the other wind-energy facilities, as several of the existing facilities used smaller turbines, ranging from 0.66 – 1.5 MW in size. Therefore, we used per megawatt estimates of raptor mortality for extrapolating the estimated numbers of raptor fatalities in the CPE. To estimate cumulative mortality of individual species, we assumed that species composition of bird and bat fatalities associated with 6700 MW of wind energy would be similar to species composition of fatalities found at the 16 existing facilities in the CPE, including 12 with quantified fatality estimates and four with raw data on species composition and number of fatalities. For example, American kestrels (*Falco sparverius*) composed 31.4% of the raptor fatalities found at existing wind-energy facilities. To estimate the total number of American kestrel fatalities associated with 6700 MW of wind energy development, we assumed that they would also compose 31.4% of the total cumulative number of raptor fatalities per year.

All Birds

Compared with raptors, there is little correlation between total numbers of birds (all species) observed during pre-construction surveys (most of which are song birds) and post-construction mortality, presumably because many of the collision fatalities are nocturnal migrants (see Table 1), which are not accounted for during diurnal surveys. In addition, the survey methods for quantifying use are more relevant for large birds than for small birds. Total bird use at 24 wind-energy facilities in the CPE has ranged from 5–23.6 birds/survey and averaged 13.4 birds/survey (Table 2). Total bird use at the 12 wind-energy facilities in eastern Washington and Oregon with

post-construction fatality data ranged from 5.0 birds/survey at Wild Horse to 23.6 birds/survey at Leaning Juniper, and averaged 12.0 birds/survey (Table 1). Because total bird use at proposed wind-energy facilities with pre-construction bird use data is within the range of similar bird use values for existing wind-energy facilities in the CPE, it is reasonable to assume that mortality of all birds combined at CPE wind-energy facilities would be similar to that observed at the 12 existing wind-energy facilities in the CPE. Therefore, we multiplied the total number of MW by 2.5 fatalities/MW/year (the mean among the 12 CPE wind-energy facilities) to estimate total bird mortality. To estimate total cumulative mortality by bird type and/or species, we assumed the fatalities associated with 6700 MW of wind energy would have the same group and species composition as fatalities found at existing wind-energy facilities in the CPE.

Bats

To estimate cumulative bat mortality for all projects in the CPE, we assumed that bat mortality would be similar to the existing wind-energy facilities located in the CPE. Therefore, we multiplied the total number of MW by the mean number of bat fatalities/MW/year at the other CPE Projects (1.20/MW/year). We estimated the total number of fatalities by species assuming species composition would be similar to the species composition of bat fatalities found at existing wind-energy facilities in the CPE.

RESULTS

Existing Data for CPE Projects

Raptors

Raptor use estimates and post-construction raptor fatality estimates are available for 12 wind-energy facilities in eastern Washington and Oregon. Pre-construction raptor use estimates at these wind-energy facilities have ranged from 0.26 raptors/survey at Nine Canyon, to 0.90 raptors/survey at Bighorn I, and averaged 0.52/survey (Table 2). Raptor mortality was not documented at four of these wind-energy facilities (Klondike I, Klondike III, Vansycle and Combine Hills) during one-year post-construction mortality surveys, and was relatively low at the other eight, ranging from 0.05/MW/year at Nine Canyon, Washington to 0.21/MW/year at Leaning Juniper, Oregon. Quantitative mortality estimates were not made for Condon, but only one raptor fatality was documented at that facility.

The 70 raptor fatalities found at CPE wind-energy facilities have composed 8.4% of the total bird mortality. Most of the raptor fatalities have been American kestrels (22 fatalities; 31.4%), red-tailed hawks (*Buteo jamaicensis*; 14 fatalities; 20.0%) and short-eared owls (*Asio flammeus*; 7 fatalities; 10.0%). Other raptors found as fatalities at CPE wind-energy facilities include six Swainson's hawks (*Buteo swainsonii*), four ferruginous hawks (*Buteo regalis*), three rough-legged hawks (*Buteo lagopus*), two of each of the following: great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), northern harrier (*Circus cyaneus*), unidentified buteo, and one each of the following: golden eagle (*Aquila chrysaetos*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), barn owl (*Tyto alba*), unidentified owl, and unidentified accipiter (Table 3).

All Birds

Eighty-nine species have occurred as fatalities at existing wind energy facilities in the CPE. Passerines (songbirds) have been the most abundant bird fatality at modern wind-energy facilities in western North America, comprising 59.3% of total bird fatalities (Johnson and Stephens 2010). Passerines are also the most commonly observed birds during pre-construction fixed-point bird use surveys at all of these sites. Both migrant and resident passerine fatalities have been observed. Songbird mortality at wind-energy facilities in eastern Oregon and Washington has been reasonably consistent among sites. Songbirds have composed 67.1% of the bird mortality at CPE wind-energy facilities. Horned larks (*Eremophila alpestris*) have been the most commonly observed songbird fatality in the CPE, composing 29.7% of all bird fatalities (Table 3), and have been the most abundant songbird observed during pre-construction fixed point bird use surveys at these sites. Based on long term Breeding Bird Survey (BBS) data, horned larks are likely one of the most common birds in the Columbia Plateau. No other resident songbird species comprised a large proportion of the fatalities observed at the wind-energy facilities in the CPE (Table 3). The one apparent migrant with the highest number of fatalities is the golden-crowned kinglet (*Regulus satrapa*; 47 fatalities; 5.6% of all fatalities).

Mourning doves (*Zenaida macroura*) and rock pigeons (*Columba livia*) have composed 4.3% of the mortality at CPE wind-energy facilities. Waterfowl, waterbirds and shorebirds have composed only 2.1% of the fatalities. Mortality compared to use by these groups is very low. For example, only two Canada goose fatalities were documented at the Klondike, Oregon wind-energy facility (Johnson et al. 2003a), even though 43 flocks totaling 4845 individual Canada geese were observed during pre-construction fixed-point bird use surveys (Johnson et al. 2002a). Shorebird use of wind-energy facilities in the CPE has been low, with the most common species being killdeer. Shorebirds as a group are rarely killed at wind-energy facilities; of 1247 avian fatalities collected at modern wind-energy facilities in western North America and summarized in Johnson and Stephens (2010), only three (0.2%) were shorebirds. Low shorebird mortality has occurred even though shorebirds have been recorded at virtually every wind-energy facility evaluated. Some waterfowl, shorebird and other waterbird mortality will occur at CPE wind-energy facilities, but based on all available data from other facilities, the numbers are expected to be low relative to the use of each area. Upland gamebirds documented during surveys of CPE wind-energy facilities include ring-necked pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), chukar (*Alectoris chukar*), and California quail (*Callipepla californica*). Upland gamebird mortality is fairly common, as upland gamebirds have comprised 9.6% of all fatalities at modern wind energy facilities in western North America, behind only passerines and raptors (Johnson and Stephens 2010). In the CPE, upland gamebirds are one of the most common fatalities, composing 12.6% of all identified fatalities (Table 4). Based on habitat present, results from other regional wind-energy facilities, and the presence of upland gamebirds during baseline surveys, some mortality of upland gamebirds is expected to occur at nearly all wind-energy facilities in the CPE.

Bats

Bat mortality estimates have been made for 11 existing wind-energy facilities in the CPE, where they ranged from 0.23–2.46 fatalities/MW/year, and averaged 1.20 fatalities/MW/year (Table 5). Bat mortality patterns at wind-energy facilities in Washington and Oregon have followed patterns similar to the rest of the country. Of 390 bat fatalities collected at existing wind-energy

facilities in eastern Oregon and Washington, 364 (93.4%) have been the two migratory species that occur in the CPE, including 180 hoary bats (*Lasiurus cinereus*) and 184 silver-haired bats (*Lasionycteris noctivagans*). The other mortalities have consisted of small numbers of big brown bats (*Eptesicus fuscus*), little brown bats (*Myotis lucifugus*), and unidentified bats (Table 6). Virtually all of the mortality has occurred in late summer and early fall, during the fall migration period for hoary and silver-haired bats.

Mortality Estimates and Population Consequences

Birds (Excluding Raptors)

For all birds combined, we estimate that total annual mortality in the CPE would be 16,750 birds/year. Despite several thousand bird fatalities from 6700 MW of wind power, these impacts are spread across numerous species and bird groups, as well as across seasons. Therefore, the overall impact to any given species or population of a species is substantially less. Based on species composition of fatalities at existing CPE wind-energy facilities (Table 3), passerines would compose approximately 67.1% of the fatalities, upland gamebirds would compose 12.6%, doves/pigeons would compose 4.3%, waterfowl/waterbirds/shorebirds would compose 2.1% and other bird types, such as woodpeckers, nighthawks and swifts, would compose 3.0%. Approximately 4.5% of the mortality would be composed of non-protected European starlings (*Sturnus vulgaris*), rock pigeons and house sparrows (*Passer domesticus*).

Raptors

Using raptor mortality estimates from existing wind energy facilities in the CPE, we estimate total raptor mortality in the CPE would be 516 fatalities per year. . American kestrels account for 31.4%, red-tailed hawks account for 20.0% and short-eared owls account for 10.0% of the raptor fatalities recorded at the regional wind projects studied (see Table 3). Assuming this trend holds true for all proposed wind-energy facilities in the CPE, and assuming there would be 516 raptor fatalities per year, it would be expected that on average 162 American kestrels, 103 red-tailed hawks and 52 short-eared owls would be killed each year.

The other species of raptors occurring in the CPE have had no or few fatalities at existing wind-energy facilities, and would likely represent a much smaller number of fatalities. For example, no peregrine falcon (*Falcon peregrinus*) or prairie falcon (*Falco mexicanus*) fatalities have been reported to date; therefore, our mortality estimate for this species is necessarily zero. Although one prairie falcon was found in the parking lot of the White Creek wind energy facility, it was not considered turbine related and was therefore not included in this analysis. Three species of concern in the region, golden eagle, ferruginous hawk and Swainson's hawk, have all been found as turbine collision victims in the CPE. Ferruginous hawks have composed 5.7% of the raptor fatalities, Swainson's hawks have composed 8.6%, and golden eagles have composed 1.4%. Assuming a total of 516 raptor fatalities could occur each year in the CPE, this would result in 29 ferruginous hawk, 44 Swainson's hawk, and seven golden eagle fatalities per year.

The three species of raptors with the largest expected numbers of fatalities due to wind energy development in the CPE are American kestrel, red-tailed hawk and short-eared owl. Raptor fatalities in the CPE have occurred throughout the year, with 23.1% in the spring, 43.1% in the summer,

21.5% in the fall, and 10.8% in the winter (Table 7). Approximately 56.9% of the raptor fatalities have occurred during the spring and fall migration, and during winter periods, when the affected population could contain birds from numerous local breeding populations in the Pacific Northwest as well as further north in Canada. Assuming approximately 43.1% of the mortality would occur during the breeding season, it would be expected that approximately 70 American kestrel, 44 red-tailed hawk and 22 short-eared owl fatalities would occur during the breeding season. An estimate of the breeding population in the Columbia Plateau, based on the BBS long-term average data, is approximately 170,000 breeding American kestrels, 77,000 breeding red-tailed hawks and 21,000 breeding short-eared owls (Blancher et al. 2007). Annual collision mortality in the CPE would represent approximately 0.04% of the breeding population of American kestrels, 0.06% of the breeding population of red-tailed hawks and 0.10% of the breeding population of short-eared owls. Even if we assumed all mortality (instead of 43.1%) would occur to adult breeding birds, this would still represent only 0.10%, 0.13% and 0.25% of the breeding American kestrels, red-tailed hawks and short-eared owls, respectively, in the CPE. Background mortality for these species is much higher than this estimate and the additional wind energy related mortality is likely insignificant from a population standpoint. Typical annual mortality rates for red-tailed hawks are 54% of juveniles, 20% of subadults, and 20% of adults. American kestrels suffer even higher mortality, as the annual mortality rate is 69% of juveniles and 45% of adults (Millsap and Allen 2006). Annual survival data are not available for short-eared owls (Wiggins et al. 2006). Given these numbers, plus the fact that most raptor populations can withstand additional harvest of nestlings and migrating birds by falconers of 10-20% or even higher (Millsap and Allen 2006), it is unlikely that the additional mortality of <0.30% associated with projected wind power development in the CPE would lead to measurable population effects for American kestrels, red-tailed hawks and short-eared owls. Based on an analysis of population sizes and survival rates, the US Fish & Wildlife Service conservatively estimates that falconers could harvest 13,216 juvenile red-tailed hawks and 19,575 juvenile American kestrels each year in the US without any consequences to populations (Millsap and Allen 2006). Actual harvest by falconers in 2004 was only 1062 raptors comprised of 15 species (Milsap and Allen 2006). Given these estimates of a sustainable harvest and the actual number of birds harvested, the number of birds killed in 2004 by wind turbines in North America should have fallen into a range of sustainable mortality.

Even though only four ferruginous hawk, six Swainson's hawk, and one golden eagle fatalities have been found at existing wind energy facilities in the CPE, these raptors are species of concern and warrant additional analysis. The ferruginous hawk is listed as threatened by the Washington Department of Fish and Wildlife (WDFW) and as "critical" by the Oregon Department of Fish and Wildlife (ODFW), while the Swainson's hawk is listed as "vulnerable" by the ODFW. The estimated breeding population in the CPE is 1000 ferruginous hawks (Blancher et al. 2007). Ferruginous hawks may occur in the CPE throughout the year and their populations include breeders, migrants and winter residents, as well as juveniles and adults. Given our estimate of 29 ferruginous hawk fatalities on an annual basis, even if all turbine mortality occurred to resident breeding adult birds, this would represent 2.9% of the breeding ferruginous hawks in the CPE. Because mortality would likely be spread out among migrants, winter residents, resident breeders, and juveniles as well as adults, mortality of adult ferruginous hawks actually breeding in the CPE would be less than 2.9%, likely on the order of 1–2%. According to Millsap and Allen (2006), ferruginous hawk populations can sustain 1% harvest rates (limited to juveniles) without affecting

populations. This harvest rate was considered conservative because it was modeled using data obtained from red-tailed hawk banding or marking studies, which typically greatly underestimate survival in raptors compared to telemetry studies. Therefore, the sustainable harvest rate is likely greater than 1%. To put a 1-2% mortality rate into perspective, we examined existing mortality rates of ferruginous hawks. A study of ferruginous hawks in Washington State found that annual adult mortality was 24%, and mortality of juvenile ferruginous hawks was 57% between the first and second year (Watson 2003). A ferruginous hawk banding study in Alberta, Canada found that first year mortality was 60% (Schmutz and Fyfe 1987), and a study of ferruginous hawks in Utah found that annual mortality was 25% for adults and 66% for juveniles the first year (Woffinden and Murphy 1989). Another study in Canada (Alberta and Saskatchewan) found that annual adult mortality was 29.2%, and first year mortality of nestlings was 45.5%. Despite annual adult mortality of 29.2%, the authors concluded that adult survival was not limiting the population; abundance of ground squirrels, which affected nesting success, appeared to be the primary factor regulating population size (Schmutz et al. 2008). Given published annual mortality rates for adult ferruginous hawks of 24–30%, additional losses of 1–2% of resident breeders associated with 6700 MW of wind energy development in the CPE would not likely have measurable population consequences.

The above analysis is for the entire population of 1000 ferruginous hawks in the CPE. It assumes that wind energy development and ferruginous hawk populations are spread uniformly across the entire CPE, which is not the case. Given the actual locations of existing and proposed wind energy facilities and ferruginous hawk population centers, actual impacts are likely lower. For example, the existing and proposed wind energy development in Klickitat County, Washington is approximately 1902 MW, or 28% of the 6700 MW of all currently existing and proposed wind energy development in the CPE. However, only three breeding pairs of ferruginous hawk are known to occur in the county (Jim Watson, Wildlife Research Scientist, Washington Department of Fish and Wildlife, pers. commun). Therefore, the county with the largest amount of wind energy development has a low breeding population of ferruginous hawks, which reduces the potential for significant impacts to this species across its entire range in the CPE. There is consequently little overlap between areas of intensive wind energy development and core breeding areas for ferruginous hawk, which further reduces the potential for cumulative impacts to this species. Although local populations of ferruginous hawk may be reduced in areas of intensive wind energy development, the evidence suggests that this impact is not likely to affect the ferruginous hawk population in the entire CPE.

Breeding Bird Survey data collected over the last 27 years (1980–2007) show a negative trend in population growth for ferruginous hawks in the CPE (Sauer et al. 2008), but the negative trend is not statistically significantly due to low sample sizes and uncertainty (Sauer et al. 2008). If ferruginous hawk populations are declining in the region, and wind energy development continues at its current rate of growth in the CPE, ferruginous hawk collision mortality could eventually reach a point that populations may begin to decline without some form of mitigation. Mitigation could include establishing conservation easements around ferruginous hawk breeding territories, erecting artificial nest structures, or otherwise improving habitat for ferruginous hawks in the CPE (Johnson et al. 2007).

The estimated Swainson's hawk breeding population in the CPE is 10,000 (Blancher et al. 2007). Unlike ferruginous hawks, Swainson's hawks occur in the CPE only during summer and most are resident breeders. Given our mortality estimate of 44 Swainson's hawks per year, this would represent only 0.44% of the Swainson's hawks in the CPE. Compared to many other raptor species, there is little data on annual survival of Swainson's hawks (England et al. 1997). The annual mortality rate of Swainson's hawks was reported in one study from western Canada, where it was estimated to be 15.7%, and nestling mortality rates ranged from 56–81% over the multi-year study (Schmutz et al. 2006). Given these mortality rates, additional losses of <0.5% would be considered sustainable and would not have measurable population consequences.

The golden eagle is federally protected by the Bald and Golden Eagle Protection Act and is listed as a candidate species by the WDFW, but does not have any special status in Oregon. The estimated breeding population in the CPE is 1770 (Blancher et al. 2007). Golden eagles may occur in the CPE throughout the year and their populations include breeders, migrants and winter residents, as well as juveniles and adults. Given our annual estimate of seven golden eagle fatalities, even if all turbine mortality occurred to resident breeding adult birds, this would represent 0.4% of the breeding golden eagles in the CPE. Because mortality would likely be spread out among migrants, winter residents, resident breeders, and juveniles as well as adults, mortality of adult golden eagles that breed in the CPE would be less than 0.4%. Mortality of golden eagles the first year after independence ranges from 54% to 82% (Kochert et al. 2002). At the Altamont Pass Wind Resource Area in California, mortality of radio-marked golden eagles was 16% the first year, 21% for floating birds one to three years old, and 9% for adult breeders (Hunt 2002). Based on a regression analysis of banding data, Harmata (2002) estimated that only 50% of golden eagles survive to the age of three years. Given these published mortality rates for golden eagles, additional losses of <0.4% of the population associated with 6700 MW of wind energy development in the CPE would not likely have measurable population consequences for golden eagles.

Upland Gamebirds

Upland gamebirds represent a higher percentage (12.6%) of the bird fatalities in the Columbia Plateau than in other regions in the US. No native upland gamebirds have been found as fatalities at wind-energy facilities in the CPE. All of the fatalities have been ring-necked pheasant, gray partridge, and chukar, which are all introduced species. Given our total bird mortality estimate of 16,750, approximately 2110 upland gamebird fatalities would be expected to occur on an annual basis.

The species most impacted, ring-necked pheasant, gray partridge, and chukar, are all common in mixed agricultural native grass/steppe habitats. Habitats throughout the Columbia Plateau are highly suitable for these species and the large populations likely influence the higher mortality rate for the regional wind-energy facilities. The total estimated population size of these three species combined in the CPE of Oregon and Washington is 370,900 (Blancher et al. 2007); therefore, wind energy fatalities would compose approximately 0.57% of the population. As with non-native (non-protected) passerine species, there is generally lower concern over impacts to exotic upland gamebirds. Given the vast amount of suitable habitat and the ability of these species to withstand harvest rates substantially higher than 0.57%, it is unlikely that additional fatalities from wind energy development would be significant from a population standpoint.

Waterfowl, Waterbirds and Shorebirds

Waterfowl, waterbirds and shorebirds represent a very small percentage (2.1%) of all fatalities at existing wind energy projects in the CPE. Based on our total bird mortality estimate of 16,750, approximately 352 fatalities could result on an annual basis.

Populations of waterfowl, waterbirds and shorebirds in the CPE are considerable. In addition, members of these groups are present year-round in the form of resident breeders, migrants, and winter residents. Given that we estimate only a few hundred individuals will be killed by turbine collisions on an annual basis, no cumulative impacts on these species are likely. In addition to killdeer, another shorebird commonly associated with upland habitats where wind-energy facilities are placed, is long-billed curlew. To date, however, only one fatality of this sensitive species has been documented at existing wind-energy facilities in the CPE.

Passerines

For projects in the CPE, approximately 67.1% of the bird fatalities have been passerines (Table 5). Assuming that 67.1% of all bird mortality would be composed of passerines, approximately 11,239 passerine fatalities would occur annually in the CPE. Of all passerine fatalities recorded during the regional monitoring studies, horned lark made up nearly half (44.3%) of the fatalities. Assuming this pattern holds for all CPE wind-energy facilities, it could be expected that on average there would be 4975 horned lark fatalities per year. Another common grassland breeder in the CPE, western meadowlark (*Sturnella neglecta*), composed approximately 4.8% of the passerine fatalities at wind-energy facilities, and therefore total annual mortality of this species related to wind turbine collisions would be approximately 540 individuals. At wind-energy facilities in the CPE, migrant passerines of several species generally composed approximately 30% of the bird fatalities (Table 1). Assuming these estimates are representative of all CPE wind-energy facilities, approximately 5025 nocturnal migrant fatalities would be expected per year if 6700 MW of wind power were constructed. The most common migrant fatality at existing wind-energy facilities in the CPE was golden-crowned kinglet (Table 3). Approximately 5.6% of the passerine fatalities were of this species; therefore, estimated annual mortality for this species would be approximately 938 individuals.

According to Blancher et al. (2007), the estimated size of the breeding population of horned larks in that portion of the CPE in Washington and Oregon is 2.2 million. Given our estimate of 4975 horned lark fatalities, and if it is assumed that the horned lark fatalities are spread equally over the year, then roughly 25% (~1244) of these fatalities would be during the breeding season. This represents approximately 0.06% of the breeding horned lark population. Given that most of the mortality will be composed of common species with widespread distribution and large populations, that annual mortality rates of song birds typically range from 30–70% (Lack 1966; Welty 1982), losses amounting to less than one percent are impacts to individuals, and therefore not significant from a population standpoint.

While this example represents a plausible means of addressing potential population impacts under a number of assumptions, it illustrates the low level of effect on the common grassland/agricultural species that comprise the largest portion of the fatalities. Similar examples could be used for the other species that illustrate lower effects. For example, the BBS data indicate the breeding

population of western meadowlarks in the CPE of Oregon and Washington is one million (Blancher et al. 2007). Given our estimate of 540 western meadowlark fatalities, the impact on the western meadowlark breeding population in the Columbia Plateau would be minor and insignificant. The number of fatalities from other species are even fewer (see Table 3) and unlikely to have any population effects.

In general, while modern turbines are getting taller, new wind-energy facilities do not appear to have a large impact on migrant birds. Results of marine radar surveys for proposed wind-energy facilities have indicated that the vast majority of nocturnal migrants fly at altitudes that do not put them at risk of collision with turbines (Young and Erickson 2006). Also, there have been only two multiple individual mortality events during a migration season reported at newer wind-energy facilities in the US. At Buffalo Ridge, Minnesota, fourteen migrating passerine fatalities (vireos, warblers, flycatchers) were observed at two turbines during a single night in May 2002 (Johnson et al. 2002b), and 33 migrating passerine fatalities (mostly warblers) were observed near one turbine and a well-lit substation at the Mountaineer, West Virginia, wind-energy facility in May 2004 (Kerns and Kerlinger 2004). At wind-energy facilities in the CPE, migrant passerines of several species generally composed approximately 30% of the bird fatalities. Some impacts are expected for nocturnal migrating species; however, impacts are not expected to be great for the CPE. The apparent migrant with the greatest number of collision fatalities is golden-crowned kinglet. Our annual mortality estimate for golden-crowned kinglet was 938, which would represent 0.13% of the estimated breeding population size of this species in the CPE of Oregon and Washington, which is 720,000 (Blancher et al. 2007). Golden-crowned kinglets are typically associated with forested habitats during the breeding season, so it is assumed that many of the impacted individuals were from surrounding mountainous ecoregions or populations further north (e.g., Canada), rather than from the CPE. As with horned lark, estimating the potential population size from which these birds came requires a number of assumptions. However, while the potential population size is unknown, it is possible that the individual fatalities came from several populations in surrounding or more northern ecoregions, thus further diluting the impacts on any one population. Other potential migrant species were found in lower numbers. Cumulatively the impacts to migrants would be spread over a much larger population base and are not considered significant.

Sensitive Bird Species

In addition to golden eagle and ferruginous and Swainson's hawks discussed above, other species classified as sensitive species by the WDFW and/or ODFW have been found as fatalities at CPE wind energy projects. These include long-billed curlew (*Numenius americanus*), Lewis's woodpecker (*Melanerpes lewis*), grasshopper sparrow (*Ammodramus savannarum*), sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*) and Vaux's swift (*Chaetura vauxi*). Only one fatality of each of the above species has been found at CPE wind energy projects. Given that 837 bird fatalities have been found at these projects and estimated total bird mortality is 16,750, the estimated mortality for each of these species would be approximately 20 fatalities per year. The estimated population sizes of each of these species in the CPE based on Blancher et al. (2007) is 25,000 Lewis's woodpeckers, 149,000 grasshopper sparrows, 1,060,000 sage thrashers, 314,000 sage sparrows, and 110,000 Vaux's swifts; no estimate was provided for long-billed curlew. Given these estimated populations sizes, the loss of 20 individuals per year would not have measurable population consequences.

Bats

Based on bat mortality estimates at the other regional wind-energy facilities, total bat mortality in the CPE was estimated at 8040 per year. Based on species composition of bat fatalities found at CPE wind-energy facilities, approximately 3795 silver-haired and 3714 hoary bat fatalities would occur in the CPE on an annual basis.

Unlike birds, there is little information available about population sizes of most bat species, especially the non-hibernating, solitary tree-roosting species that compose most of the wind-energy facility related mortality in North America. Results of monitoring studies across the US and Canada have found similar trends in impacts. Risk to bats from wind turbines is unequal across species and across seasons. The majority of bat fatalities at wind projects in western North America have been tree roosting bats that are long-distance migrants (Johnson and Stephens 2010). Silver-haired bats throughout the US and species in the *Lasiurus* genus, the hoary bat in the western U.S. and the eastern red bat (*L. borealis*) in the Midwest and eastern U.S., are the most abundant fatalities found at wind-energy facilities. Less common fatalities include big brown bats and *Myotis* species (Arnett et al. 2008, Johnson 2005, Johnson and Stephens 2010). The highest mortality occurs during the fall migration period for bats, from roughly late-July through September (Arnett et al. 2008, Johnson 2005). Much lower mortality rates occur in the spring and summer, particularly in the CPE.

More recently, studies at different locations in the US and Canada appear to indicate that bat mortality is not related to site features or habitat, and dissimilar results for ecologically similar facilities have been found (Baerwarld and Barclay 2009). While it is hypothesized that eastern deciduous forests in mountainous areas may be the highest risk areas, relatively high bat mortality has also occurred at wind-energy facilities in prairie/agricultural settings (Alberta, Canada; Baerwald 2008) and row crop agricultural settings in the Midwestern US (Jain 2005, Gruver et al. 2010). Bat mortality in the CPE would involve primarily silver-haired and hoary bats. Most mortality is observed during the fall migration period. The regional monitoring studies suggest resident bats do not appear to be significantly affected because very low numbers of resident bat species have been observed as fatalities. One species of potential concern is the Townsend's big-eared bat (*Corynorhinus townsendii*), a state candidate species in Washington. Very little is known about the current distribution of Townsend's big-eared bat in Washington. According to Marshall et al. (1996) the subspecies *Corynorhinus townsendii pallescens* occurs east of the Cascade Range, within the CPE. A Biological Assessment prepared to address the potential for a wind-energy facility in West Virginia to impact the federally endangered Virginia big-eared bat (*Corynorhinus townsendii virginianus*), a subspecies of Townsend's big-eared bat, concluded that the collision risk to this species is very low because it is non-migratory and forages well below the space occupied by turbine blades (Johnson and Strickland 2003). These conclusions are also likely applicable to Townsend's big-eared bat, and to date no fatalities of this species have been found at any wind energy facility in the CPE.

Hoary bats and silver-haired bats occupy forested habitats during the breeding season – habitat distinctly lacking and localized throughout the CPE. The significance of wind energy impacts on hoary and silver-haired bat populations is difficult to predict, as there is no information available on the overall population sizes of these bats. However, hoary and silver-haired bats are widely

distributed throughout North America. Most concern over impacts to bats is with wind-energy facilities built on ridgetops in the Appalachian Mountains, where mortality levels have been as high as 39.7 bat fatalities/MW/year (Kerns et al. 2005), substantially higher than the average of 1.20 bat fatalities/MW/year observed in the Pacific Northwest.

In general, mortality levels on the order of one to two bats per MW are likely not significant to populations, although cumulative effects may have greater consequences for long-lived, low-fecundity species such as bats. Unlike many bird species that may have multiple clutches of multiple young per year, bats are long-lived species with relatively low reproductive rates. For example, hoary and silver-haired bats typically produce only two young per year (Shump and Shump 1982, Kunz 1982). As such, their populations are much slower to recover from large fatality events than other species, such as most birds, that have much higher reproductive rates. Bats tend to live longer than birds, however, and may have a longer breeding lifespan. The impact of the loss of breeding individuals to populations such as these may have greater consequences.

Because migratory tree bats are primarily solitary tree dwellers that do not hibernate, it has not been possible to develop any suitable field methods to estimate their population sizes (Carter et al. 2003). As a result, impacts on these bat species caused by wind energy development cannot be put into perspective from a population impact standpoint. To help solve this problem, population genetic analyses of DNA sequence and microsatellite data are being conducted to provide effective population size estimates, to determine if populations are growing or declining, and to see if these populations are comprised of one large population or several discrete subpopulations that use spatially segregated migration routes (Amy L. Russell, Assistant Professor, Grand Valley State University, Allendale, Michigan, pers. commun.).

Since it is most likely breeding populations from surrounding mountainous/forested ecoregions or from more northern areas (e.g., Canada) are affected at the Columbia Plateau wind-energy facilities during the fall migration, the dynamics of these populations would need to be known to predict population effects. For large and stable populations the level of impact is not expected to be significant, although impacts could be more pronounced for less stable populations. Bat Conservation International (BCI), the American Wind Energy Association (AWEA), the US Fish & Wildlife Service (USFWS), and the US Department of Energy National Renewable Energy Laboratory (NREL) have initiated a research effort termed the Bat Wind Energy Cooperative to conduct research and further understand bat and wind turbine interactions and how to prevent or minimize bat fatalities at wind energy facilities.

Indirect Effects

Grassland and shrub-steppe communities are the most abundant native communities in the CPE, but they are also highly subjected to development and conversion to agriculture (Johnson and O'Neil 2001). In addition to potentially thousands of new vertical structures, added wind energy generation in the region will result in more roads (mostly dirt and gravel) and increased human activity due to turbine construction and maintenance. A substantial portion of these impacts will be to already heavily-disturbed agricultural fields and moderately disturbed rangeland used for

livestock grazing. The percent of direct impacts actually occurring in native grassland or shrub-steppe habitat are difficult to predict and would be based on individual facility design and layout. However, based on the community types that existing wind-energy facilities are located in, we assume that approximately 25% of the existing and proposed facilities would be in cultivated cropland. Based on terrestrial vegetative communities in the CPE (Figure 2), only seven of the 47 existing or proposed wind energy facilities as of late 2008 were in communities classified as shrub steppe, with two additional facilities in areas classified as grasslands. The remaining facilities were all within vegetative communities classified by Quigley and Arbelbeide (1997) as agricultural lands. These lands include croplands as well as rangelands used for cattle grazing, but are apparently degraded such that they are no longer classified as shrublands or grasslands. Therefore, most of the wind energy facilities in the CPE are in areas already degraded to some extent from conversion to pastures and cultivated cropland.

Assuming that on average the permanent impacts associated with a turbine and the associated access roads are 1.5 acres per turbine, and that 1.5-3.0 MW turbines are used for all new projects in the foreseeable future, then approximately 5000 acres (7.8 mi^2) of non-agricultural vegetation types, primarily grassland shrub-steppe vegetation, would be lost in the CPE with 6700 MW of wind energy. These impacts would be spread over a large area geographically (see Figure 1). Given that the CPE is 32,096 mi^2 in size, permanent impacts associated with 6700 MW of wind energy development would represent only 0.02% of the area.

While the CPE covers a large area, and characteristic grassland shrub-steppe habitat is widespread, it is also heavily fragmented by agricultural activities. Species that depend on native habitat face physical and ecological barriers within the region and at the region's edges. The Columbia River, and other smaller rivers in the area, cut deep canyons and present linear alteration to the general physiography and potential barriers to some animal species movement. Large swaths of agricultural land are less obvious, but may pose significant obstacles to small or less mobile animals. While many birds are not impeded by such physical barriers, some smaller, habitat-specific birds that depend on brushy habitats for cover could be affected by such habitat fragmentation. Habitat specialists and obligates such as greater sage-grouse (*Centrocercus urophasianus*) and sage sparrow (*Amphispiza belli*) require large tracts of continuous sage habitat (Johnson and O'Neil 2001), which is largely missing from the Columbia Plateau, and the range for these species in the Columbia Plateau is already severely restricted. Assuming that agricultural vegetation types are not important wildlife habitat, habitat loss impacts are not expected to be a significant loss to any given species within the entire CPE. However, because existing and proposed wind-energy facilities tend to be concentrated within certain regions within the CPE (see Figure 1), habitat loss may lead to localized population declines of some species.

In addition to direct effects through collision mortality, wind-energy development results in direct loss of habitat where infrastructure is placed and indirect loss of habitat through behavioral avoidance and habitat fragmentation. Direct loss of habitat associated with wind-energy development is relatively minor compared to most other forms of energy development. Although wind-energy facilities can cover substantial areas, the permanent footprint of facilities such as the turbines, access roads, maintenance buildings, substations and overhead transmission

lines, generally occupies only 5 to 10% of the entire development area (Bureau of Land Management [BLM] 2005). Estimates of temporary construction impacts range from 0.2 to 1.0 ha (0.5 to 2.5 ac) per turbine (AWEA 2009). Behavioral avoidance, however, may reduce habitat suitability over much larger areas for some species of wildlife, depending on how far a species is displaced from wind-energy facilities. The greatest concern with displacement impacts in western North America has been where facilities were constructed in native habitats such as grasslands or shrublands (Leddy et al. 1999, Mabey and Paul 2007).

Most studies on raptors at wind-energy facilities indicate displacement effects to be negligible. A before-after/control impact study of avian use at the Buffalo Ridge wind-energy facility in Minnesota found evidence that northern harriers (*Circus cyaneus*) avoided turbines on a small scale (< 100 m [328 ft] from turbines) and large scales (range of 105 - 5,364 m [345 – 17,598 ft]) in the year following construction (Johnson et al. 2000a). Two years following construction, however, no large-scale displacement was detected. The only published report of avoidance of wind turbines by nesting raptors occurred at the Buffalo Ridge facility, where raptor nest density on 101 mi^2 (261.6 km^2) of land surrounding the facility was 5.94 nests/39 mi^2 (5.94 nests/101.0 km^2) yet no nests were present in the 12 mi^2 (31.1 km^2) facility itself, even though habitat was similar (Usgaard et al. 1997). At a facility in eastern Washington, raptors still nested in the study area at approximately the same levels after construction, and several nests were located within a half-mile (0.8 km) of turbines (Erickson et al. 2004). Howell and Noone (1992) found similar numbers of raptor nests before and after construction of Phase 1 of the Montezuma Hills facility in California, and anecdotal evidence indicates that raptor use of the Altamont Pass wind resource area in California may have increased since installation of wind turbines (Orloff and Flannery 1992, AWEA 1995). At the Foote Creek Rim wind-energy facility in southern Wyoming, one pair of red-tailed hawks nested within 0.3 miles (0.5 km) of the nearest turbine, and seven red-tailed hawk nests, one great horned owl (*Bubo virginianus*) nest, and one golden eagle nest located within one mile (1.6 km) of the facility successfully fledged young (Johnson et al. 2000b, Western EcoSystems Technology, Inc. [WEST] unpublished data). The golden eagle pair successfully nested a half-mile (0.8 km) from the facility for three different years after the project became operational.

Studies in western North America concerning displacement of non-raptor species have concentrated on grassland passerines and waterfowl. Wind-energy facility construction appears to cause small-scale local displacement of some grassland passerines and is likely due to the birds avoiding turbine noise and maintenance activities. Construction also reduces habitat effectiveness because of the presence of access roads and large gravel pads surrounding turbines (Leddy 1996, Johnson et al. 2000a). Leddy et al. (1999) surveyed bird densities in Conservation Reserve Program (CRP) grasslands at the Buffalo Ridge wind-energy facility in Minnesota, and found mean densities of 10 grassland bird species were four times higher at areas >180 m (591 ft) from turbines than they were at grasslands nearer turbines. Johnson et al. (2000a) found reduced use of habitat within 100 m of turbines by seven of 22 grassland-breeding birds following construction of the Buffalo Ridge facility. At the Stateline wind-energy facility in Oregon and Washington, use of areas <50 m from turbines by grasshopper sparrow (*Ammodramus savannarum*) was reduced by approximately 60%, with no reduction in use >50 m from turbines (Erickson et al. 2004). At the Combine Hills facility in Oregon, use of areas

within 150 m of turbines by western meadowlark was reduced by 86%, compared to a 12.6% reduction in use of reference areas over the same time period (Young et al. 2005a). Horned larks, however, showed significant increases in use of areas near turbines at both of these facilities, likely because this species prefers areas of bare ground such as those created by turbine pads and access roads (Beason 1995).

Shaffer and Johnson (2008) examined displacement of grassland birds at two wind energy facilities in the northern Great Plains. Intensive transect surveys were conducted on plots with and without turbines. The study focused on five species at two study sites, one in South Dakota and one in North Dakota. Based on this analysis, killdeer (*Charadrius vociferous*), western meadowlark, and chestnut-collared longspur (*Calcarius ornatus*) showed no avoidance of wind turbines. However, grasshopper sparrow and clay-colored sparrow (*Spizella pallida*) showed avoidance out to 200 m (656 ft).

At the Buffalo Ridge facility, the abundance of several bird types including shorebirds and waterfowl was significantly lower at survey plots with turbines than at reference plots without turbines, indicating that the area of reduced use was limited primarily to areas within 100 m of the turbines (Johnson et al. 2000a). These results are similar to those of Osborn et al. (1998), who reported that birds at Buffalo Ridge avoided flying in areas with turbines.

Populations of mountain plovers (*Charadrius montanus*) at the Foote Creek Rim wind-energy facility in Wyoming declined during construction but have slowly increased since, although not to the same level present prior to construction. It is not known if the initial decline or subsequent increase was due to presence of the wind-energy facility or to regional changes in mountain plover populations. Nevertheless, some mountain plovers have apparently become habituated to the turbines, as 11 of 28 nests found during surveys (39%) were located within 75 m (246 ft) of turbines (Young et al. 2005b).

Breeding dabbling ducks (mallard, blue-winged-teal [*Anas discors*], gadwall [*A. strepera*], northern pintail [*A. acuta*], and northern shoveler [*A. clypeata*]) were counted on wetland complexes at two wind-energy facilities and similar reference areas in North and South Dakota during the 2008 breeding season (Walker et al. 2008, unpublished report). Breeding duck numbers were similar between developed and undeveloped areas. The study is continuing through 2010 to further assess response of breeding ducks to wind-energy development.

The CPE wind energy facilities will be sited in vegetation communities common to the region, and other similar vegetation types are abundant. Furthermore, the actual area occupied by turbines and other infrastructure in a typical modern wind energy facility is only 5-10% of the total project area (BLM 2005). However, it is not known if displaced individuals simply move somewhere else and breed successfully, have reduced breeding success, do not breed at all, or some combination of the above. In addition, habitat fragmentation and disturbance from turbines and maintenance activities may make the entire wind-energy facility unsuitable for some species. If this occurs, a reduction in the number of breeding birds within the wind-energy facility and adjacent areas may occur, and the effect may be more pronounced in areas with concentrated facilities in circumstances where habitat is a limiting factor. However, the total area occupied by wind-energy facilities is only a small

fraction of the CPE (see Figure 1), and measurable population impacts are not likely for the entire region.

DISCUSSION

Mortality estimates for this analysis were based on species composition of fatalities found at 16 existing wind energy facilities in the CPE. Sample sizes for this analysis were relatively small for some groups. For example, we estimated ferruginous hawk mortality assuming that they would compose 5.7% of all raptor fatalities based on four ferruginous hawk fatalities out of 70 raptor fatalities found at the existing wind energy facilities. This ratio could easily change as additional fatality data are collected at new wind energy facilities in the CPE.

Our cumulative mortality estimates should be considered tentative, as no comparable fatality data exist for the large 2.0-3.0 MW turbines proposed for many of the future wind-energy facilities in the CPE. These estimates assume bird and bat fatality rates for a 3.0-MW turbine would be twice as high as a 1.5-MW turbine, which may not be accurate. Although the 2.0-3.0 MW turbines have a larger rotor diameter, which may increase collision risk to raptors, the rotor-swept area is higher off the ground and the turbine rotates at slower speeds, which may actually reduce risk to some raptors. Based on an analysis of avian fatality data at wind farms with turbines ranging in size from 0.04–1.8 MW, tower heights ranging from 24–94 m and rotor diameters ranging from 15–80 m, Barclay et al. (2007) concluded that avian fatality rates were not affected by any of these parameters. Therefore, inflating our estimates to account for larger turbines may lead to over-estimates of avian mortality.

This cumulative effects analysis was based largely on results of existing studies of wind-energy facilities in the region, and in particular monitoring studies that estimated the direct impacts of a particular wind-energy project. The overall design for these studies incorporates several assumptions or factors that affect the results of the fatality estimates. First, all bird casualties found within the standardized search plots during the study periods were included in the analyses. It is assumed that carcass found incidentally within a search plot during other activities would have been found during a standardized carcass search. Second, it was assumed that all carcasses found during the studies were due to collision with wind turbines. True cause of death is unknown for most of the fatalities. It is highly likely that some of the casualties included in the data pool for the various projects were due to natural causes or background mortality such as predation, disease, other natural causes, or manmade causes such as farming activity or vehicles on county/project roads. The overall effect of these assumptions is that the analyses provide a conservative estimate (an overestimate) of mortality.

This cumulative impacts analysis assumed that up to 6700 MW of wind energy could be developed in the CPE. However, based on recent estimates by the Northwest Power and Conservation Council (NPCC), which recognize constraints on wind development, such as transmission capacity, the NPCC projects that 5577 MW of wind energy development will be installed by the year 2013 (Jeff King, Senior Resource Analyst, presentation to the Northwest Wind Integration Forum Steering Committee, January 7, 2010). Because our estimates of bird and bat fatalities assuming that 6700 MW of wind energy would be developed are likely

overestimates, for comparison purposes we also derived estimates assuming that 5577 MW of wind energy would be developed (Table 8).

A few studies of wind-energy facilities in other regions of the country have provided information on background mortality. During a four-year study at Buffalo Ridge, Minnesota, 2482 fatality searches were conducted on study plots without turbines to estimate reference mortality in the study area. Thirty-one bird fatalities comprising 15 species were found (Johnson et al. 2000a). Reference mortality adjusted for searcher efficiency and carcass removal for the study was estimated to average 1.1 fatalities per plot per year. At a second study, pre-project carcass searches were conducted at a proposed wind-energy facility in Montana (Harmata et al. 1998). Three bird fatalities were found during eight searches of five transects, totaling 10.94 miles (17.61 km) per search. On average, approximately 1.12 miles (1.8 km) of transect are searched within each turbine plot in the referenced studies for the CPE (Table 2). The amount of transect searched at the Montana site per search was equivalent to searching approximately seven to nine turbines for the regional studies. The background estimate for observed mortality would be approximately 0.33 per turbine plot per year, unadjusted for scavenging and searcher efficiency. The background mortality information from the Minnesota and Montana studies suggests that the estimates of bird mortality include some fatalities not related to turbine collision, and this factor alone would lead to an over-estimate of actual bird collision mortality for wind-energy facilities.

Avian population estimates used in this analysis relied on breeding bird survey (BBS) data, and some of these estimates had relatively large standard errors. Thogmartin et al. (2006) reviewed the population estimation approach used by Blancher et al. (2007) and concluded that because BBS data were designed to detect long-term population trends, use of these data for estimating population sizes may be questionable. Regardless of these concerns, in order to estimate cumulative impacts, information on sizes of affected populations is required, and the population estimates provided by Blancher et al. (2007) are the only ones available for the CPE.

Finally, this cumulative impacts assessment only examined cumulative impacts of birds and bats due to wind energy development in the CPE. Wind energy development is only one factor affecting wildlife populations in the CPE, and is likely minor compared to other past, present, and future actions in the CPE, including large-scale conversion of native shrublands and grasslands to crop land; expansion of urban areas and rural subdivisions; road and highway construction; energy development, including dams for hydropower; and increases in other infrastructure, such as communication towers and power lines. For example, a review conducted by Erickson et al. (2001) found that wind energy contributes only a minor fraction of the overall avian collision mortality in the US due to powerlines, roads, communication towers and other structures. The ability to estimate wind energy development impacts on wildlife is unique because several studies have been conducted in the CPE to quantify bird and bat impacts. Similar estimates of bird and bat impacts due to direct mortality and loss or fragmentation of habitat caused by other activities are not available.

REFERENCES

American Wind Energy Association (AWEA). 1995. Avian Interactions with Wind Energy Facilities: a Summary. Prepared by Colson & Associates for AWEA, Washington, D.C.

American Wind Energy Association (AWEA). 2009. AWEA Website. Home page: http://www.awea.org/; Current U.S. wind energy capacity by state (updated September 2009): http://www.awea.org/projects/

Arnett, E.B., W.K. Brown, W.P. Erickson, J.K. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R. Koford, C.P. Nicholson, T. O'Connell, M.D. Piorkowski, and R.D Tankersley, Jr. 2008. Patterns of bat fatalities at wind energy facilities in North America. *Journal of Wildlife Management* 72: 61-78.

Baerwald, E.F. 2008. Variation in the Activity and Fatality of Migratory Bats at Wind Energy Facilities in Southern Alberta: Causes and Consequences. Thesis. University of Calgary, Calgary, Alberta, Canada.

Baerwald, E.F. and R. M. R. Barclay. 2009. Geographic variation in activity and fatality of migratory bats at wind energy facilities. Journal of Mammalogy 90:1341–1349.

Barclay, R.M.R., E.F. Baerwald, and J.C. Gruver. 2007. Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height. Canadian Journal of Zoology 85:381-387.

Beason, R. C. 1995. Horned Lark (*Eremophila alpestris*). *In* The Birds of North America, No. 195 (A. Poole and F. Gill, Eds.). The Birds of North America, Inc., Philadelphia, PA.

Blancher, P.J., K.V. Rosenberg, A.O. Panjabi, B. Altman, J. Bart, C.J. Beardmore, G.S. Butcher, D. Demarest, R. Dettmers, E.H. Dunn, W. Easton, W.C. Hunter, E.E. Inigo-Elias, D.N. Pashley, C.J. Ralph, T.D. Rich, C.M. Rustay, J.M. Ruth, and T.C. Will. 2007. Guide to the Partners in Flight Population Estimates Database. Version: North American Landbird Conservation Plan 2004. Partners in Flight Technical Series No. 5. http://www.partnersinflight.org/

Bureau of Land Management (BLM). 2005. Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM Administered Land in the Western United States. U.S. Department of the Interior (USDOI), BLM, Washington, D.C. http://windeis.anl.gov/

Carter, T.C., M.A. Menzel, and D.A. Saugey. 2003. Population Trends of Solitary Foliage-Roosting Bats. *In*: Monitoring Trends in Bat Populations of the United States and Territories: Problems and Prospects. Biological Resources Discipline, Information, and Technology Report. U.S. Geological Survey (USGS). USGS/BRD/ITR-2003-003. T. J. O'Shea and M. A. Bogan, eds. Pp. 41-47. http://www.fort.usgs.gov/products/publications/21329/21329.pdf

England, A. Sidney, Marc J. Bechard and C. Stuart Houston. 1997. Swainson's Hawk (Buteo swainsoni), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/265doi:10.2173/bna.265

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and bat mortality associated with the Vansycle Wind Plant, Umatilla County Oregon. 1999 study year. Technical report submitted to Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 22 pp.

Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, Jr., K.J. Sernka and R.E. Good. 2001. Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee Publication. http://www.nationalwind.org/pubs/default.htm

Erickson, W.P., B. Gritski, and K. Kronner. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report, September 2002 – August 2003. Technical report submitted to Energy Northwest and the Nine Canyon Technical Advisory Committee.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Erickson, W.P., K. Kronner, and K.J. Bay. 2007. Stateline II Wind Project Wildlife Monitoring Report, January – December 2006. Technical report submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Erickson, W.P., J.D. Jeffrey, and V.K. Poulton. 2008. Puget Sound Energy Wild Horse Wind Facility Post-Construction Avian and Bat Monitoring: First Annual Report, January – December 2007. Prepared by WEST, Inc. for Puget Sound Energy, Ellensburg, WA.

Fishman Ecological Services, LLC. 2003. Carcass survey results for SeaWest Windpower, Inc., Condon Site, 2002-2003. Prepared for SeaWest WindPower, Inc., Condon Wind Project, Gilliam County, Oregon.

Gill, J.P., M. Townsley, and G.P. Mudge. 1996. Review of the Impacts of Wind Farms and Other Aerial Structures Upon Birds. Scottish Natural Heritage Review No. 21. Scottish Natural Heritage. Battleby, United Kingdom.

Gritski, B., K. Kronner, and S. Downes. 2008. Leaning Juniper Wind Power Project, 2006 − 2008 Wildlife Monitoring Final Report. Unpublished Report *Prepared for* PacifiCorp Energy by Northwest Wildlife Consultants, Inc., Pendleton, OR.

Gritski, B., S. Downes, and K. Kronner. 2009. Klondike IIIa (Phase 2) Wind Power Project Wildlife Monitoring Year One Summary: August 2008–August 2009. Unpublished report prepared for Iberdrola Renewables by Northwest Wildlife Consultants.

Gruver, J., M. Sonnenburg, K. Bay and W. Erickson. 2010. Post-Construction Bat and Bird Fatality Study at the Blue Sky Green Field Wind Energy Center, Fond du Lac County, Wisconsin July 21, 2008 – October 31, 2008 and March 15, 2009 – June 4, 2009. Unpublished report prepared by WEST, Inc., Cheyenne, Wyoming.

Harmata, A. R. 2002. Encounters of Golden Eagles banded in the Rocky Mountain West. J. Field Ornithol. 73:23-32.

Harmata, A., K. Podruzny, and J. Zelenak. 1998. Avian Use of Norris Hill Wind Resource Area, Montana. National Renewable Energy Laboratory, Golden, CO. NREL/SR-500-23822

Howell, J.A. and J. Noone. 1992. Examination of Avian Use and Mortality at a U.S. Windpower Wind Energy Development Site, Montezuma Hills, Solano County, California. Final Report to Solano County Department of Environmental Management, Fairfield, California. 41pp.

Hunt, G. 2002. Golden eagles in a perilous landscape: predicting the effects of mitigation for wind turbine blade-strike mortality. California Energy Commission Report P500-02-043F.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Johnson, D.H. and T.A. O'Neil (managing editors). 2001. *Wildlife-Habitat Relationships in Oregon and Washington.* Oregon State University Press, Corvallis, OR. 768 pp.

Johnson, G.D. 2005. A review of bat collision mortality at wind-energy developments in the United States. Bat Research News 46:45-49.

Johnson, G.D. and W.P. Erickson. 2008. Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Final Report prepared for Klickitat County Planning Department, Goldendale Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. October 30, 2008.

Johnson, G.D. and S. Stephens. 2010. Wind Power and Bio Fuels: A Green Dilemma for Wildlife Conservation. Chapter 9 *In*: Energy Development and Wildlife Conservation in Western North America. D. E. Naugle, Ed., Island Press, Washington, D.C. In Press.

Johnson, G.D. and M.D. Strickland. 2003. Biological Assessment for the Federally Endangered Indiana Bat (*Myotis sodalis*) and Virginia Big-Eared Bat (*Corynorhinus townsendii virginianus*), Nedpower Mount Storm Wind Project, Grant County, West Virginia. Unpublished report prepared for NedPower Mount Storm LLC, Chantilly, Virginia, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. October 8, 2003. http://www.west-inc.com.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-year study. Technical report prepared by WEST, Inc. for Northern States Power Co., Minneapolis, MN. 212pp.

Johnson, G. D., D. P. Young, Jr., C. E. Derby, W. P. Erickson, M. D. Strickland, and J. W. Kern. 2000b. Wildlife monitoring studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999. Technical Report prepared by WEST, Inc. for SeaWest Energy Corporation and Bureau of Land Management. 195pp.

Johnson, G.D., W.P. Erickson, and K. Bay. 2002a. Baseline Ecological Studies For the Klondike Wind Project, Sherman County, Oregon; Final Report prepared for Northwest Wind Power, Goldendale, Washington.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002b. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30: 879-887.

Johnson, G., W. Erickson, J. White, R. McKinney. 2003a. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Plant, Sherman County, Oregon. Technical report prepared for Northwestern Wind Power, Goldendale, Washington. March 2003.

Johnson, G.D., M.D. Strickland, W.P. Erickson, and D.P. Young, Jr. 2007. Use of data to develop mitigation measures for wind power development impacts to birds. Pages 241-257 *In* Birds and Wind Farms, Risk Assessment and Mitigation. M. de Lucas, G.F.E. Janss, and M. Ferrer, (eds.). Quercus Press, Madrid, Spain.

Kerns, J. and P. Kerlinger. 2004. A Study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual Report for 2003. Technical Report prepared for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee. Curry and Kerlinger, LLC. 39 pp.

Kerns, J., W.P. Erickson, and E.B. Arnett. 2005. Bat and Bird fatality at wind energy facilities in Pennsylvania and West Virginia. Pages 24-95 *in* E.B. Arnett, technical editor, Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Kochert, M. N., K. Steenhof, C. L. Mcintyre and E. H. Craig. 2002. Golden Eagle (Aquila chrysaetos), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/684doi:10.2173/bna.684

Kronner, K., R. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Monitoring Final Report, 2006-2007. Technical report prepared by Northwest Wildlife Consultants, Inc., Goldendale, WA. Prepared for PPM Energy and the Big Horn Technical Advisory Committee.

Kunz, T.H. 1982. Silver-haired Bat, *Lasionycteris noctivagans*. Mammalian Species 172:1-5.

Lack, D. 1966. Population Studies of Birds. Clarendon Press, Oxford.

Leddy, K.L. 1996. Effects of wind turbines on nongame birds in Conservation Reserve Program grasslands in southwestern Minnesota. M.S. Thesis, South Dakota State Univ., Brookings. 61pp.

Leddy, K.L., K.F. Higgins, and D.E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. Wilson Bull. 111:100-104.

Mabey, S. and E. Paul. 2007. Impact of Wind Energy and Related Human Activities on Grassland and Shrub-Steppe Birds. A Critical Literature Review Prepared for the National Wind Coordinating Committee (NWCC) and The Ornithological Council. 183 pp. http://www.nationalwind.org/pdf/IMPACTOFWINDENERGYANDRELATEDHUMANACTIVITIESONGRASSLANDANDSHRUB-STEPPEBIRDS.pdf

Marshall, D.B., M.W. Chilcote, and H. Weeks. 1996. Species at risk: sensitive, threatened and endangered vertebrates of Oregon. 2nd edition. Oregon Department of Fish and Wildlife, Portland, Oregon.

Millsap, B.A. and G.T. Allen. 2006. Effects of falconry harvest on wild raptor populations in the United States: Theoretical considerations and management recommendations. Wildlife Society Bulletin 34:1392-1400.

NWC and WEST, 2007. Avian and bat monitoring report for the Klondike II Wind Power Project, Sherman County, Oregon. Unpubl. report prepared by Northwest Wildlife Consultants and WEST, Inc. for PPM Energy, Portland, OR.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report P700-92-001 to Alameda, Contra Costa, and Solano Counties, and the California Energy Commission, Sacramento, California, by Biosystems Analysis, Inc., Tiburon, California. March 1992.

Osborn, R.G., C.D. Dieter, K.F. Higgins, and R.E. Usgaard. 1998. Bird flight characteristics near wind turbines in Minnesota. Am. Midl. Nat. 139:29-38.

Quigley, T.M.; Arbelbeide, S.J., tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins: Vol 2. Gen. Tech. Rep. PNWGTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Vol 1-4. (Quigley, Thomas M., tech. ed.; The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD.

Schmutz, J.K. and R.W. Fyfe. 1987. Migration and mortality of Alberta ferruginous hawks. Condor 89:169-174.

Schmutz, J.K., D.T.T. Flockhart, C.S. Houston, and P.D. McLoughlin. 2008. Demography of ferruginous hawks breeding in western Canada. Journal of Wildlife Management 72:1352-1359.

Schmutz, J.K., P.D. McLoughlin, and C.S. Houston. 2006. Demography of Swainson's hawks breeding in western Canada. Journal of Wildlife Management 70:1455-1460.

Shaffer, J.A. and D.H. Johnson. 2008. Displacement Effects of Wind Developments on Grassland Birds in the Northern Great Plains. Presented at the Wind Wildlife Research Meeting VII, Milwaukee, Wisconsin. Wind Wildlife Research Meeting VII Plenary. October 28-29, 2008. http://www.nationalwind.org/pdf/ShafferJill.pdf

Shump, Jr., K.A. and A.U. Shump. 1982. Hoary bat, *Lasiurus cinereus*. Mammalian Species 185:1-5.

Smallwood, K.S. and C.G. Thelander. 2004. Bird Mortality at the Altamont Pass Wind Resource Area: March 1998 - September 2001. Final report to the National Renewable Energy Laboratory (NREL), Golden, Colorado, Subcontract No. TAT-8-18209-01 with BioResource Consultants, Ojai, California. In review.

Thogmartin, W.E, F.P. Howe, F.C. James, D.H. Johnson, E.T. Reed, J.R. Sauer, and F.R. Thompson, III. 2006. A review of the population estimation approach of the North American Landbird Conservation Plan. The Auk 123:892-904.

Thorson, T.D., Bryce, S.A., Lammers, D.A., Woods, A.J., Omernik, J.M., Kagan, J., Pater, D.E., and Comstock, J.A., 2003. Ecoregions of Oregon (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Usgaard, R.E., D.E. Naugle, R.G. Osborn, and K.F. Higgins. 1997. Effects of wind turbines on nesting raptors at Buffalo Ridge in southwestern Minnesota. Proceedings of the South Dakota Academy of Science 76: 113-117.

U.S. NABCI Committee. 2000. North American Bird Conservation Initiative: Bird Conservation Region Descriptions. A Supplement to the North American Bird Conservation Initiative Bird Conservation Regions Map. U.S. Fish and Wildlife Service, Arlington, VA.

Walker, J., S.E. Stephens, N.D. Niemuth, C.R. Loesch, R.E. Reynolds, J.S. Gleason, and M.A. Erickson. 2008. Assessing Potential Impacts of Wind Energy Development on Abundance of Breeding Duck Pairs in the Prairie Pothole Region of North and South Dakota. Unpublished report, Ducks Unlimited, Bismarck, North Dakota.

Watson, J.W. 2003. Migration and winter ranges of ferruginous hawks from Washington. Final Report. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Welty, J.C. 1982. The Life of Birds, 3rd Edition. Saunders College Publishing, Philadelphia.

Wiggins, D. A., D. W. Holt and S. M. Leasure. 2006. Short-eared Owl (Asio flammeus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/062doi:10.2173/bna.62.

Woofinden, N.D. and J.R. Murphy. 1989. Decline of a ferruginous hawk population: A 20-year summary. Journal of Wildlife Management 53:1127-1132.

Young, Jr., D.P. and W. P. Erickson. 2006. Wildlife Issue Solutions: What Have Marine Radar Surveys Taught Us About Avian Risk Assessment? Proceedings of the American Wind Energy Association Windpower 2006 Conference and Exhibition, Pittsburgh, Pennsylvania, June 4-7, 2006.

Young, Jr., D.P., J.D. Jeffrey, W.P. Erickson, K. Bay, K. Kronner, B Gritski, and J. Baker. 2005a. Combine Hills Turbine Ranch Wildlife Monitoring First Annual Report, March 2004-March 2005. Technical report prepared for Eurus Energy America Corporation, Umatilla County, and the Combine Hills Technical Advisory Committee.

Young, D.P. Jr., W.P. Erickson, and J.P. Eddy. 2005b. Mountain Plover (*Charadrius montanus*) Surveys, Foote Creek Rim Wind Plant, Carbon County, Wyoming, 1995-2005. Unpublished report prepared for PacifiCorp and SeaWest Windpower, Inc. by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Young, Jr., D.P., W.P. Erickson, J.D. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. **W**estern **E**co**S**ystems Technology, Inc. Cheyenne, Wyoming, and Walla Walla, Washington. 25pp.

Table 1. Avian use estimates and avian fatality estimates for existing wind energy projects in the Columbia Plateau Ecoregion[a].

Project	Mean annual avian use (#/20-min survey)		Mean annual mortality (#/MW/year)			
	Raptors	All birds	Raptors	All birds	Nocturnal Migrants	Source
Combine Hills, OR	0.60	6.0	0	2.6	0.27	Young et al. 2005a
Klondike, I OR	0.47	17.5	0	0.9	0.35	Johnson et al. 2003a
Klondike II, OR	0.47	17.5	0.11	3.1	2.11	NWC and WEST, 2007
Klondike III, OR	0.78 [b]	8.18 [b]	0	2.5	0.51	Gritski et al. 2009
Vansycle, OR	0.41	13.1	0	1.0	0.32	Erickson et al. 2000
Stateline, WA/OR	0.41	13.1	0.10	2.4	0.78	Erickson et al. 2004, 2007
Hopkins Ridge, WA	0.64	8.7	0.14	1.2	0.46	Young et al. 2007
Nine Canyon, WA	0.26	9.4	0.05	2.8	0.45	Erickson et al. 2003
Wild Horse, WA	0.40	5.0	0.09	1.6	0.88	Erickson et al. 2008
Bighorn I, WA	0.90	16.6	0.15	2.6	0.57	Kronner et al. 2008
Leaning Juniper, OR	0.52	23.6	0.21	6.7	1.56	Gritski et al. 2008
Condon, OR	0.37	5.8	0.02[c]	0.05[c]	NR	Fishman Ecological Services 2003
Mean	**0.52**	**12.0**	**0.077**	**2.5**	**0.75**	

[a] Quantitative fatality estimates are not yet available for the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon

[b] Surveys were 10 minutes long; estimates provided were multiplied by 2 to estimate use during a 20-minute interval

[c] not adjusted for searcher efficiency or scavenger removal; study methods differed from other projects and were not as rigorous; therefore this estimate should be regarded as a minimum mortality estimate and it was not used in calculation of the mean values.

Table 2. Avian use estimates (# observed per 20 minutes per plot with 800-m radius viewshed) for Wind Resource Areas in the Columbia Plateau Ecoregion.

		Mean avian use	
Wind Resource Area	**Location**	**Raptors**	**All birds**
Hopkins Ridge	Columbia Co., WA	0.64	8.7
Nine Canyon	Benton Co., WA	0.26	9.4
Desert Claim	Kittitas Co., WA	0.77	15.3
Kittitas Valley	Kittitas Co., WA	0.90	12
Wild Horse	Kittitas Co., WA	0.40	5
Big Horn I	Klickitat Co., WA	0.90	16.6
White Creek	Klickitat Co., WA	0.66	11.9
Linden Ranch	Klickitat Co., WA	1.64	11.1
Hoctor Ridge	Klickitat Co., WA	1.38	15.3
Imrie	Klickitat Co., WA	0.70	19.2
Windy Point	Klickitat Co., WA	0.77	16.0
Windy Flats	Klickitat Co., WA	0.83	19.9
Reardan	Lincoln Co., WA	0.90	13
Zintel Canyon	Benton Co., WA	0.44	19
Maiden	Benton/Yakima Co., WA	0.38	11.6
Combine Hills	Umatilla Co., OR	0.60	6
Klondike	Sherman Co., OR	0.47	17.5
Biglow	Sherman Co., OR	0.30	9.1
Vansycle	Umatilla Co., OR	0.41	13.1
Elkhorn	Union Co., OR	1.05	21.7
Shepherd's Ridge	Morrow Co., OR	0.61	6.5
Leaning Juniper	Gilliam Co., OR	0.52	23.6
Condon	Gilliam Co., OR	0.37	5.8
Stateline	Walla Walla Co., WA/Umatilla Co., OR	0.41	13.1
Mean		**0.68**	**13.4**
Range		**0.26 – 1.64**	**5 – 23.6**

Table 3. Number and species composition of bird fatalities found at the existing Columbia Plateau Ecoregion wind energy projects [a].

Species	Number fatalities	% composition
horned lark	249	29.7
golden-crowned kinglet	47	5.6
ring-necked pheasant	45	5.4
gray partridge	36	4.3
unidentified passerine	32	3.8
western meadowlark	27	3.2
European starling	25	3.0
mourning dove	24	2.9
chukar	23	2.7
American kestrel	22	2.6
dark-eyed junco	21	2.5
unidentified bird	20	2.4
white-crowned sparrow	17	2.0
red-tailed hawk	14	1.7
rock pigeon	12	1.4
yellow-rumped warbler	11	1.3
ruby-crowned kinglet	10	1.2
winter wren	10	1.2
American robin	8	1.0
Brewer's sparrow	7	0.8
northern flicker	7	0.8
short-eared owl	7	0.8
common nighthawk	6	0.7
house wren	6	0.7
Swainson's hawk	6	0.7
Townsend's warbler	6	0.7
unidentified sparrow	6	0.7
unidentified kinglet	6	0.7
black-billed magpie	5	0.6
red-breasted nuthatch	5	0.6
golden-crowned sparrow	5	0.6
spotted towhee	4	0.5
Canada goose	4	0.5
ferruginous hawk	4	0.5
common raven	3	0.2
rough-legged hawk	3	0.4
song sparrow	3	0.4
vesper sparrow	3	0.4
white-throated swift	3	0.4
acorn woodpecker	2	0.2

American coot	2	0.2
Cassin's vireo	2	0.2
chipping sparrow	2	0.2
great blue heron	2	0.2
great horned owl	2	0.2
house finch	2	0.2
long-eared owl	2	0.2
Macgillivray's warbler	2	0.2
mallard	2	0.2
mountain bluebird	2	0.2
northern harrier	2	0.2
northern rough-winged swallow	2	0.2
pine siskin	2	0.2
sage thrasher	2	0.2
savannah sparrow	2	0.2
unidentified buteo	2	0.2
unidentified warbler	2	0.2
Vaux's swift	2	0.2
western tanager	2	0.2
American goldfinch	1	0.1
American pipit	1	0.1
Barn owl	1	0.1
black-throated sparrow	1	0.1
brown-headed cowbird	1	0.1
bufflehead	1	0.1
California quail	1	0.1
Cooper's hawk	1	0.1
downy woodpecker	1	0.1
golden eagle	1	0.1
grasshopper sparrow	1	0.1
gray catbird	1	0.1
hairy woodpecker	1	0.1
horned grebe	1	0.1
house sparrow	1	0.1
killdeer	1	0.1
Lewis's woodpecker	1	0.1
long-billed curlew	1	0.1
northern pintail	1	0.1
orange-crowned warbler	1	0.1
red-winged blackbird	1	0.1
sage sparrow	1	0.1
sharp-shinned hawk	1	0.1
Swainson's thrush	1	0.1
Townsend's solitaire	1	0.1
tree swallow	1	0.1

turkey vulture	1	0.1
unidentified accipiter	1	0.1
unidentified duck	1	0.1
unidentified empidonax	1	0.1
unidentified gamebird	1	0.1
unidentified nuthatch	1	0.1
unidentified owl	1	0.1
unidentified thrush	1	0.1
unidentified vireo	1	0.1
unidentified woodpecker	1	0.1
varied thrush	1	0.1
Virginia rail	1	0.1
warbling vireo	1	0.1
western grebe	1	0.1
western kingbird	1	0.1
western wood-pewee	1	0.1
Williamson's sapsucker	1	0.1
Wilson's warbler	1	0.1
yellow warbler	1	0.1
Total	837	100

[a] Species composition of bird fatalities is based on the data provided in those studies included in Table 1 as well as raw fatality data (species and numbers) for the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon

Table 4. Percent composition of avian fatalities by species group for existing Columbia Plateau Ecoregion wind energy projects.

Species	Number of Fatalities	Percent Composition
Passerines	562	67.1
Upland gamebirds	106	12.6
Raptors	70	8.5
Doves/pigeons	36	4.3
Waterbirds/waterfowl/shorebirds	18	2.1
Other birds[a]	25	3.0
Unidentified birds	20	2.4
Totals	**837**	**100**

[a] woodpeckers, nighthawks, swifts

Table 5. Summary of bat mortality at existing wind energy projects in the Columbia Plateau Ecoregion.

Project Name [state]	Bats per MW[a]	Reference
Stateline [OR/WA]	1.44	Erickson et al. 2004, 2007
Vansycle [OR]	1.12	Erickson et al. 2000
Klondike [OR]	0.77	Johnson et al. 2003b
Klondike II [OR]	0.41	NWC and WEST, Inc. 2007
Klondike III [OR]	0.23	Gritski et al. 2009
Hopkins Ridge [WA]	0.63	Young et al 2007
Wild Horse [WA]	0.39	Erickson et al. 2008
Nine Canyon [WA]	2.46	Erickson et al. 2003
Leaning Juniper [OR]	1.98	Gritski et al. 2008
Big Horn I [WA]	1.90	Kronner et al. 2008
Combine Hills [OR]	1.88	Young et al. 2005a
Average	**1.20**	

[a] Most reports do not provide number per MW of energy produced so this number was calculated based on the mortality per turbine and capacity of turbines studied.

Table 6. Number and species composition of bat fatalities found at eight existing Columbia Plateau wind energy projects[a].

Species	Number of Fatalities	Percent Composition
silver-haired bat	184	47.2
hoary bat	180	46.2
unidentified bat	13	3.3
little brown bat	8	2.1
big brown bat	5	1.3
Totals (4 species)	**390**	**100**

[a] Species composition of bat fatalities is based on the data provided in those studies included in Table 5 as well as raw fatality data (species and numbers) for the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon

Table 7. Seasonal timing of raptor fatalities at existing wind energy facilities in the Columbia Plateau.

	Season				
Wind Energy Project	**Spring**	**Summer**	**Fall**	**Winter**	**Overall**
Combine Hills, OR	0	0	0	0	0
Klondike I, OR	0	0	0	0	0
Klondike II, OR	0	1	1	0	2
Klondike III, OR	0	0	0	0	0
Vansycle, OR	0	0	0	0	0
Stateline, WA/OR	3	8	6	1	18
Hopkins Ridge, WA	1	3	1	1	6
Nine Canyon, WA	1	0	0	0	1
Wild Horse, WA	1	5	0	0	6
Bighorn I, WA	4	5	2	5	16
Leaning Juniper, OR	4	3	4	0	11
Condon, OR	1	0	0	0	1
Totals	**15**	**28**	**14**	**7**	**65**
Percent	**23.1**	**43.1**	**21.5**	**10.8**	**100**

Table 8. Comparison of avian and bat fatality estimates presented in this report between 6700 and 5577 megawatts of wind energy development in the Columbia Plateau ecoregion.

	MW of installed Capacity	
Fatality estimates by avian or bat species/group	**5577**	**6700**
All birds	13,942	16,750
All raptors	430	516
American kestrel	135	162
Red-tailed hawk	86	103
Short-eared owl	43	52
Ferruginous hawk	24	29
Swainson's hawk	37	44
Golden eagle	6	7
Upland gamebirds	1756	2110
Waterfowl/waterbirds/shorebirds	293	352
Passerines	9351	11,239
Horned lark	4139	4975
Western meadowlark	449	540
Nocturnal migrants	4181	5025
Golden-crowned kinglet	780	938
Long-billed curlew	17	20
Lewis's woodpecker	17	20
Grasshopper sparrow	17	20
Sage thrasher	17	20
Sage sparrow	17	20
Vaux's swift	17	20
All bats	6689	8040
Silver-haired bat	3157	3795
Hoary bat	3090	3714

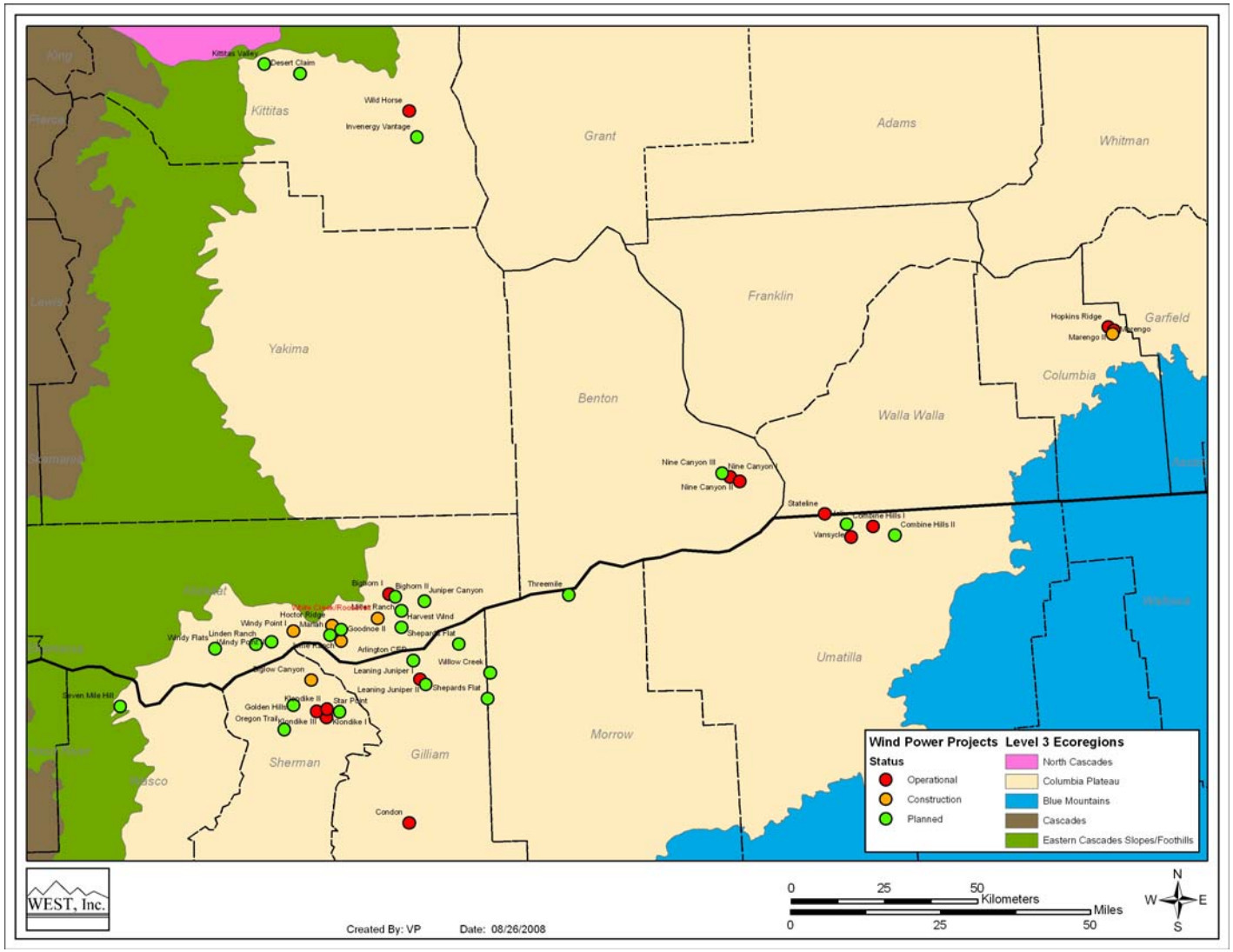


Figure 1. Location of existing and proposed wind energy facilities in the Columbia Plateau Ecoregion of southeastern Washington and northeastern Oregon, October 2008.

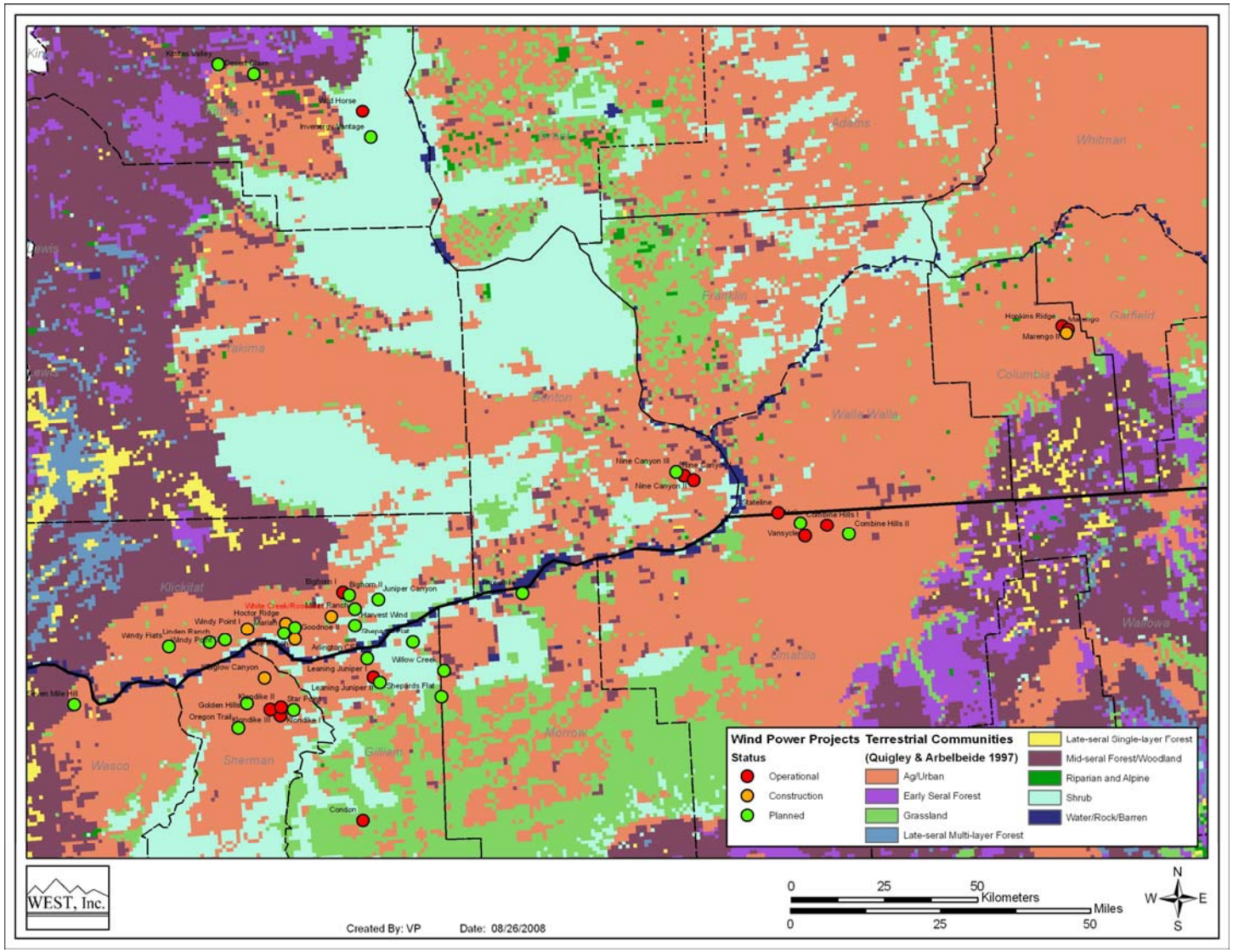


Figure 2. Terrestrial vegetative communities within the Columbia Plateau Ecoregion.

C-12

Avian and Bat Cumulative Impacts Analysis. Shepherds Flat Wind Project. Gilliam and Morrow Counties, Oregon. Prepared for LifeLine Renewable Energy, Inc.

David P. Young, Jr. and Victoria K. Poulton, WEST, Inc.

2007.

AVIAN AND BAT CUMULATIVE IMPACTS ANALYSIS SHEPHERDS FLAT WIND PROJECT GILLIAM AND MORROW COUNTIES, OREGON

March 2007

Prepared For:

LifeLine Renewable Energy, Inc

Prepared By:

David P. Young, Jr. and Victoria K. Poulton
Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, Wyoming 82001

WEST, Inc.

TABLE OF CONTENTS

1.0 INTRODUCTION AND BACKGROUND 1
2.0 METHODS 1
3.0 RESULTS 4
3.1 STUDY AREA AND WIND PROJECTS 4
3.2 DIRECT IMPACTS TO BIRDS 8
3.3 DIRECT IMPACTS TO BATS 11
3.4 HABITAT IMPACTS 13
4.0 DISCUSSION 14
4.1 SIGNIFICANCE OF IMPACTS TO BIRDS 15
4.2 SIGNIFICANCE OF IMPACTS TO BATS 17
5.0 REFERENCES 18

LIST OF TABLES

Table 1. Wind power projects constructed or planed in the Columbia Plateau ecological region of Washington and Oregon 5

Table 2. Avian use estimates and avian fatality estimates for wind power projects in the Columbia Plateau Ecoregion 8

Table 3. Number and species composition of bird fatalities found at the seven Pacific Northwest regional wind projects 10

Table 4. Percent composition of avian fatalities by species group for the seven Pacific Northwest regional wind project monitoring studies 11

Table 5. Summary of Bat Mortality at newer generation wind project monitoring studies in the Columbia Plateau ecoregion 12

Table 6. Number and species composition of bat fatalities found at six Pacific Northwest regional wind projects 12

LIST OF FIGURES

Figure 1. Level III ecological regions and wind power development projects in southeastern Washington and northeastern Oregon 3

Figure 2. Terrestrial vegetative communities in southeastern Washington and northeastern Oregon 7

1.0 INTRODUCTION AND BACKGROUND

Over the last decade, there has been a surge of interest in wind power development in Oregon and Washington along the Columbia River corridor and within the Columbia Plateau physiographic region (ecoregion). A central issue for wind power developments is the potential impacts to avian and bat resources, and in particular direct impacts such as avian or bat fatalities. Wind power proposals are commonly reviewed by natural resource agencies, private conservation groups, permitting authorities and other stakeholders. Frequently, baseline studies are conducted that are designed to estimate avian presence and abundance at proposed development sites for use in the impact assessment and siting of the project followed by monitoring studies post construction which are designed to measure impacts from the project. As more wind power projects are constructed along the Columbia River and surrounding region, cumulative impacts from multiple projects have become a concern and are important to consider.

The proposed Shepherds Flat wind power project is located in Gilliam and Morrow Counties, in north-central Oregon. The proposed project would have from 300-326 turbines, each with a capacity of 2.3-2.5 megawatts (MW), for an overall project capacity of 750 MW. The total proposed project area using the lease area boundaries is approximately 31,270 acres (48.9 mi^2). The project boundary comes within 1 mile of the Columbia River to the north. Land use is typical of other existing and proposed wind projects in the region and consists primarily of dryland agriculture, of which small amounts have been converted to Conservation Reserve Program (CRP) lands, and areas of native grassland rangeland.

Most wind power development in northern Oregon and southern Washington has been within the Columbia Plateau Level III Ecoregion (Thorson et al. 2003; Figure 1). The Columbia Plateau was historically characterized by open, arid shrub-steppe and grassland-steppe habitats. The current predominant land use of the Ecoregion is dryland agriculture, CRP lands, and rangeland. Precipitation through the region is 6-12 inches per year (Thorson et al. 2003). Surrounding ecoregions are more mountainous, receive more precipitation, and are more forested than the Columbia Plateau. While the Columbia Plateau has less vegetative strata than surrounding ecoregions, and is an excellent place for wind power development, plant and animals species that are specialized for this type of habitat may be recipient of a larger portion of the cumulative impacts from wind development.

2.0 METHODS

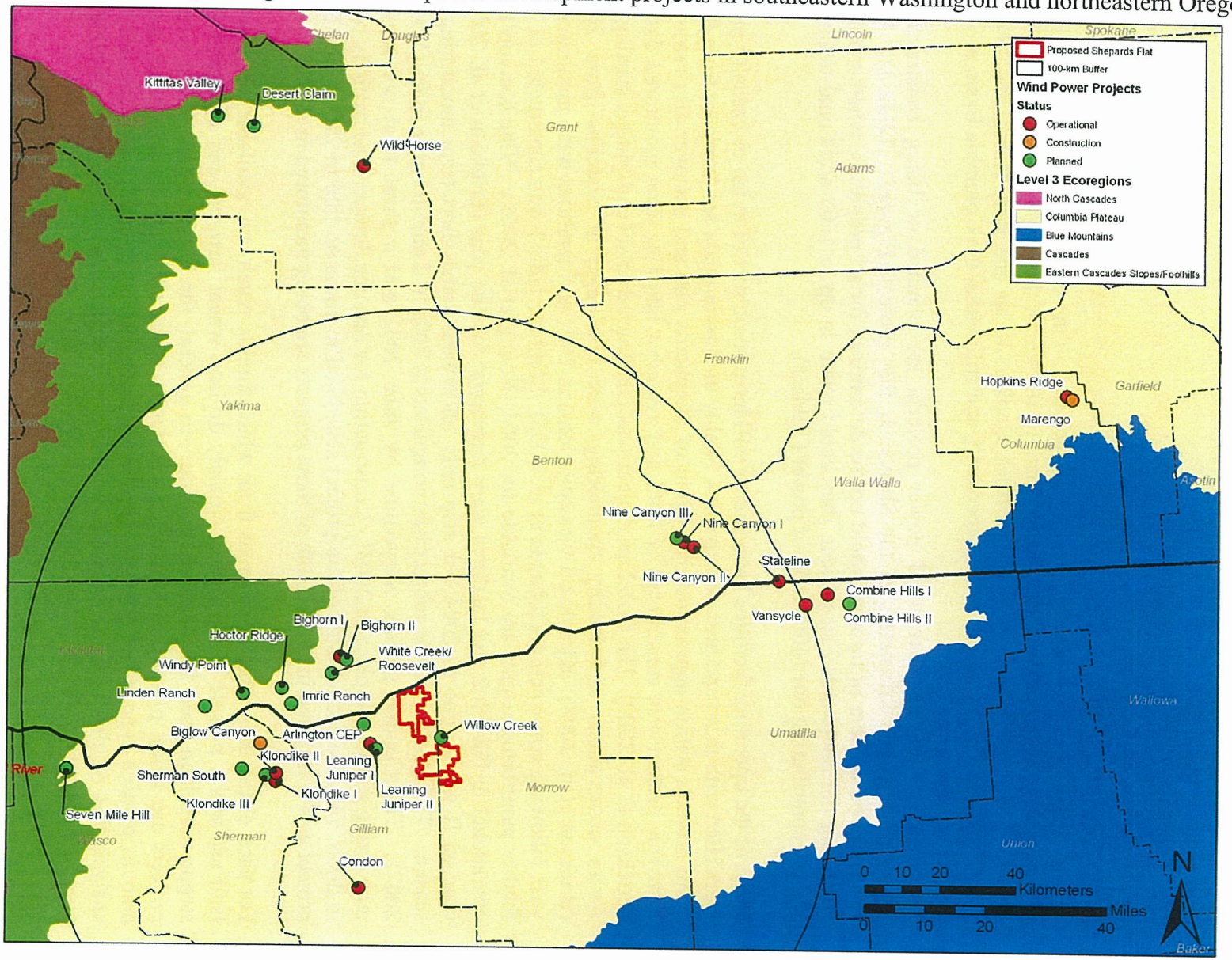
This report is intended to provide a broad, qualitative analysis using existing public information about existing wind projects and wind project proposals in the region and results of monitoring (fatality) studies to compile a cumulative impact analysis for avian and bat resources. The analysis relies heavily on existing information from studies in the Columbia Plateau Ecoregion. Information about wind project proposals was gathered from a variety of sources such as federal and state agencies (e.g., BPA, Oregon EFSC), permitting agencies (e.g., Kickitat County), non-

profit renewable energy advocates (e.g. Renewable Northwest Project), and other public sources such as internet resources. Basic information such as the proposed capacity, turbine size and number, and location about each project identified was gathered and summarized to the extent possible. In many cases the actual boundary of the proposal could not be identified and only a general location was known.

The general approach to the cumulative effects analysis was to summarize results of fatality monitoring studies at operational wind projects within the same ecoregion, and then use the results to estimate impacts for all constructed and proposed wind projects within approximately 100 km of the proposed Shepherds Flat project (Figure 1). The 100km buffer is somewhat arbitrary but due to similarities of habitat and land use throughout the whole Columbia Plateau ecoregion the resources potentially impacted by wind projects are similar for all projects. The Vansycle and Combine Hills wind projects occur just outside a 100km distance from Shepherds Flat and are included in the analysis (Figure 1).

This cumulative effects analysis considers data from seven projects in the Columbia Plateau ecoregion where monitoring for fatalities has occurred. Predominant vegetation type and land use for all the projects where monitoring occurred is similar (dryland agriculture, grassland and shrub-steppe rangeland), and the fatality and avian survey data were all collected using similar methods. The data sets used in this report were collected using similar methods, where observed fatality rates calculated from standardized carcass searches were adjusted for searcher efficiency and carcass removal biases. The analysis operates under the assumption that the avian and bat communities are similar across all projects because of habitat and land use similarities throughout the ecoregion, and thus applicable to the new proposed projects in this same ecoregion. Details about results, methods, and estimates of potential avian impacts from each individual project are available in the referenced project reports.

Figure 1. Level III ecological regions and wind power development projects in southeastern Washington and northeastern Oregon.



3.0 RESULTS

3.1 Study Area and Wind Projects

As of early 2007, 12 wind projects were in operation in the Columbia Plateau Ecoregion and 10 of these were in operation within approximately 100 km of the proposed Shepherds Flat project (Figure 1, Table 1). Two operating facilities, Hopkins Ridge and Wild Horse, are about 180 km to the east and 140 km to the north respectively and still within the Columbia Basin ecoregion.

Currently, up to 19 other wind power projects are planned or being constructed within approximately 100 kilometers of the Shepherds Flat project (Figure 1, Table 1). While the capacity and number of turbines could not be determined for all proposals, when completed and including the Shepherds Flat project, they could result in up to 1600 additional turbines in the region, contributing over 4060 MW of power (Table 1).

Most of the operating facilities have had or will have some sort of avian or casualty monitoring associated with them and post-construction fatality monitoring data are available from five of the wind projects within approximately 100km of Shepherds Flat and six over all (Table 2). The Vansycle project was constructed in 1998 and avian/bat fatalities were monitored during 1999 (Erickson et al. 2000). The Stateline project was constructed in several phases starting in 2001. Avian observations and fatality monitoring were conducted at Stateline from 2001-2003 (Erickson et al. 2004). Klondike I was completed in 2001 and fatalities were monitored for one year following construction (Johnson et al. 2003) Combine Hills I was constructed in 2003 and fatality monitoring results are available for 2004 (Young et al. 2005). Nine Canyon I became operational in fall 2002 and fatalities were monitored for one year (Erickson et al. 2003). Nine Canyon II was online in 2004 but also only underwent some short term monitoring for one season. The Hopkins Ridge project was completed in 2005 and monitored in 2006 (Young et al. 2007). The Condon project was online by June 2002 and a short term non-standardized monitoring study took place in 2003[1]. Construction for Leaning Juniper was partially completed in 2006, with the second half of the project scheduled to come on line in 2007. The Big Horn project was completed in 2006. Both of these projects are being monitored in 2007.

For each of the individual study areas from which fatality results are available, the predominant land use was a mosaic of agriculture, mainly dryland wheat farming, and grassland or shrub-steppe rangeland used for livestock grazing. In general, the region where future wind power projects are being planned is similar in vegetation types although for any given project the amount of each type varies (Quigley and Arbelbeide 1997, Figure 2). It is assumed for the analysis that results from the existing studies, which are similar, would be applicable to new proposed projects.

[1] Monitoring at the Condon wind project took place for less than one year in 2002-2003 (Fishman 2003). This study did not use similar methods to the other studies and was not as rigorous. No searcher efficiency or carcass removal surveys were conducted so the reported results are simply observed number of fatalities for the study and not comparable to the other studies.

Table 1. Wind power projects constructed or planed in the Columbia Plateau ecological region of Washington and Oregon.

Project	Max. Capacity (MW)	No. Turbines	Turbine Size (MW)	General Habitat and Land Use	Dist. To Shepherds Flat (km)	Project Information Source
Existing						
Combine Hills I (Umatilla Co., OR)	41	41	1	dryland ag, grazed shrub steppe	105	http://www.rnp.org/News/pr_EurusCombineJun03.html
Vansycle Ridge (Umatilla Co., OR)	25	38	0.66	dryland ag,	100	http://www.rnp.org/Projects/vansycle.html
Stateline (Umatilla Co., OR)	300	399	0.66	dryland ag, grazing, shrub steppe	95	http://www.ppmenergy.com/cs_stateline.html
Klondike I (Sherman Co., OR)	24	16	1.5	dryland ag	35	http://www.rnp.org/Resources/Klondike%201%20pager.pdf
Klondike II (Sherman Co., OR)	75	50	1.5	dryland ag	35	http://www.portlandgeneral.com/about_pgc/current_issues/klondikeII/Default.asp?bhcp=1
Condon (Gilliam Co., OR)	50	83	0.6	farming, grazing	30	http://www.cfw.bpa.gov/environmental_services/Document_Library/Condon_Wind/RODwMAP.pdf
Leaning Juniper I (Gilliam Co., OR)	104	63	1.5	farming, grazing	5	http://www.cfw.bpa.gov/environmental_services/Document_Library/Arlington_PPM/ROD031105.pdf
Nine Canyon I (Benton Co., WA)	64	49	1.3	farming, steppe	80	http://www.energy-northwest.com/downloads/ninecan.pdf
Nine Canyon II (Benton Co., WA)	16	12	1.3	farming, steppe	80	http://www.energy-northwest.com/downloads/9Canyon.pdf
Hopkins Ridge (Columbia Co., WA)	150	83	1.8	farming, crp, grazing, steppe	180	http://www.rnp.org/News/pr_PSEHopkinsDec05.htm
Big Horn I (Klickitat Co., WA)	250	167	1.5	drylnd ag, crp, lithosol-grassland	13	http://www.cfw.bpa.gov/environmental_services/Document_Library/Big_Horn/BigHornROD03242005.pdf
Wild Horse (Kittitas Co., WA)	230	127	1.8	lithosol, shrub steppe	140	http://www.res-ltd.com/wind-farms/wf-wildhorse/htm
Under Construction						
Biglow Canyon (Sherman Co., OR)	450	211	1.65	farming, grazing	30	http://www.bpa.gov/corporate/pubs/RODS/2006/RODKlondikeIIIBiglowCanyon.pdf
Marengo (Columbia Co., WA)	140	78	1.8	dryland ag, shrub steppe	180	http://www.pacificpower.net/Homepage/Homepage35750.html
Proposed						
Seven Mile Hill (Wasco Co., OR)	50				~90	http://www.oregon.gov/ENERGY/SITING/review.shtml#Seven_Mile_Hill_Wind_Project

Project	Max. Capacity (MW)	No. Turbines	Turbine Size (MW)	General Habitat and Land Use	Dist. To Shepherds Flat (km)	Project Information Source
Klondike III (Sherman Co., OR)	272	165	1.8	farming, grazing	30	http://egov.oregon.gov/ENERGY/SITING/docs/KWPPublicFilingNotice.pdf
Leaning Juniper II (Gilliam Co., OR)	279			farming, grazing	~5	http://www.oregon.gov/ENERGY/SITING/review.shtml#Leaning_Juniper_Wind_Power
Arlington CEP (Gilliam Co., OR)	104	63	1.65	grazed shrub-steppe	6.5	http://www.bpa.gov/corporate/pubs/rods/2005/EFW/Arlington-Wind-Interconnection-ROD-1-14-05.pdf
Shepherds Flat (Gilliam Co., OR)	750	300-326	2.3-2.5		0	Data provided by BPA
Willow Creek (Morrow Co., OR)	180			farming, grazing	<1	http://www.transmission.bpa.gov/PlanProj/Wind/willow.cfm
Combine Hills II (Umatilla Co., OR)	63	41	1.5	dryland ag, grazed shrub steppe	~105	http://www.cfw.bpa.gov/environmental_services/Document_Library/Combine_Hills/Combine_Hills_Cx.pdf
Big Horn II (Klickitat Co., WA)	150			agriculture, crp	~15	
White Creek/Roosevelt (Klickitat Co., WA)	205	166-200	1.5-1.8	farming, grazing	13	http://www.cfw.bpa.gov/environmental_services/Document_Library/Rock_Creek/RockCreekSubstationROD.pdf
Windy Point (Klickitat Co., WA)	242.5	97	2.5	farming, grazing	~32	http://www.bpa.gov/corporate/pubs/RODS/2006/WindyPointI_IIRODFINAL.pdf
Hoctor Ridge (Klickitat Co., WA)	60			ag/grazing, woodland	31	
Linden Ranch/DNR (Klickitat Co., WA)	56			agriculture, grazing	52	
Imrie Ranch (Klickitat Co., WA)	100	35	2.8	agriculture, grazing	31	
Windtricity (Klickitat Co., WA)	12					
Mariah Energy (Klickitat Co., WA)	4					
Nine Canyon III (Benton Co., WA)	32	14	2.3	dryland wheat	~80	http://www.energy-northwest.com/news/2006/06_07.php
Desert Claim (Kittitas Co., WA)	180	90	2.0	grassland, agriculture shrub steppe	160	
Kittitas Valley (Kittitas Co., WA)	130	65	2.0	grassland, grazing	170	
Totals	~4800	~2950				

Figure 2. Terrestrial vegetative communities in southeastern Washington and northeastern Oregon.

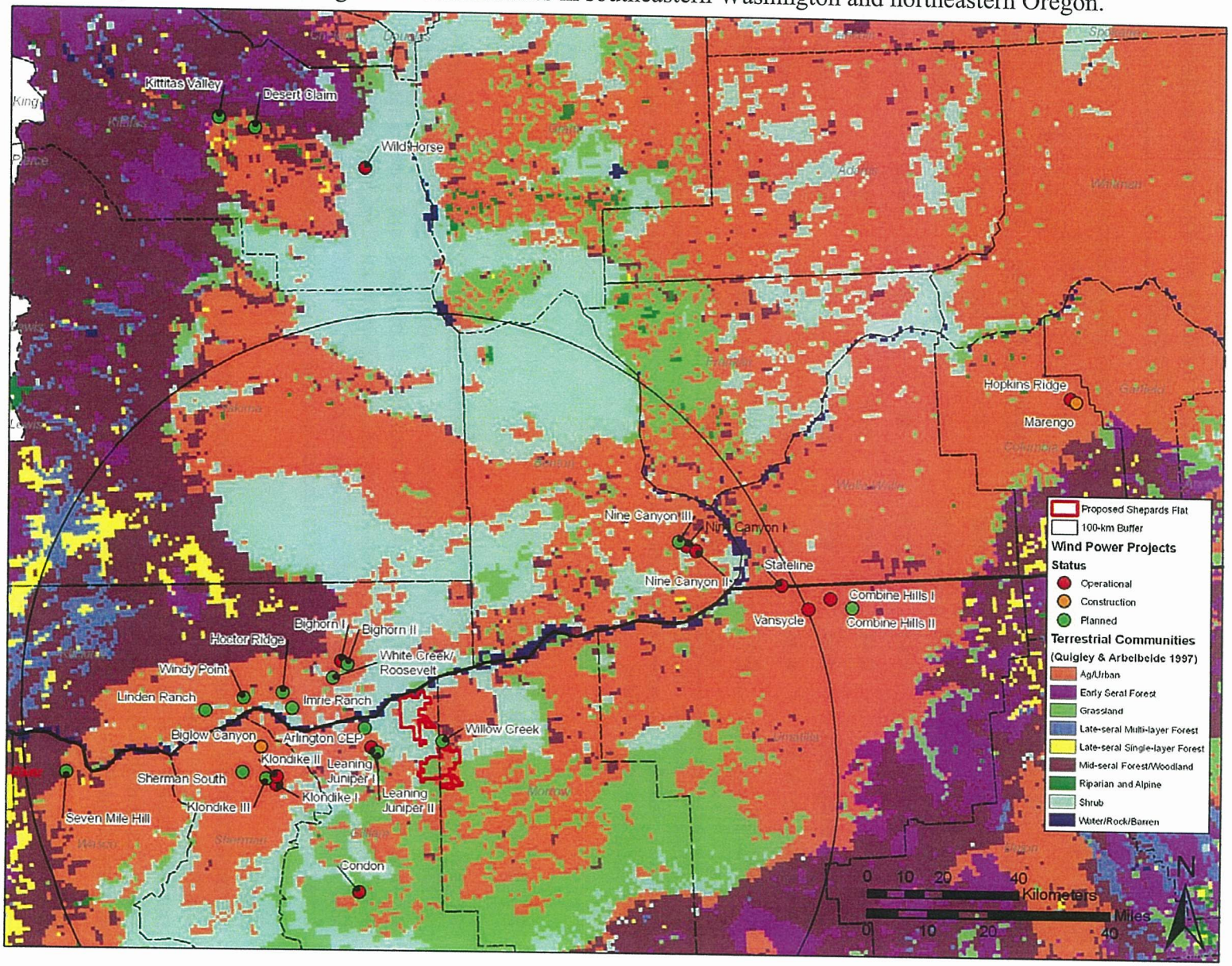


Table 2. Avian use estimates and avian fatality estimates for wind power projects in the Columbia Plateau Ecoregion.

Project	Mean annual avian use (#/20-min survey)		Mean annual mortality (#/MW/year)			
	Raptors	All birds	Raptors	All birds	Nocturnal Migrants	Source
Combine Hills, OR	0.60	6.0	0	2.6	0.27	Young et al. 2005
Klondike, OR	0.47	17.5	0	0.9	0.35	Johnson et al. 2003
Vansycle, OR	0.41	13.1	0	1.0	0.32	Erickson et al. 2000
Stateline, WA/OR	0.41	13.1	0.09	2.9	0.73	Erickson et al. 2004
Hopkins Ridge, WA	0.64	8.7	0.14	1.2	0.46	Young et al. 2007
Nine Canyon, WA	0.26	9.4	0.05	2.8	0.45	Erickson et al. 2001
Condon, OR	0.37	5.8	0.02[a]	0.05[a]	NR	Fishman 2003
Mean	**0.45**	**10.5**	**0.05**	**1.9**	**0.43**	

[a] not adjusted for searcher efficiency or scavenger removal; study methods differed from other projects and were not as rigorous; therefore this estimate should be regarded as a minimum mortality estimate and it was not used in calculation of the mean values.

3.2 Direct Impacts to Birds

Annual avian mortality estimates at wind farms in the Columbia Plateau Ecoregion ranged from 0.9 to 2.9 birds per MW (Table 2). The average for six projects with comparable data collection methods was 1.9 avian deaths/MW/year. All constructed, planned, and under construction projects within 100km and including Shepherds Flat would contribute about 4060 MW of power. Assuming that mortality rates are representative of the region, new wind power generation could cause between approximately 3,650 and 11,775 and on average 7,715 avian deaths per year in the region.

Raptors

At modern wind power projects in the Columbia Plateau Ecoregion, raptor species generally constitute only a small portion of avian use, ranging from 0.26 to 0.64 observation per 20-min survey. Raptor mortality has also been low ranging from 0 to 0.14 raptor fatalities per MW per year. An added 4060 MW of capacity in the region could result in between 0 and 568, and on average about 200 raptor deaths per year.

Red-tailed hawk, American kestrel, and northern harrier account for most of the raptor use at other projects where avian use was studied (see Erickson et al 2001, 2002). In the winter, rough-legged hawk and red-tailed hawk account for majority of the raptor use. If it is assumed that raptor use is correlated with mortality, these species are expected to be the raptor species with the highest collision risk across the projects. The potential exists for other species to collide with turbines,

including Swainson's hawk, ferruginous hawk, turkey vulture, golden eagle, Cooper's hawk, sharp-shinned hawk, prairie falcon, and bald eagle; however, the mortality risk associated with these species is expected to be lower than the mortality for red-tailed hawks and American kestrel due to the lower use by these species in general. In addition, American kestrel and red-tailed hawk have been the most common fatality at regional wind projects (Table 3; Erickson et al. 2001, 2004, Young et al. 2007). Common owl species such as great-horned, which are typically not effectively surveyed during the day, may also be at risk of collision, although short-eared owl has been the only owl species fatality recorded at the regional wind projects (Table 3). While use is often high for turkey vultures, they appear less susceptible to collision than most other raptors (see Orloff and Flannery 1992, Erickson et al. 2001). In addition, there have been very few northern harrier, ferruginous hawk, rough-legged hawk, and *Accipiter* species fatalities recorded at wind projects (Table 3, Erickson et al. 2001, 2002).

Passerines

Passerines have been the most abundant avian fatality at wind projects studied (see Erickson et al. 2000, 2001, 2002, Johnson et al. 2002, Young et al. 2003, 2005, 2007), often representing more than 80% of the avian fatalities. For projects in the Columbia Plateau Ecoregion on average approximately 69% of the avian fatalities have been passerines (Table 4). Both migrant and resident passerine fatalities have been observed, with migrants generally making up 20-30% of the avian fatalities. Assuming that 69% of all bird mortality would be passerine fatalities between approximately 2,518 and 8,125 and on average 5,323 passerine deaths per year in the region would occur. Some impacts are expected for nocturnal migrating species, however, impacts are not expected to be great for the Columbia Plateau Ecoregion. Estimates for nocturnal migrant mortality at the regional wind projects have ranged from 0.27 to 0.73 per MW per year (Table 2). Assuming these estimates are representative of Columbia Plateau wind projects, between approximately 1,090 and 2,960 nocturnal migrant fatalities would be expected if 4060 MW of wind power were constructed.

Passerine species most common to the project sites will likely be most at risk, including horned lark, western meadowlark, and European starling, however, there is generally little concern over potential mortality of this non-native, non-protected species. Horned larks have been the most commonly observed fatality at several wind projects, including Vansycle, Combine Hills, and Stateline (Table 3, Erickson et al. 2003, Young et al. 2005, Erickson et al. 2004) and represent approximately 35% of the avian fatalities in the Columbia Plateau ecoregion at wind projects. Golden crowned kinglet, a tree/forest dwelling species, have been recorded as fatalities at a few projects and are generally considered migrants.

Table 3. Number and species composition of bird fatalities found at the seven Pacific Northwest regional wind projects.

Species	Number of Fatalities	Percent Composition
Horned lark	128	35.2
Ring-necked pheasant *(n)*	35	9.6
Golden-crowned kinglet	23	6.3
Chukar *(n)*	17	4.7
Western meadowlark	15	4.1
European starling *(n)*	15	4.1
Gray partridge *(n)*	14	3.8
White-crowned sparrow	12	3.3
Red-tailed hawk	9	2.5
American kestrel	9	2.5
Unidentified passerine	8	2.2
Yellow-rumped warbler	6	1.6
Winter wren	5	1.4
Rock dove *(n)*	5	1.4
Canada goose	4	1.1
Dark-eyed junco	4	1.1
Unidentified bird	4	1.1
House wren	3	0.8
Red-breasted nuthatch	3	0.8
Black-billed magpie	3	0.8
Northern flicker	3	0.8
Golden-crowned sparrow	3	0.8
Unidentified sparrow	2	0.5
Short-eared owl	2	0.5
Savannah sparrow	2	0.5
Ruby-crowned kinglet	2	0.5
Vesper sparrow	2	0.5
White-throated swift	2	0.5
Rough-legged hawk	2	0.5
Great blue heron	2	0.5
Red-winged blackbird	1	0.3
Ferruginous hawk	1	0.3
Grasshopper sparrow	1	0.3
American pipit	1	0.3
Mallard	1	0.3
Swainson's thrush	1	0.3
Swainson's hawk	1	0.3
Spotted towhee	1	0.3
Lewis's woodpecker	1	0.3
American robin	1	0.3
Macgillivray's warbler	1	0.3

Species	Number of Fatalities	Percent Composition
House finch	1	0.3
Virginia rail	1	0.3
American coot	1	0.3
Cooper's hawk	1	0.3
Gray catbird	1	0.3
Northern harrier	1	0.3
Townsend's warbler	1	0.3
Unidentified flycatcher	1	0.3
Totals (47 species)	363	100

n = non-native species

Table 4. Percent composition of avian fatalities by species group for the seven Pacific Northwest regional wind project monitoring studies.

Species	Number of Fatalities	Percent Composition
Passerines	251	69.1
Upland gamebirds *(n)*	66	18.2
Raptors	26	7.2
Other birds[a]	20	5.5
Totals	363	100
Non-protected species[b]	20	5.5

[a] Waterbirds, waterfowl, rails, doves, woodpeckers, swifts

[b] European starling and rock dove

Upland gamebirds

For projects in the Columbia Plateau Ecoregion, upland gamebirds have composed a higher percentage of avian fatalities than in other regions of the U.S., approximately 18% of all avian fatalities (Table 4). Three introduced species, ring-necked pheasant, chukar, and gray (Hungarian) partridge are the most commonly found non-passerine fatalities (Table 3). Estimates for upland game bird mortality in the Columbia Plateau Ecoregion have varied from 0.27 to 0.47 per MW per year. Provided these estimates are representative, between 1,090 and 1,910 upland gamebird fatalities would be expected per year for 4060 MW of wind power.

3.3 Direct Impacts to Bats

Results of fatality monitoring for the Columbia Plateau Ecoregion wind projects indicate mortality ranges of approximately 0.63 to 2.46 bats per MW per year (Table 5). Based on these results, and considering the similarities in the characteristics of the project areas and other regional projects, a conservative estimate of total bat mortality would be between 2,550 and 9,990 bats per year, assuming 4060 MW of wind power is constructed.

Table 5. Summary of Bat Mortality at newer generation wind project monitoring studies in the Columbia Plateau ecoregion.

Project Name [state]	No. Bats /turbine/year	Bats per MW[1]	Reference
Stateline [OR/WA]	1.12	1.70	Erickson et al. 2004
Vansycle [OR]	0.74	1.12	Erickson et al. 2000
Klondike [OR]	1.16	0.77	Johnson et al. 2003
Hopkins Ridge [WA]	1.13	0.63	Young et al 2007
Nine Canyon [WA]	3.21	2.46	Erickson et al. 2001b
Combine Hills [OR]	1.88	1.88	Young et al. 2005
Average	1.54	1.43	

[1] Most reports do not provide number per MW of energy produced so this number was calculated based on the mortality per turbine and capacity of turbines studied.

Only four species of bat fatalities have been documented for six wind projects monitored in the Columbia Plateau Ecoregion (Table 6). The vast majority of the fatalities were composed of two species: silver-haired bat (48%) and hoary bat (46%), two species of foliage (tree) dwelling migratory bats (see Erickson et al. 2003, 2004; Young et al. 2005, Johnson et al. 2003, Young et al 2007). Monitoring studies at other wind projects nationwide have documented impacts to bats with some common results for all regions (Johnson 2005). The species at highest risk appear to be foliage dwelling (forest, trees) fall migratory species. The annual period when most bat fatalities occur is in August and September. Hoary and silver-haired bats are wide spread across North America and breed into the boreal forests regions of Canada and migrate south to winter in the southern U.S., Mexico, and potentially further south in Central America. Many bats will migrate short distances to suitable hibernacula for the winter; however, short distance migrant species do not appear to be at as great a risk based on the monitoring studies results.

Table 6. Number and species composition of bat fatalities found at six Pacific Northwest regional wind projects.

Species	Number of Fatalities	Percent Composition
Silver-haired bat	115	48.3
Hoary bat	110	46.2
Unidentified bat	7	2.9
Little brown bat	3	1.3
Big brown bat	3	1.3
Totals (4 species)	238	100

Bat foraging areas such as riparian zones, shrublands, streams, and other water sources are generally limited in the Columbia Plateau Ecoregion and usually confined to river and stream corridors. The sites chosen for wind development in the ecoregion generally have few bat

foraging or concentration areas. At several wind projects studied in the U.S., bat collision mortality during the breeding season was far less, despite the fact that relatively large populations of resident bats of several species were documented in proximity to the wind plant (see Gruver 2002; Johnson et al., 2002; Johnson 2005). Based on these studies, it appears that wind projects, especially those in open habitats, pose little risk to non-migratory bat populations.

3.4 Habitat Impacts

Grassland and shrub-steppe habitat is one of the most abundant habitat types in Eastern Oregon and Washington, but it is also highly subjected to development and conversion to agriculture (Johnson and O'Neil 2001). In addition to potentially thousands of new vertical structures, added wind generation in the region will result in more roads (mostly dirt and gravel) and increased human activity due to turbine construction and maintenance. Most habitat impacts will be to already heavily disturbed agriculture fields and moderately disturbed grazing/rangeland. The percent of direct impacts actually occurring in grassland or shrub-steppe habitat are difficult to predict and would be based on individual project design and layout.

Because of the location of the proposed wind projects (Figure 2, Table 1), it is expected that the majority of habitat impacts will occur in dryland agriculture vegetation. Under a set of assumptions about impacts and project location, the amount of cumulative impacts to vegetation communities can be estimated. Assuming that: (1) on average the permanent impacts associated with a turbine and the associated roads are between 1.5 and 2.5 acres per turbine; (2) 25% of a project layout occurs in non-agricultural vegetation types, which in many cases is a drastic overestimate; and (3) 1.5-2.5 MW turbines are used for the proposed build out identified (Table 1), then between 630 and 1750 acres of non-agricultural vegetation type, primarily grassland shrub-steppe vegetation, would be lost in the Columbia Plateau Ecoregion with 4060 MW of wind projects. These impacts would be spread over a large area geographically (see Figure 1) and are considered an overestimate because of efforts to locate projects in agricultural vegetation types. On a local (project) scale, these impacts are generally on the edge of native vegetation areas where they abut agriculture fields.

While the Columbia Plateau covers a large area, and characteristic grassland shrub-steppe habitat is widespread, it is also heavily fragmented by agricultural activities. Species that depend on native habitat face physical and ecological barriers within the region and at the region's edges. The Columbia River and other smaller rivers in the area cut deep canyons and present linear alteration to the general physiography and potential barriers to some animal species movement. Large swaths of agricultural land are less obvious, but may pose significant obstacles to small or less mobile animals. While many birds are not impeded by such physical barriers, some smaller, habitat specific birds that depend on brushy habitats for cover could be affected by such habitat fragmentation. Habitat specialists and obligates such as sage-grouse (*Centrocercus urophasianus*) and sage sparrow (*Amphispiza belli*) require large tracts of continuous sage habitat (Johnson and O'Neil 2001), which is largely missing from the Columbia Plateau, and the range for these species in the Columbia Plateau is already severely restricted. Assuming that agricultural vegetation types are not critical wildlife habitat, habitat loss impacts are not expected to be a significant loss to any given species.

4.0 DISCUSSION

This cumulative effects analysis was based largely on results of other studies of wind projects in the region and in particular monitoring studies that estimated the direct impacts of a particular wind project. The overall design for these studies incorporates several assumptions or factors that affect the results of the fatality estimates. First, all bird casualties found within the standardized search plots during the study periods were included in the analyses. It is assumed that carcass found incidentally within a search plot during other activities would have been found during a standardized carcass search. Second, it was assumed that all carcasses found during the studies were due to collision with wind turbines. True cause of death is unknown for most of the fatalities. It is highly likely that some of the casualties included in the data pool for the various projects were due to natural causes or background mortality such as predation, disease, other natural causes, or manmade causes such as farming activity or vehicles on county/project roads. The overall effect of these assumption is that the analyses provide a conservative estimate (an over estimate) of mortality due to the studied wind project.

A few wind studies in other regions of the country have provided information on background mortality. During a four-year study at Buffalo Ridge, Minnesota, 2,482 fatality searches were conducted on study plots without turbines to estimate reference mortality in the study area. Thirty-one (31) avian fatalities comprising 15 species were found (Johnson *et al.* 2000). Reference mortality adjusted for searcher efficiency and carcass removal for the study was estimated to average 1.1 fatalities per plot per year. At a second study, pre-project carcass searches were conducted at a proposed wind project in Montana (Harmata *et al.* 1998). Three bird fatalities were found during 8 searches of 5 transects, totaling 17.61 km per search. On average, approximately 1.8 km of transect is searched within the turbine plots in the referenced studies for the Columbia Plateau region (Table 2). The amount of transect searched at the Montana site per search was equivalent to searching approximately 7-9 turbines for the regional studies. The background estimate for observed mortality would be approximately 0.33 per turbine plot per year, unadjusted for scavenging and searcher efficiency. The background mortality information from the Minnesota and Montana studies suggests that the estimates of bird mortality include some avian fatalities not related to turbine collision, and this factor alone would lead to an over-estimate of true avian collision mortality for wind projects.

It should also be noted that the fatality estimates may vary from the expected range based on many factors that may influence bird and bat use of a project site such as habitat, topography, foraging areas, migratory patterns, as well as project characteristics such as turbine size, met towers, proximity to high bird use areas and other site specific and/or weather variables. It is difficult to determine the influence these parameters have on impacts from wind projects; however, because of the general similarities of results from the monitoring studies within the Columbia Plateau Ecoregion (see Table 2) it is generally believed that future direct impacts from new wind development in the region are also likely to be similar.

4.1 Significance of Impacts to Birds

Despite several thousand bird fatalities from 4060 MW of wind power, these impacts are divided across numerous species and groups of species and also across seasons, and thus the overall mortality to any given species or population of a species is substantially less and not expected to be significant.

Passerines

For most studies that have occurred in agricultural settings, a few common species make up the majority of bird observations and fatalities at the site, however, a variety of other species, including migrants, have been recorded as fatalities but typically in low numbers and frequency. The majority of avian deaths (69%) due to wind power facilities in the Columbia Plateau region were of common passerines in mixed agriculture and grassland habitat (see Table 3). Horned larks are the most common fatality at most of the projects studied. For example at the Stateline, Combine Hills, Nine Canyon I, horned larks were 39%, 41%, and 47% of all avian fatalities, respectively and a much higher percentage of the passerine fatalities. Other shrub-steppe and open country passerines such as western meadowlarks and European starling were also found regularly. For example, European starling made up 18% of the fatalities at the Hopkins Ridge project (Young et al. 2007).

Given that most of the mortality will be common species with widespread distribution and large populations, impacts are expected to be to individuals and not populations. For example, over all passerines recorded during the regional monitoring studies, horned lark made up over half (51%) of the fatalities. Assuming this pattern holds for the regional wind development, it could be expected that on average there would be 2,715 horned lark fatalities per year. Local populations of horned larks are difficult to define because of the vast amount of suitable habitat for this species in the Columbia Plateau. Based on data from the USGS Breeding Bird Survey routes in the Columbia Plateau, the long term average was 50.3 horned larks detected for 71 routes in the ecoregion (Saur et al. 2005). Each BBS route covers 25 miles with a survey plot radius of 0.25 mile for a total survey area of roughly 12.5 square miles or 8,000 acres. The total area surveyed in the 71 routes (~568,000 acres) represent ~2.8% of the 20,280,000 acre Columbia Plateau. The annual average observed number of horned larks for the 71 routes was approximately 3,573. Assuming this represents 2.8% of the breeding horned lark population in the Columbia Plateau, the total would be approximately 127,500 horned larks. This is a likely a minimum estimate because horned larks are a small bird that is detected with relatively low probability beyond 200 m. If it is further assumed that the 2,715 horned lark fatalities are spread equally over the year, then roughly one-quarter of these (~679) would be during the breeding season. This represents approximately 0.5% of the breeding horned larks and is not considered significant. It is likely that other background mortality of breeding horned larks is greater than this estimate.

While this example represents a plausible means of addressing potential population impacts under a number of assumptions, it illustrates the low level of effect on the common grassland/agricultural species that have been the most impacted. Similar examples could be used for the other species which illustrate lower effects. For example the BBS data indicates a long term average of 77.61 western meadowlarks for routes in the Columbia Plateau (Saur et al. 2005). Western meadowlark represents approximately 6% of the passerine fatalities at wind projects. Based on similar

calculations the impact on the western meadowlark breeding population in the Columbia Plateau would be minor and insignificant. The number of fatalities from other species are even fewer (see Table 3) and unlikely to have any population effects.

Nocturnal Migrants

In general, while modern turbines are getting taller, new wind projects do not appear to have a large impact on migrant birds. Results of marine radar surveys for proposed wind projects have indicated that the vast majority of nocturnal migrants fly at altitudes that do not put them at risk of collision with turbines (Young and Erickson 2006). Also, there have been only two multiple individual mortality events during a migration season reported at newer wind projects in the U.S. At Buffalo Ridge, Minnesota, fourteen migrating passerine fatalities (vireos, warblers, flycatchers) were observed at two turbines during a single night in May 2002 (Johnson et al. 2002), and 33 migrating passerine fatalities (mostly warblers) were observed near one turbine and a well-lit substation at the Mountaineer, West Virginia, wind project in May 2004 (Kerns and Kerlinger 2004). In general for wind projects in the Columbia Plateau, approximately 25% of the fatalities have been considered migrants spread over many species. The most common migrant fatality was golden-crowned kinglet (Table 3). Approximately 9% of the passerine fatalities were of this species. Golden-crowned kinglets are typically associated with tree or wooded habitats during the breeding season so it is assumed that many of the impacted individuals were from surrounding more mountainous ecoregions or populations further north (e.g., Canada). As with horned lark, estimating the potential population size from which these birds came requires a number of assumptions. However, while it is unknown, it is possible that the individual fatalities came from multiple populations in surrounding or more northern ecoregions, thus diluting the impacts on any one population. Other potential migrant species were found in lower numbers. Cumulatively the impacts to migrants would be spread over a much larger population base and are not considered significant.

Raptors

Red-tailed hawk and American kestrel account for more than 69% of the raptor fatalities recorded at the regional wind projects studied (see Table 3). Assuming this trend holds true for all proposed wind projects in the Columbia Plateau, it would be expected that on average 70 red-tailed hawk and 70 American kestrels would be killed each year. Following a similar analysis as that used for horned lark (above) it would be expected that approximately 18 red-tails and kestrels fatalities would occur during the breeding season. An estimate of the breeding population in the Columbia Plateau based on the BBS long-term average data is approximately 6820 breeding red-tailed hawks and 6288 breeding American kestrels. The impact to the breeding population would represent approximately 0.26% and 0.28% respectively. Background mortality for these species is likely higher than this estimate and it is considered insignificant. The other species of raptors have been impacted far less and would represent a much smaller number of fatalities.

Upland Gamebirds

Upland gamebird species represent a higher percentage (18%) of the avian fatality pool in the Columbia Plateau than in other regions in the U.S., although it is believed that many of the fatalities that are recorded are not wind turbine related. A large percentage of the upland gamebird fatalities are feather spots, suggesting the possible cause of death was predation or other non-turbine related cause. The species impacted, ring-necked pheasant, gray partridge, and chukar are introduced species common in

mixed agricultural native grass/steppe habitats. Habitat throughout the Columbia Plateau is highly suitability for these species and the large populations likely influence the higher mortality rate for the regional wind projects. As with non-native (non-protected) passerine species, there is generally low concern over impacts to upland gamebirds. These species are regulated by state agencies as game species. Impacts to these species are not expected to be significant and given the vast amounts of suitable habitat and other impacts to these species (i.e., hunting) it is unlikely that fatalities from wind development to these species would be significant.

4.2 Significance of Impacts to Bats

Unlike with birds, there is little information available about populations of bat species. For most species that are not threatened or endangered and have large distributions, very little is known about potential numbers that exist. Results of monitoring studies across the U.S. and Canada have found similar trends in impacts such as risk to bats from wind turbines is unequal across species and across seasons. The majority of bat fatalities at wind projects in the U.S. and Canada have been foliage/tree or forest dwelling long-distance migrant species. Species in the *Lasiurus* genus, hoary bat (*L. cinereus*) in the west and red bat (*L. borealis*) in the east, and silver-haired bats (*Lasionycteris noctivagans*) are the most abundant fatalities found at wind projects. Less common fatalities are of big brown bats and *Myotis* species. Numerous studies across the U.S. and Canada have shown this trend (see Johnson 2005). The highest mortality occurs during what is believed to be the fall migration period for bats from roughly late-July through September. Numerous studies across the U.S. and Canada have also shown this trend (see Johnson 2005). Much lower mortality rates, and particular in the Columbia Plateau Ecoregion, occur in the spring and summer.

More recently however, studies at different location in the U.S. and Canada, appear to indicate that bat mortality is not related to site features or habitat and dissimilar results for ecologically similar projects have been found. While it is hypothesized that eastern deciduous forests in mountainous areas may be the highest risk areas, higher bat mortality has also occurred at wind projects in prairie/agricultural settings (Alberta, Canada) and mixed deciduous woods and agricultural settings (Maple Ridge, New York). For example, a wind project in dryland agricultural prairie type habitats in southern Alberta has reported fairly high observed bat mortality (not corrected for searcher and carcass removal biases) of 12-15 bats per turbine per year or 7-8 bats per MW per year (Baerwald 2006). In contrast, other nearby (within 25 km) wind projects to that site have reported similar bat mortality (1-2 bats per MW per year) to the wind projects studied in the Columbia Plateau Ecoregion (Baerwald, pers. comm.).

Bat mortality in the Columbia Plateau Ecoregion would involve primarily silver-haired and hoary bats (see Table 6), and no impacts to threatened or endangered bat species are anticipated. The regional monitoring studies suggest resident bats do not appear to be significantly affected because in general, very low numbers of resident bat species have been observed fatalities. Hoary bats and silver-haired bats generally occupy forested or treed habitats during the breeding season – habitat distinctly lacking and localized in the Columbia Plateau Ecoregion. Most mortality is observed during the fall migration period and of these migrant species. The significance of this impact on hoary and silver-haired bat populations is difficult to predict, as

there is very little information available regarding the overall population size and distribution of the bats potentially affected. Hoary bat and silver-haired bats are widely distributed in North America. In general, mortality levels on the order of 1-2 bats per turbine or per MW are thought to be on individuals and not significant to populations, however, cumulative effects may have greater consequences for long-lived low-fecundity species such as bats. Unlike many avian species that may have multiple clutches of multiple young per year, hoary bats and silver-haired bats likely only raise one or two young per year and only breed once per year (Shump and Shump 1982, Kunz 1982). Bats tend to live longer than birds, however, and may have a long breeding lifespan. The impact of the loss of breeding individuals to populations such as these is generally unknown but may have greater consequences.

Since it is most likely breeding populations from surrounding mountainous/forested ecoregions or from more northern area (e.g., Canada) that are affected at the Columbia Plateau wind projects during the fall migration, the dynamics of these populations would need to be know to predict population effects. If these populations are large and stable the level of impact is not expected to be significant. However, if population trends are decreasing the added impact from wind development may continue to cause population declines. This information is generally unknown and future study is needed before the significance of the impacts can be estimated.

5.0 REFERENCES

Baerwald, E. 2007. Bat Fatalities in Southern Alberta. Proceeding of the Wildlife Research Meeting VI, November 2006, San Antonio, Texas. National Wind Coordinating Collaborative.

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and bat mortality associated with the Vansycle Wind Plant, Umatilla County Oregon. 1999 study year. Technical report submitted to Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 22 pp.

Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, Jr., K.J. Sernka and R.E. Good. 2001. Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee Publication. http://www.nationalwind.org/pubs/default.htm

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., M.D. Strickland, R.E. Good, M. Bourassa, K. Bay. 2002. Synthesis and comparison of baseline avian and bat use, raptor nesting and mortality information from proposed and existing wind developments. Technical Report prepared for Bonneville Power Administration, Portland, Oregon.

Erickson, W.P., B. Gritski, and K. Kronner. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report, September 2002 – August 2003. Technical report submitted to Energy Northwest and the Nine Canyon Technical Advisory Committee.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Fishman Ecological Services, LLC. 2003. Carcass survey results for SeaWest Windpower, Inc., Condon Site, 2002-2003. Prepared for SeaWest WindPower, Inc., Condon Wind Project, Gilliam County, Oregon.

Gruver, J.C. 2002. Assessment of bat community structure and roosting habitat preferences for the hoary bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming. M.S. Thesis, University of Wyoming, Laramie. 149pp.

Johnson, D.H. and T.A. O'Neil (managing editors). 2001. *Wildlife-Habitat Relationships in Oregon and Washington.* Oregon State University Press, Corvallis, OR. 768 pp.

Johnson, G.D. 2005. A review of bat collision mortality at wind-energy developments in the United States. Bat Research News 46:45-49.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd and D.A. Shepherd. 2000. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-year study. Technical report prepared by WEST, Inc. for Northern States Power Co., Minneapolis, MN. 212pp.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30: 879-887.

Johnson, G., W. Erickson, J. White, R. McKinney. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Plant, Sherman County, Oregon. Technical report prepared for Northwestern Wind Power, Goldendale, Washington. March 2003.

Kerns, J. and P. Kerlinger. 2004. A Study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual Report for 2003. Technical Report prepared for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee. Curry and Kerlinger, LLC. 39 pp.

Kunz, T.H. 1982. Silver-haired Bat, *Lasionycteris noctivagans*. Mammalian Species 172:1-5.

Orloff, S., and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final report to Alameda, Costra Costa, and Solano Counties and the California Energy Commission. Biosystems Analysis, Inc. Tiburon, CA.

Quigley, T.M.; Arbelbeide, S.J., tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins: Vol 2. Gen. Tech. Rep. PNWGTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Vol 1-4. (Quigley, Thomas M., tech. ed.; The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Sauer, J. R., J. E. Hines, and J. Fallon. 2005. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2005. Version 6.2.2006, USGS Patuxent Wildlife Research Center, Laurel, MD*

Shump, Jr., K.A. and A.U. Shump. 1982. Hoary bat, *Lasiurus cinereus*. Mammalian Species 185:1-5.

Thorson, T.D., Bryce, S.A., Lammers, D.A., Woods, A.J., Omernik, J.M., Kagan, J., Pater, D.E., and Comstock, J.A., 2003. Ecoregions of Oregon (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. Avian and bat mortality associated with the initial phase of the Foote Creek Rim Wind Power Project, Carbon County, Wyoming: November 1998 - June 2002. Technical Report prepared by WEST, Inc. for Pacificorp, Inc., SeaWest Windpower, Inc. and Bureau of Land Management. 35 pp.

Young, Jr., D.P., J.D. Jeffrey, W.P. Erickson, K. Bay, K. Kronner, B Gritski, and J. Baker. 2005. Combine Hills Turbine Ranch Wildlife Monitoring First Annual Report, March 2004-March 2005. Technical report prepared for Eurus Energy America Corporation, Umatilla County, and the Combine Hills Technical Advisory Committee.

Young, Jr., D.P. and W. P. Erickson. 2006. Wildlife Issue Solutions: What Have Marine Radar Surveys Taught Us About Avian Risk Assessment? Proceedings of the American Wind Energy Association Windpower 2006 Conference and Exhibition, Pittsburgh, Pennsylvania, June 4-7, 2006.

Young, Jr., D.P., W.P. Erickson, J.D. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. **W**estern **E**co**S**ystems Technology, Inc. Cheyenne, Wyoming, and Walla Walla, Washington. 25pp.

Appendix D-1
Land Use Consistency Determination
Skamania County, May 2009

Skamania County
Community Development Department

Skamania County Courthouse Annex
Post Office Box 790
Stevenson, Washington 98648
Phone: 509-427-3900 FAX: 509 427-3907

May 4, 2009

Allen Fiksdal, Manager
Energy Facility Site Evaluation Council
905 Plum Street SE, 3rd Floor
PO Box 43172
Olympia, WA 98504-3172

Subject: Certificate of Land Use Consistency Review for Whistling Ridge Wind Energy Project

Dear Mr. Fiksdal:

Skamania County has reviewed the Application for Site Certification that was submitted to the Washington State Energy Facility Site Evaluation Council on March 10, 2009 for the Whistling Ridge Energy Project. The application was reviewed to determine if the project was consistent or inconsistent with applicable County land use plans and zoning ordinances.

If the application had been submitted to the County, the project would require the following county issued reviews and permits: a SEPA Review, a Conditional Use Permit (only for the portion of the project located within the zoned area), a National Scenic Area (NSA) Permit (only for the portion of the project related to road and intersection widening that is located within the NSA), Building Permits, Critical Area Review (outside of the NSA), On-site Septic Permit, Well Drilling Inspection, and a Water Availability Verification Evaluation (W.A.V.E) Application. However, the final requirements and conditions of approval for the project would be determined by EFSEC during their review process.

Zoning Update:

In December 2007, the County began work to revise Title 21, the current Zoning Ordinance. Part of the update process was to try and incorporate small and large-scale energy facilities into the County regulations. The County's SEPA decision (A Determination of Non-Significance) for the zoning draft was appealed by two organizations. In their appeal, the organizations were requesting the County to prepare an EIS for non-project actions that may lead to significant adverse impacts. On February 19,

2009, the Hearing Examiner decided in favor of the appellants, the Determination of Non-Significance was reversed, and remanded to the County for preparation of an EIS. Since this decision, the map and text updates for the Zoning Ordinance project have permanently been placed on hold. It has not been decided whether or not the County will continue with this project or start from scratch when the zoning update process resumes. There is no scheduled time to return to the zoning project. The current adopted zoning is what applies to this project, drafts of "proposed" or "future" zoning ordinances or any Hearing Examiner review of such documents have no basis or bearing on this application before EFSEC. Only 7 of the potential 50 turbines are even located within an area that has a zoning classification. The remainder of the project area is unzoned.

Consistency Review:

After reviewing the location of the proposed Whistling Ridge Wind Energy Facility project I find that the project is consistent with the following land use codes and maps: SCC Title 21 Zoning Code, SCC 21A Critical Areas, Title 24 Clearing and Grading, the Comprehensive Plan, and resource maps. The project is not within SCC Title 20 (Shorelines) jurisdiction.

After reviewing the location of the proposed road improvements, SCC Title 22 Columbia River Gorge National Scenic Area Ordinance, and the resource maps, I find the road improvement portion of the application consistent with SCC Title 22 with conditions of approval. I further find that similar road improvement projects (road widening, realignments, etc.) have been found consistent with SCC Title 22 in the past.

For more detailed findings see the attached staff reports.

Sincerely,

Karen A. Witherspoon, AICP,
Community Development Department Director

cc: Jason Spadaro, SDS Lumber
Board of County Commissioners

Attachments: Staff Report
Zoning Map

RESOLUTION 2009-22

(Certification of Land Use Consistency Review for Whistling Ridge Wind Energy Project)

WHEREAS, Whistling Ridge Energy Project, LLC ("Applicant") filed an Application for Site Certification ("ASC") to the Washington Energy Facility Site Evaluation Council ("EFSEC") on March 10, 2009 for the Whistling Ridge Energy Project ("Project") pursuant to RCW 80.50; and

WHEREAS, EFSEC has assumed lead agency status pursuant to the State Environmental Policy Act, RCW 43.21C for the environmental review of this Project. Skamania County anticipates participating in the SEPA process; and

WHEREAS, the Skamania County Community Development Director reviewed the ASC to determine the project's consistency with applicable County land use plans and zoning ordinances and prepared a Certificate of Land Use Consistency; and

WHEREAS, the Board of County Commissioners have reviewed the Community Development Director's Certification of Land Use Consistency; and

WHEREAS, the Board of County Commissioners on May 5, 2009 considered the Community Development Director's determination at a regularly scheduled, public meeting; and

WHEREAS, due notice of the Commissioner's meeting set forth above has been given as required by law; and

WHEREAS, the development of the Whistling Ridge Energy Project, if approved, will be specifically governed by a Site Certification Agreement signed by the Governor and the Applicant, including conditions of approval developed through the upcoming public process, including SEPA review; and

WHEREAS, more detailed findings of consistency are included in the Community Development Director's Certificate of Land Use Consistency, which is attached hereto and is incorporated herein by reference as if set forth in full; and

NOW THEREFORE, BE IT RESOLVED, the Board of County Commissioners, after due deliberation, adopts the Certificate of Land Use Consistency and resolves that the Whistling Ridge Energy Project is consistent with the Skamania County land use plans and applicable zoning ordinances. A representative for Skamania County appointed by the Board of Commissioners is serving as a member of the Siting Council. Consequently, Skamania County does not, at this time, make any findings or determination regarding compliance with any other regulatory requirements or siting standards, and any potential conditions of approval recommended by Skamania County will be made at such time as the SEPA review is completed and after public meetings and hearings have been duly conducted by EFSEC, in accordance with Chapter 80.50 RCW.

PASSED IN REGULAR SESSION this 5th day of May 2009.

BOARD OF COMMISSIONERS SKAMANIA COUNTY WASHINGTON CLERK OF THE BOARD

BOARD OF COUNTY COMMISSIONERS
SKAMANIA COUNTY, WASHINGTON

Chairman

Commissioner

Commissioner

ATTEST:

Clerk of the Board

APPROVE AS TO FORM ONLY:

Prosecuting Attorney

Skamania County
Community Development Department

Skamania County Courthouse Annex
Post Office Box 790
Stevenson, Washington 98648
509 427-3900 FAX: 509 427-3907

STAFF REPORT FOR LAND USE CONSISTENCY REVIEW

I. SUMMARY OF PROPOSED ACTION (Project description)

This Land Use Consistency Review Staff Report is to address the application for the Whistling Ridge Energy Project to the Washington State Energy Facility Site Evaluation Council.

As proposed by the application submitted March 10, 2009 to the Energy Facility Site Evaluation Council (EFSEC), Jason Spadaro President of SDS Lumber Co, and of Whistling Ridge Energy LLC, is proposing a facility, collectively called the Whistling Ridge Energy Project, of up to 50 1.2- to 2.5- MW wind turbines with a total capacity of 75 MW of electricity. The project would be located on a 1,152-acre site in unincorporated Skamania County owned by SDS Co, LLC and Broughton Lumber Company, on the forested ridges of Saddleback Mountain. Each turbine would be up to approximately 426 feet tall to the tops of the blades extended over the tower of the wind turbine. In addition to the turbines, the planned facility would include: electrical transformers, 34.5 kilovolt collector lines and systems (primarily underground), permanent meteorological towers, an Operations and Maintenance facility (including bathrooms and kitchen), a new well for potable water, an on-site septic system, a substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line, and approximately 2.4 miles of newly-constructed and 7.2 miles of improved roads to provide access to the wind turbine locations during construction and for Operations and Maintenance.

The proposal states that several wind turbines will be placed in a Residential 10 (R10) zoning designation on the project site. While researching the parcels using the County's Geographic Information System (GIS), legal descriptions and official zoning maps, no R10 zoning designation was found within the project site. The proposal states that roughly 400 acres of the project site is located within FOR/AG 20 zoning and Residential 10 zoning designations. However, Community Development staff research of the County's GIS and assessor maps show that approximately 1,036 acres of the project site is unzoned, and approximately 127 acres of the project site is zoned FOR/AG 20. County GIS and assessor maps show the project area to be approximately 1,163 acres, however, this is just an approximation based on legal descriptions since no boundary survey was conducted. This information does not affect the consistency review of the project, rather it is a clarification of the project based on County's consistency review.

The proposal further includes improvements to roads and intersections within the National Scenic Area in order to provide access to the project site. The roadways

affected include Cook Underwood Road, Kollock-Knapp Road, Scoggins Road and private road logging CG2930. Improvements to the county roadways and the private logging road would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components from SR 14 to the proposed project site. These improvements may include 1) Rebuilding large sections of the existing roadway network, 2) Widening certain sections of the existing roadway network, 3) Flattening and/or rebuilding existing roadway topography both horizontally and vertically, and 4) Placing asphalt in select areas for equipment access.

II. GENERAL INFORMATION

Owner(s):	SDS Lumber Co PO Box 266 Bingen, WA 98605 Broughton Lumber Co 92 Office Road Underwood, WA 98651
Applicant(s)/Applicant(s) Representative:	Jason Spadaro, President, SDS Lumber Co and Whistling Ridge Energy, LLC PO Box 266 Bingen, WA 98605
Tax Parcel Number(s):	03-10-00-0-0-0300-00 (portion) 03-10-00-0-0-0400-00 (full) 03-10-00-0-0-0800-00 (portion) 03-10-00-0-0-1100-00 (portion) 03-09-00-0-0-2990-00 (portion) Skamania County Road Right-of-Way
Location:	The subject parcels are located in the eastern portion of Skamania T3N, R10E & T3N, R9E, W.M.
Zoning:	127 acres of the proposed project area is zoned FA20. The remaining 1,036 acres is un-zoned. NSA: the roadways within the NSA are zoned General Management Area, Large-Scale Agriculture (Ag-1), Commercial Forest (F-1), Small Woodland (F-3), Residential, and Open Space (OS).
Comprehensive Plan Designation	Conservancy (outside NSA)
Square Footage/Acreage:	The entire project area is located outside of the NSA and is 1,152 acres (1,163 acres by County calculations), spanning portions of five parcels. Approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines.
Proposed Use	Semi-public utility facility Road Improvements (w/in NSA)
Number of Lots:	The project area spans portions of five parcels.
Density:	N/A

Sanitary Sewer District:	Individual On-Site Septic System for proposed Operations and Maintenance Facility
Domestic Water Supplies:	Applicant is proposing an individual well to serve the kitchen and bathroom facilities in the Operations and Maintenance Building.
Fire District:	Fire District #3
School District:	#31 Mill A and White Salmon School Districts
Drainage Basin:	Wind / White Salmon
WRIA:	29B
WRIA Number	29B

III. HISTORY/BACKGROUND:

Skamania County is one of ten counties in Washington State that is not required to fully plan under the Growth Management Act. The County is not required to establish zoning classifications on all the land within its jurisdiction.

The 2007 Comprehensive Plan applies to all unincorporated land within Skamania County. The National Scenic Area is a sub-area which uses the Columbia River Gorge Management Plan as its Comprehensive Plan. Not all of unincorporated Skamania County has a zoning classification. The critical area regulations only apply outside of the NSA. Within the NSA there is a comprehensive land use application that reviews projects for Scenic, Natural, Cultural, and Recreational resources. The project area is outside of the NSA. The only potential work to be conducted within the NSA is improvements to existing roads which is an allowable review use in the NSA Land Use classification.

SDS Co. LLC submitted their application for the Whistling Ridge Energy Project on March 10, 2009. Skamania County Community Development Department is providing EFSEC with a consistency review of all county regulations that apply to the project.

IV. SEPA THRESHOLD DETERMINATION:

EFSEC issued a scoping notice on April 6, 2009 to begin the EIS review process. A revised notice was issued April 21, 2009.

V. PUBLIC HEARING NOTICE:

EFSEC published all required notices.

VI. NATURAL ENVIRNOMENT

A. Topography:

The resource maps indicate that the subject parcels within the project area, have slopes ranging from zero percent to over 40%. Under Skamania County's Critical Areas Ordinance (Title 21A), the subject parcels are located in a Class II Landslide Hazard Area. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. a description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. an evaluation of the analysis area's inherent erosion hazards;
c. a site plan of the area delineating all areas of the site subject to erosion hazard; and
d. proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

B. Soils:
According to the Natural Resources Conservation Service (NRCS) Soil Survey of Skamania County, the soil types of the parcels are: McElroy gravelly loam (types 66, 67, 68), Timberhead gravelly loam (types 135. 136), Underwood loam (type 144). Each of these soils has a T Factor of 5. Under Skamania County's Critical Areas Ordinance, Title 21A, the subject parcels are located in a Class I Erosion Hazard Area.

C. Surface Water:
Within the proposed project area there is: One (1) Class 4N stream; 19 Class 5N streams; and five (5) unclassified streams.

The proposal states that one stream, a Class V, will be crossed. This stream is located outside of the project area (see review in NSA Title 22) within the National Scenic Area boundary. The proposal states that no new construction will occur within any stream or its associated buffer that is located within the project area (outside of the NSA).

D. Vegetation:
The project area is covered by second and third growth commercial timber stands.

E. Wildlife:
The entire project area is within Elk winter range habitat. No other habitat was found on resource maps.

F. Sensitive Areas:
No Sensitive Areas were found on the Resource maps within the proposed project area. No known cultural or archaeological resources were found within the project area.

VII. NEIGHBORHOOD CHARACTERISTICS

The Comprehensive Plan designation of this project area is Conservancy. Some of the surrounding area is Rural Lands II, with the majority being Conservancy.

The southern project boundary line (including the southeast project line) borders the Columbia River Gorge National Scenic Area.

VIII. TRANSPORATION PLANS

Access of the proposed site would be provided from State Route 14 to Cook-Underwood Road, Kollack-Knapp Road, Scoggins Road and a private logging road listed as CG2930, located on SDS Lumber Company and Broughton Lumber Company property. These access roads are located within the National Scenic Area.

IX. UTILITIES

A. Stormwater:
Discharge of stormwater runoff would be regulated by EFSEC based on the Department of Ecology's stormwater pollution control program. The proposal indicates mitigation measures by Best Management Practices and by implementing a Stormwater Pollution Prevention Plan (SWPPP) during and after construction. The final design would conform to the applicable Ecology Stormwater Management Manual in effect at the time or as instructed by EFSEC.

B. Wastewater Disposal:
The Applicant is required to apply for an On-Site Septic System permit as the Operations and Maintenance Building will include bathroom and kitchen facilities. Prior to issuance of any building permit, the applicant is required to have an approved On-Site Septic System Design.

C. Potable Water:
Prior to the issuance of a building permit for the proposed Operations and Maintenance Building, the applicant is required to have an approved Water Availability Verification Evaluation (WAVE).

X. COMPREHENSIVE PLAN

The following Goals and Policies of the Skamania County Comprehensive Plan are applicable to the proposed project.

Chapter 2: Land Use Element
Goals and Policies
Conservancy Designation

Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).

Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possibly by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.

Finding:
The project area lies within the Conservancy Comprehensive Plan Designation. Within the conservation designation, public facilities and utilities, and utility substations are allowed.

Conclusion:
The project is considered a semi-public utility facility and would therefore be consistent with the Conservancy Designation.

Goal LU.3: To coordinate public and private interests in land development.

Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.

Finding:
The project area is located outside of the Columbia River Gorge National Scenic Area boundary. The turbines would be painted gray to minimize aesthetic effects. The proposed project would be located within an area where roadways and high voltage regional transmission lines already exist, which would minimize the need for new disturbances.

Conclusion:
The project is consist with this goal and policy.

Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.

Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.

Finding:
High-voltage regional transmission lines, owned and operated by Bonneville Power Administration (BPA) are located on the project site. Access roadways already exist. The project uses existing patterns in Land Use which helps to minimize the public costs of providing services and new infrastructure.

Conclusion:
The project is consistent with this goal and policy.

Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.

Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.

Policy LU.5.7: Adequate on-site wells and septic systems should be properly installed, monitored and maintained in accordance with local and state health departments.

Finding:
The proposed project is located in the Conservancy Designation, which allows for public utility facilities and utility stations. The surrounding areas are Conservancy Designation, as well as Rural Lands II Designation, which also allows for utility facilities and utility substations. The project site has been previously logged by forestry activities and the proposal would allow the forestry activities to continue.

High-voltage transmission lines, cell towers and rock quarries currently exist in the area, so the project would be compatible with these uses.

The proposed Operations and Maintenance Building would include bathroom and kitchen facilities and would therefore be required to have an approved on-site septic system as well as an adequate potable water supply. This would be a condition of approval.

Conclusion:
The project is consistent with the goals and policies. A valid OSS and proof of potable water should be a condition of approval.

Chapter 3: Environmental Element
Goals and Policies

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water and energy resources.

Policy E.1.4: Implement and preserve critical area buffers based on Best Available Science adjacent to critical areas to adequately protect such areas from development and land use impacts.

Finding:
Several streams exist on the proposed project site, with buffers ranging from 25' to 50', which must be maintained at all times unless exemptions are met or variances are granted.

Conclusion:
This proposal is consistent with the goals and policies.

Goal E.3: To minimize the loss of life and property from landslides, seismic, volcanic or other naturally occurring events, and minimize or eliminate land use impacts on geologically hazardous areas.

Policy E.3.4: Require geotechnical studies to determine construction methods and technologies necessary to further public safety in geologically hazardous areas. The development design and construction technology used shall be appropriate to the soil limitations on the particular site.

Finding:
The project should require a geotechnical assessment report and soil borings to be conducted on-site. The report should be reviewed and accepted by Skamania County prior to issuing any building permits. Any and all setbacks determined within the report must be followed.

Conclusion:
The project is consistent with these goals and policies.

Chapter 4: Transportation Element

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Finding:
All roadways that will be used for this proposal are existing and some improvement will be necessary for the transportation of the equipment and construction materials. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant should consult with the Skamania County Public Works Department regarding the sufficiency of roads. Turbine equipment would likely be transported to either the Port of Longview or the Port of Vancouver, and much of it transported by barge up the Columbia River to the Applicant's existing barge and dock facilities in Bingen, Washington. If rail is used, it will be by existing rail lines.

Conclusion:
This proposal is consist with these goals and policies. The road improvements will enhance the level of service on these roads and benefit the community.

Chapter 5: Archaeology and Historic Preservation Element

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance:

Policy AHP.1.3: Coordinate county inventory efforts with Native American groups and governmental efforts.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging. No known archaeological or cultural resources were found on the Washington State Department of Archaeological and Historic Preservation (DAHP) resource maps which staff used to research the project area.

Further, if the project would have applied for a Conditional Use permit, the application would have been sent to various state agencies, federal agencies, and Native American Governments, allowing the opportunity to comment on the project. EFSEC should consult with these groups during the process.

Conclusion:
This project is consistent with these goals and policies.

Goal AHP.3: Protect historic, archaeological, and cultural resources through a comprehensive planning approach.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging.

Conclusion:
This project is consistent with these goals and policies.

XI. STATUTES/CODES:

Skamania County Code Title 21 – Zoning

Chapter 21.64 – Unmapped Classification (UNM)

21.64.020 – Allowable Uses

In the areas classified as Unmapped, all uses which have not been declared a nuisance by statute, resolution, ordinance, or court of jurisdiction are allowable. The standards, provisions, and conditions of this title shall not apply to unmapped areas.

Finding:
1,036 acres of this project is unzoned and therefore there are no restricted uses. Utility facilities and utility substations have not been declared a nuisance by a known Washington State Court or by local ordinance or resolution or by any known state or federal statutes.

Conclusion:
The project is consistent with the zoning designation of UNM.

Chapter 21.56 – Resource Production Zone Classification (FOR/AG 10 & 20)

21.56.030 – Conditional Uses

(C) Semi-public facilities and utilities

Finding:
Approximately 127 acres of this project is located within the FOR/AG 20 zoning classification. The "A" string of the project within this zoning classification. The "A" string includes seven turbines. All other proposed turbines are outside of the zoned area. Semi-public facilities and utilities are a conditional use within this zoning designation. The applicant would need to submit a conditional use application for review by the Hearing Examiner for

approval of this project if the County was conducting the project review. Conditional use permits are reviewed and issued by the County Hearing Examiner.

21.16.070 - Hearing Examiner - Duties and Responsibilities

The Hearing Examiner shall hear and decide:

A. Applications for conditional uses. Conditional uses are those uses, which may or may not be compatible with permitted uses in a specific zoning designation. If the Hearing Examiner determines the use is not compatible with permitted or existing uses in the specific area of the proposed use then the proposed use shall be denied. Alternatively, if the Hearing Examiner determines that the proposed use is compatible with permitted and existing uses in the specific area of the proposed use then the proposed use then the proposed use may be approved or approved with conditions to make it make it compatible with the area.

1. In determining whether the use is compatible with the area, the proposed use shall:

a. Be either compatible with other uses in the surrounding area or is no more incompatible than are other outright permitted uses in the applicable zoning district;

Finding:
The proposal is to install up to 50 wind turbines on a parcel of land in unincorporated Skamania County, 1,036 acres are unzoned, and 127 acres are zoned FOR/AG 20. The entire proposal is located within the Conservancy Comprehensive Plan Designation.

Unzoned areas of Skamania County and the Conservancy Comprehensive Plan Designation allow for public utility facilities and utility substations. The FOR/AG 20 zoning district lists semi-public utility facilities and utility substations as a conditional use and allows public facilities outright with no additional zoning review being required.

The surrounding areas are located within the Conservancy Designation, as well as the Rural Lands II Designation, both of which allow public utility facilities and utility substations. The property is currently uses for commercial forestry activities, and these activities will be allowed to continue once the turbines are constructed. Cell towers, high-voltage transmission lines and rock quarries exist in the area. There is a small portion of the project site that abuts Residential 10 (R10) zoning, which also lists semi-public utilities as conditional use.

Conclusion:
The proposal is compatible with other uses within the area, both within the Comprehensive plan designation and the zoning designation.

b. Not materially endanger the health, safety, and welfare of the surrounding community to an extent greater than that associated with other permitted uses in the applicable zoning district.

Finding:
The subject parcel is located in a geological hazard area due to the slope and soil type and requires a geotechnical assessment report.

The applicant is required to show proof of potable water and obtain an on-site septic system permit from the Skamania County Community Development Department through the building permit process. The proposal includes bathroom and kitchen facilities located in the Operation and Maintenance Building.

EFSEC has required an EIS to be prepared and will ultimately decide what conditions of approval would be necessary for the project to be found to not materially endanger the health, safety and welfare of the surrounding community. By obtaining the water, septic and building permits, conducting the geotechnical analysis and best management practices during construction, the project could be found consistent with this provision.

Conclusion:
The proposal will not materially endanger the health, safety, and welfare of the surrounding community.

c. Not cause the pedestrian and vehicular traffic associated with the use to conflict with existing and anticipated traffic in the neighborhood to an extent greater than that associated with other permitted uses in the applicable zoning district.

Finding:
Access of the proposed site would be provided from State Route 14 to Cook-Underwood Road, Kollack-Knapp Road, Scoggins Road and a private logging road listed as CG2930, located on SDS Lumber Company and Broughton Lumber Company property.

All roadways that will be used for this proposal are existing and some improvement will be necessary for the transportation of the equipment and construction materials. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant will consult with the Skamania County Public Works Department regarding the sufficiency of roads and road upgrade requirement. Other permitted uses include: single family residences in conjunction with forest or farm management, recreational facilities, semi-public facilities and utilities, saw mills, shake and shingle mills, chippers, pole and log yards, geothermal energy facilities, aircraft landing fields, cluster developments, child mini day care centers, and child day care centers.

Conclusion:
The proposal will not cause a conflict with existing pedestrian and vehicular traffic.

d. Be supported by adequate service facilities and would not adversely affect public services to the surrounding area.

Finding:
The proposal states that an Engineering, Procurement, and Construction (EPC) contractor will prepare a safety plan that would apply to all personnel working on-site. The plan would ensure compliance will all laws, ordinances, regulations

and standards concerning health and safety. An Environmental Compliance Program would cover avoidance of sensitive areas during construction, waste handling and storage, stormwater management, spill prevention and control, and other components required by State and County regulations. An Emergency Response Plan would be established to ensure employee safety from the following: medical emergency, major power loss, fire, extreme weather, earthquake, volcano, and bomb threat. This plan would be established prior to construction.

Condition:
All safety plans and programs are required to be in place prior to construction. These plans and programs should be included as a conditional of approval.

e. Not hinder or discourage the development of permitted uses on neighboring properties in the applicable zoning district as a result of the location, size, or height of the buildings, structures, walls, or required fences or screening vegetation to a greater extent than other permitted uses in the applicable zoning district.

Finding:
The proposal is to install up to 50 wind turbine structures on a project site spanning portions of five parcels. This use is classified as a semi-public utility facility within the FOR/AG 20 zoning designation.

Other uses in the FOR/AG 20 zoning designation include, among others: forestry practices and associated management activities of forest crop, commercial and domestic agriculture, water resource management facilities, log sorting and storage areas, etc.

Surrounding zoning includes FOR/AG 20, as well as R10 (Residential 10) outside of the NSA. To the south of the project area, inside the NSA, the surrounding area is zoned Large Scale Agriculture, Commercial Forest, Small Woodland and Open Space. Current uses surrounding the project site include commercial forestry uses, agriculture including pear and apple orchards, and three small, unincorporated residential communities and other agriculture related dwellings.

Conclusion:
The proposal is compatible with other uses in the region and will not effect the allowed uses on those parcels. The proposal states commercial forestry activities will likely continue on the project site parcels as well.

f. Not be in conflict with the goals and policies expressed in the current version of the County's comprehensive plan.

Finding:
As discussed above, the proposal is consistent with the Skamania County Comprehensive Plan.

2. Criteria for determining conditions to be imposed on conditional uses shall be based on the health, safety, and general welfare of the public, any environmental standards in force in Skamania County,

other applicable provisions set forth in this Title and shall be subject to conditions which may include, but are not limited to the following;

a. Limiting the manner in which the use is conducted including restricting the time an activity may take place, and restraints to minimize such environmental effects as noise, vibration, air pollution, glare, and odor.

Finding:
The EIS and EFSEC will determine what conditions, if any, are required to be implemented for this project.

b. Establishing a special yard, open space, lot area or lot dimensions.

Finding:
Not applicable

c. Limiting the height, size, or location of a building or other structure.

Finding:
127 acres of this project site, which includes seven proposed turbines, is located within FOR/AG 20 zoning designation. Under the current FOR/AG 20 zoning designation, the required front yard setback is 35-feet from the centerline of the private road or 20-feet from the front property line with the front defined as the line which parallels a public road right-of-way or a private road easement, or that line where a road, driveway, or access panhandle enters a lot. The required rear setback under the current regulations is 20-feet from the rear lot line with the rear defined as the lot line which is opposite and farthest away from the front lot line

The remainder of this parcel, 1,036 acres, is unzoned and therefore has setbacks as determined by the Building code list from Title 15. Building Code setback requirements for un-zoned lots 12,500 square feet or larger is:
Front Yard: No building or accessory building shall be constructed closer than 45 feet from the centerline of the public road right-of-way or 35 feet from the centerline of the private road (note including private driveways), or road or 15 feet from the front property line, whichever is greater;
Side Yard: On each side of the building or accessory building a side yard shall be provided for not less than 5 feet; and
Rear Yard: A rear yard shall be provided of not less than 15 feet, including accessory buildings.

Conclusion:
Under the current regulations, the proposed location meets the minimum requirements. However, EFSEC may require additional setbacks or micro-siting of turbines.

d. Designating the size, number, location, and nature of vehicle access points.

Finding:
No new roads are proposed at this time. The EIS traffic studies and road design plan will determine any requirements for vehicle access points.

e. Increasing the amount of street dedication, roadway width, or improvements within the street right-of-way.

Finding:
The EIS traffic studies and road design plans will determine the necessary road improvements. No new roads are proposed at this time.

f. Limiting or otherwise designating the number, size, location, height, and lighting of signs.

Finding:
Non-applicable

g. Limiting the location and intensity of outdoor lighting and requiring it to be shielded.

Finding:
Lighting of turbine strings will need to meet Federal Aviation Administration (FAA) requirements. Lighting on buildings are requested to be hooded and shielded. This is a request and not currently a requirement in the County zoning code.

h. Requiring berming, screening, landscaping, or another facility to protect adjacent or nearby properties and designating standards for its installation and maintenance.

Finding:
The residences closest to the project site are located approximately 0.48 mile and 0.8 mile from proposed turbine locations. A new homesite location has been applied for, and would be approximately 2,000 feet (0.38 Mile) from the south property line. The unincorporated community of Willard is located approximately 2.25 miles northwest of the project site. The unincorporated community of Mill A is also located near the project site, approximately 1.5 miles west of the site. The homes near the project site are rural, primarily single family, between 30 and 50 years old, and low- to medium-density.

Conclusion:
In order to protect adjacent and nearby properties, the applicant should only excavate the minimum needed to install the wind turbines and accessory structures, and the Operations and Maintenance facility, maintain existing trees, and re-vegetate all undeveloped disturbed areas with native trees and shrubs along the west and south lot lines. However, since this land is being used for Commercial Forestry, the removal of timber in conjunction with this operation should not be restricted.

i. Designating the height, location, and materials for a fence.

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic

reasons.

j. Protecting and preserving existing trees, vegetation, water resources, wildlife habitat, or other significant natural, historic, or cultural resources.

Finding:
The proposed project is located within a Class II Landslide Hazard Area and a Class I Erosion Hazard Area due to the soil type and requires a geotechnical assessment report. The entire project site is also located within elk winter range habitat. Several streams exist on site, which would require buffers ranging between 25' to 50'. There are no current County requirements to preserve trees or vegetation outside of critical resource stream buffers. No cultural or historic resources found in database research.

Conclusion:
In order to prevent possible wind and water erosion, the applicant should use Best Management Practices during all phases of construction and replant all undeveloped disturbed areas with native vegetation. The project requires a geotechnical assessment report to address the landslide hazard on the property.

Skamania County Code Title 21A – Critical Areas

21A.04.010 - General Provisions

A. RELATIONSHIP TO SHORELINES MANAGEMENT MASTER PLAN AND SHORELINES MANAGEMENT ACT PERMITS ORDINANCE.

In event of any conflict between this Title and regulations contained in the Shorelines Ordinance, those regulations that provide greater protection of Critical Areas shall apply.

Finding:
There are several streams located on the subject parcel. The proposal is to erect up to 50 wind turbine structures. No stream located on-site is a Shoreline of Countywide or Statewide significance and therefore the Skamania County Shoreline Management Program does not apply.

Conclusion:
Skamania County Critical Areas Ordinance, Title 21A, provides the greatest protection to the critical areas and only applies outside of the National Scenic Area.

21A.04.030 - STREAMS, CREEKS AND RIVERS
(4) Buffer Widths
(b) ... undisturbed buffers shall be preserved around all regulated streams, creeks and rivers.
(c) The required width of undisturbed buffer areas shall depend upon the class of water represented by the stream, creek or river protected, the type or scale of use or development proposed by an applicant and the vegetative community adjacent to the water body.

(iv) For Class IV streams, creeks and rivers, the standard buffer zone width shall be 50 feet.
(v) For Class V streams, creeks and rivers, the standard buffer zone width shall be 25 feet.

Finding:
The proposed project area includes several streams ranging from a 25' to 50' undisturbed buffer requirement. The proposal states that no new construction would occur within wetlands, streams, or associated buffers. The existing road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold (100% or less of the original footprint).

The only existing roadway to receive improvements crosses a Class V stream within the National Scenic Area. (See Title 22 below)

Conclusion:
Maintaining critical areas buffers should be a condition of approval.

21A.05.050 – Fences in Deer and Elk Winter Range

(A) New development permits issued by the County shall include a requirement that, in deer and elk winter range, construction of new and replacement fences shall be subject to the following:

1. *New fences in deer and elk winter range shall be allowed only when necessary to control livestock or pets or to exclude wildlife from specified areas, such as gardens or orchards. Fenced areas shall be the minimum necessary to meet the needs of the project applicant.*
2. *New and replacement fences in winter range shall comply with the following, unless the applicant demonstrates the need for an alternative design:*
    a. *The top wire shall not be more than 42 inches high to make it easier for deer to jump over the fence.*
    b. *The distance between the top two wires shall be at least 10 inches to make it easier for deer and to free themselves if they become entangled.*
    c. *The bottom wire shall be at least 16 inches above the ground to allow fawns to crawl under the fence. It should consist of smooth wire because barbs often injure animals as they crawl under the fence.*
    d. *Stays or braces placed between strands of wire shall be positioned between fence posts where deer are most likely to cross. Stays create a more rigid fence, which allows deer a better change to wiggle free if their hind legs become caught between the top two wires.*
3. *Woven wire fences may be authorized only when a project applicant clearly demonstrates that such a fence is required to meet his or her specific needs, such as controlling hogs and sheep.*

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic reasons.

Conclusion:
If EFSEC requires fencing, a condition of approval should be to follow the above guidelines for fencing within deer and elk winter range.

21.A.06 Geologically Hazardous Areas

21A.06.010 Erosion Hazard Areas

A. Class I Erosion Hazard Areas:
Class I Erosion Hazard Areas (EHAs) area areas that are subject to severe development constraints due to a site's susceptibility to erosion from wind and/or water.

Class I EHAs are identified in the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service, as having an index of greater than or equal to 3.75

21A.06.020 Landslide Hazard Areas

A. Class II Landslide Hazard Areas (LHAs) are areas with slopes 20% and 30% that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than 30%.

Class II LHAs shall be identified using the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service. Department personnel shall make a preliminary determination of percentage of slope. The applicant shall verify soil type and precise percentage of slope.

Finding:
The proposed project site is located within a Class I Erosion Hazard Area and a Class II Landslide Hazard Area under Skamania County Critical Areas Ordinance Title 21A. The resource maps indicate that the subject parcels have slopes ranging from zero percent to over 40%. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. a description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. an evaluation of the analysis area's inherent erosion hazards;
c. a site plan of the area delineating all areas of the site subject to erosion hazard; and
d. proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

Conclusion:
The proposal discusses submitting a geotechnical assessment report and performing soil borings on site. This report must be reviewed and approved by Skamania County and will be a condition of approval.

Skamania County Code Title 22 – Columbia River Gorge National Scenic Area

ADMINISTRATION

SCC Section 22.06.020, states that "No building, structure or parcel of land shall be used, and no building or structure shall be hereafter erected, altered or enlarged, including those proposed by local, state or federal agencies, in that portion of the County lying within the Columbia River Gorge National Scenic Area in any manner that is inconsistent with the provisions of this Title."

ZONING

The subject roadways are in the General Management Area (GMA), on lands zoned Large-Scale Agriculture (Ag-1), Commercial Forest (F-1), Small Woodland (F-3), Residential, and Open Space (OS). The following sections of Skamania County Code Title 22 are what the proposed road modifications would be reviewed under within each land use designation:

SCC Section 22.14.010(C) Large-Scale Agricultural (Ag-1) Zone Review Uses:
(h) Construction, reconstruction or modifications of roads, not in conjunction with agriculture or with forest use or forest practices.

SCC Section 22.14.030(E) Commercial Forest (F-1) Zone Review Uses:
(h) Construction, reconstruction or modifications of roads, not in conjunction with agriculture or with forest use or forest practices.

SCC Section 22.14.050(E) Small Woodland (F-3) Zone Review Uses:
(h) Construction, reconstruction or modifications of roads, not in conjunction with agriculture or with forest use or forest practices.

SCC Section 22.14.060(D) Residential Zone Review Uses:
(c) Construction, reconstruction or modifications of roads.

SCC Section 22.14.110(C) Open Space (OS) Zone Review Uses:
(c) Repair, maintenance, operation and improvement of existing structures, trails, roads, railroads, utility facilities and hydroelectric facilities.

Finding:
The proposed Whistling Ridge Energy Project will require the improvement of roads and intersections within the National Scenic Area in order to provide access to a semi public utility facility. The roads that would require improvement are within five different land use designations within the General Management Area of the National Scenic Area. Each of these five designations allows for the modification or improvement of existing road as a review use. Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge

National Scenic Area Ordinance Title 22 that is in effect at the time of the application.

SCENIC RESOURCE PROTECTION

TOPOGRAPHIC VISIBILITY

The road improvement project within the National Scenic Area is topographically visible from the following key viewing areas from the approximate distances:

KEY VIEWING AREA	DISTANCE ZONE		
	FOREGROUND 0-1/4 Mile	MIDDLEGROUND 1/4 to 3 Miles	BACKGROUND Over 3 Miles
Columbia River	X	X	X
SR-14	X	X	X
I-84		X	X
Historic Columbia River Hwy		X	X
Cook-Underwood Road	X	X	X
Sandy River			
Pacific Crest Trail			
Portland Women's Forum			
Crown Point			
Rooster Rock State Park			
Larch Mountain			
Cape Horn			
Bridal Veil State Park			
Multnomah Falls			
Bonneville Dam Visitor Center			
Beacon Rock			
Dog Mtn. Trail			X
Oregon Highway 35		X	X
Panorama Point Park			X
SR-141		X	X
SR-142			
Rowena Plateau and Nature Conservancy Viewpoint			

The improvements to the existing roads within the National Scenic Area will require review for consistency with the provisions for the protection of scenic resources. Projects within the National Scenic Area are reviewed to ensure that the development will be visually subordinate as seen from twenty-two (22) key viewing areas within the National Scenic Area. **The criteria for Scenic Resource Protection (in Chapter 22.18) cannot be used as grounds to deny a proposed use, but may affect the siting, location, size and other design features of proposed developments (see Section 22.18.010(A)).**

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. Conditions may be applied to various elements of the proposed development to ensure they are visually subordinate to their setting as seen from key viewing areas.

NATURAL RESOURCE PROTECTION
The existing logging road CG2930 includes the crossing of one stream. This crossing will require road expansion. SCC Section 22.20.020(A)(2) allows for the modification, expansion, replacement or reconstruction of serviceable structures, if the actions would not:

a. Increase the size of an existing structure by more than 100 percent,
b. Result in a loss of wetlands acreage or functions, or cause a loss of water quality, natural drainage, and fish and wildlife habitat in streams, ponds, lakes and riparian areas, or
c. Intrude further into a water resource zone. Structures shall be considered intruding further into a water resource zone if any portion of the modified, expanded, replaced, or reconstructed structure is located closer to the water resource than the existing structure.

In order to allow for the expansion of the crossing of the one seasonal stream, the project will be required to meet the Practicable Alternative Test found in SCC Section 22.20.010:

A) An alternative site for a proposed use shall be considered practicable if it is available and the proposed use can be undertaken on that site after taking into consideration cost, technology, logistics, and overall project purposes. A practicable alternative does not exist if a project applicant satisfactorily demonstrates all of the following:

1) The basic purpose of the use cannot be reasonably accomplished using one or more other sites in the vicinity that would avoid or result in less adverse effects on wetlands, ponds, lakes, riparian areas, wildlife or plant areas and/ or sites;
2) The basic purpose of the use cannot be reasonably accomplished by reducing its proposed size, scope, configuration, or density, or by changing the design of the use in a way that would result in less adverse effects on wetlands, ponds, lakes, riparian areas, wildlife or plant areas and/ or sites; and;
3) Reasonable attempts were made to remove or accommodate constraints that caused a project applicant to reject alternatives

to the proposed use. Such constraints include inadequate infrastructure, parcel size, and land use designations. If a land use designation or recreation intensity class is a constraint, an applicant must request a Management Plan amendment to demonstrate that practicable alternatives do not exist.

If these conditions are met, the stream crossing expansion will require best management practices, must not alter or destroy stream function and water quality, and the applicant will need to rehabilitate the area to the maximum extent practicable.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. Conditions may be applied to various elements of the proposed development to ensure that the project meets the above-mentioned requirement.

The following sensitive wildlife areas or sites may occur within 1,000 feet of the project:
Mule, Blacktail Deer and Elk habitat, Cliffs/Bluffs habitat, Osprey nest site, Ringneck snake, Larch Mountain Salamander Hood Area and sites, Western Gray Squirrel nest sites, California Mountain Kingsnake, and Waterfowl Wintering Area.

SCC Section 22.20.030 requires that all projects within the National Scenic Area that are located within 1,000 feet of any known wildlife area or sites require review for wildlife habitat protection. The project is located within 1,000 feet of known wildlife areas and sites within the National Scenic Area. Skamania County Community Development would work with the Washington State Department of Fish and Wildlife (WDFW) to determine if the applicant would be required to hire a wildlife biologist to prepare a Wildlife Management Plan.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. The applicant may be required to hire a wildlife biologist in order to determine the impact the proposed road improvements of the project would have on wildlife areas and sites and how those impacts could be mitigated. Mitigation measures would be included as conditions of approval.

The following sensitive plant areas or sites may occur within 1,000 feet of the project:

Oregon White Oak/ Idaho Fescue, Douglas fir / Common Snowberry – Oceanspray, Diffuse Stickseed.

SCC Section 22.20.040 requires that all projects within the National Scenic Area that are located within 1,000 feet of any known sensitive plants require review

for sensitive plant protection. The project is located within 1,000 feet of known sensitive plants within the National Scenic Area. Skamania County Community Development would work with the Washington Natural Heritage Program (WNHP) to determine if the applicant would be required to hire a person with recognized expertise in botany or plant ecology to conduct a field survey. If this is required, buffers or protection and rehabilitation plans may be required.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. The applicant may be required to hire a person with recognized expertise in botany or plant ecology to conduct a field survey. If this is required, buffers or protection and rehabilitation plans may be required. Mitigation measures would be included as conditions of approval

CULTURAL RESOURCE PROTECTION

Upon the submittal of a National Scenic Area Land Use Application the proposed road improvement project would be reviewed in accordance with SCC Chapter 22.22, Cultural Resource Protection. The application materials would be forwarded to Marge Dryden, Heritage Resources Program Manager for the Columbia River Gorge National Scenic Area. Ms. Dryden will determine if the proposed project requires Reconnaissance and Historic Survey reports. The proposed road improvement project would be considered a large-scale use, as SCC Section 22.22.010(E)(1)(e)(iii) includes public transportation facilities as a large-scale use. The applicant will be responsible for hiring a qualified professional to conduct a Reconnaissance Survey and prepare a report on their findings.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. The applicant will be responsible for hiring a qualified professional to conduct a Reconnaissance Survey and prepare a report on their findings. Sections 22.22.060 Cultural Resources Discovered After Construction Begins and 22.22.070 Discovery of Human Remains as conditions of approval. These conditions will act as an Inadvertent Discovery Plan.

RECREATIONAL RESOURCE PROTECTION

SCC Section 22.24.010 Applicability of Chapter – Maps.
Proposed resource-based recreation facilities or uses shall be consistent with recreation intensity classes as set out on the Recreation Intensity Class maps adopted by the Columbia River Gorge National Scenic Area.

Skamania County Code Title 24 – Clearing & Grading

24.02.50 Applicability

Unless exempted under SCC Section 24.02.060, no person shall perform any grading activity without having first obtained a permit from the Department. Exemption from the permit process shall not relieve any person the requirement

for installation of appropriate erosion control measures for their project. No permit or exemption granted pursuant to this title shall remove an applicant's obligation to comply in all respects with the applicable provisions of any other federal, state, or local law or regulation.

24.02.060 Exemptions

The following activities are exempt from the permit requirements of this title. Materials from exempted excavations may require a separate permit for placement as fill.

A. Mining, quarrying, excavating, processing, or stockpiling activities of rock, sand, gravel, or clay if such operations are authorized by a valid Department of Natural Resources Surface Mine Reclamation Permit or Skamania County Conditional Use Permit or other provision of Skamania County Code.

B. All State Department of Natural Resources regulated Class I, II, III, or IV special forest practice activity conducted in accordance with Chapter 76.09 RCW and WAC Title 222.

C. Grading, clearing, filling or excavation of less than 500 cubic yards, only if located outside Critical Areas (SCC Title 21A) and regulated Shorelines (SCC Title 20).

D. Emergency actions which must be undertaken immediately or for which there is insufficient time for full compliance with this title in the event that:

1. There is an imminent threat to public health or safety.

2. There is imminent danger to public or private property;

3. There is an imminent threat of serious environmental degradation;

a. A person or agency determines that the need to take emergency action is so urgent that there is not sufficient time for review by the Department; such emergency action may be taken immediately. Any person or agency undertaking such action shall notify the Department within one working day following the commencement of the emergency action. Following such notification the Department shall determine if the action taken was within the scope of the emergency actions allowed in this subsection. If the Department determines that the action taken or part of the action taken is beyond the scope of allowed emergency action, enforcement action is authorized, as outlined in SCC Section 24.02.120.

b. If the action taken qualifies as an emergency, and would have otherwise required a grading permit under this Title, then an application for a grading permit will be submitted with in 30 days following the emergency event. The application requirements, review, issuance, and inspections will be conditioned as outlined in this Title.

E. All exemptions as enumerated in the Critical Area and Shoreline Ordinances.

F. Nothing herein may interfere or overrule the Right to Farm Ordinance.

G. Nothing in this ordinance shall be retroactive and all current projects are hereby vested

Finding:

The proposal will include excavation work to install concrete foundations with a diameter of up to approximately 60 feet for each wind turbine. The Collector System will disturb an area approximately 30 feet in width, with 8.5 miles of underground collector cable

trenches proposed. Approximately 2.4 miles of new gravel access roads will be constructed as part of the proposal.

Conclusion:
As the volume and area of the clearing activities exceeds the exemption amount of volume and/or area, the applicant/property owner is required to obtain a Clearing and Grading Permit under SCC Section 24.02.050. EFSEC will make a determination on what conditions of approval are necessary.

24.02.070 Application Requirements

Unless exempted under SCC Section 24.02.060, all persons proposing to conduct grading and/or clearing activity within the jurisdictional boundaries of unincorporated Skamania County shall first apply for a grading permit. The applicant shall obtain a grading permit in conformance with this title prior to any grading activity.

A. The permit application shall at a minimum include the following:
1. *A completed application, signed by the property owner and the applicant, a vicinity map, environmental checklist (if required), and any relevant supplemental information required by the Director.*
2. *Grading plans as described in SCC Section 24.02.080.*
3. *A full identification and written description of the work to be covered by the permit for which the application is made.*
4. *A timeline for completion of the project.*
5. *Non-refundable application fee as determined by resolution of the Board of County Commissioners.*

Finding:
The applicant/property owner does not meet the exempt criteria for a Clearing and grading permit and is therefore required to submit a Clearing and Grading permit application.

Conclusion:
The proposed project will require a Clear and Grading permit application which should be a condition of approval.

The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

A. Granting of Permits
1. *After an application has been filed and reviewed the Director shall ascertain whether such proposed grading work complies with the provisions of this title. If the application and plans so comply, or if they are corrected or amended so as to comply, and the proposal is consistent with all other relevant county codes, the Director shall issue a grading permit.*
2. *The applicant/property owner shall maintain the approved grading plans and permit available on the site, and provide an individual copy to any grading contractor who will be working at the site.*

3. *A grading permit shall be valid for a period of two years from the date of permit issuance, only for the grading work applied for. An extension may be granted for an additional 12 months for special circumstances. Request for extensions shall be submitted in writing to the Department prior to expiration of the current permit, setting forth the reasons and justification for the request. No permit may be extended more than once. Renewal of permits may be accomplished with existing plans and reports, if no changes are being made to the proposal, and no new significant issues are raised during the review.*

Conclusion:
In order to be in compliance with this section of the Clearing and Grading Ordinance, a condition of approval shall be that the permit and grading plans are available on site and that the grading permit is valid for two years.

24.02.080 Grading Plan

An application for clearing and grading shall be accompanied by a grading plan. If the clearing and grading project involves engineered grading, than an engineered grading plan based on an engineering report or an engineering geology report shall be submitted with the application. Engineered grading plans shall be prepared and stamped by an engineering geologist, geotechnical engineer and/or civil engineer licensed to work in the State of Washington. Grading within a geological hazard critical area may require a geotechnical assessment report in compliance with the Critical Area Protection Ordinance (SCC Title 21A). A grading plan shall include:

- *A. An easily reproducible drawing at a scale of appropriate size to show location and details of all cuts and all fills including depth and finished slopes of all cuts and all fills.*
- *B. A general vicinity map of the area and site plan of the project.*
- *C. North arrow.*
- *D. Dimensions and location of subject property boundary lines, location of the permit area boundary, existing and proposed roads, or driveways, easements, natural or man made bodies of water and drainages, critical areas, shorelines, and any existing or proposed structures, wells or septic systems on the site, and the distance between such features.*
- *E. Bodies of water, critical areas, structures, wells and septic systems on adjacent property and lying within 50 feet of the subject grading activity boundary that could be affected by the proposed grading operations.*
- *F. Location and dimensions of buffer areas to be maintained or established, and location and description of proposed erosion-control devices or structures.*
- *G. Map drawn with contour intervals (5 foot or less) that adequately depict existing and proposed slope for the proposal.*
- *H. Total quantities, in cubic yards, and type of cut and fill material, including on-site grading material, and imported material. Cross section drawings that include:*
  1. *Maximum depth of fill and maximum height of cuts.*
  2. *Existing and proposed buildings and their setbacks from cut or fill slopes.*
  3. *Existing grades extending a minimum of 20 feet beyond the scope of work.*

4. *Finished grades of cuts and fills extending a minimum of 20 feet beyond the scope of work.*
5. *Retaining walls and the adjacent grade at least 20 feet on either side of the wall(s).*
6. *Grades of all existing cut and fill areas expressed as a ratio of horizontal to vertical slope.*

I. *The disposal site for excavated material. Off-site disposal may require a separate grading permit.*

J. *The location of proposed erosion and sedimentation control measures showing compliance with the requirements of SCC Section 24.02.090.*

K. *Detailed plans of all surface and subsurface drainage devices, walls, cribbing, dams, berms, settling ponds, or other water or erosion control devices to be utilized as a part of the proposed work.*

L. *Any recommendations included in an engineering geology or geotechnical assessment or report for grading or developing the property. If required, assessment and reports shall be completed in compliance with SCC Title 21A prior to issuance of a clearing and grading permit.*

Finding:
Under Skamania County's Critical Area Ordinance (Title 21A), the subject parcel is designated as a Class I Erosion Hazard Area due to the soil susceptibility to wind and water erosion and a portion of the subject parcel is designated as a Class II Landslide Hazard Area due to 20% slopes underlain with clay type soils. A geotechnical assessment report is required for the proposed project. The project is further required to have effective erosion control measures in place during all phases of the project.

Conclusion:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

24.02.090 Grading Standards

Unless otherwise recommended in an approved soils engineering or engineering geology report, grading shall conform to the following standards. Erosion control measures may be installed as outlined in this title, unless otherwise recommended by a project engineer.

A. *Appropriate erosion control measures shall be installed prior to any grading activity. All erosion control measures shall be maintained in place until vegetation is established for suitable erosion and sedimentation control. No sediment from grading operations shall be permitted to leave the site or enter any surface waters or wetlands. If the grading activity timeline includes winter months, then a "winter shutdown" standard for site erosion control will be provided by the applicant.*

B. *Sites shall have a finished grade that drains away from structural foundations for a minimum of 10 feet.*

C. *All sites shall be cleaned upon project completion, including installation of permanent native grass seeding, landscaping, or other organic means of erosion control.*

D. *Cuts or fills of five feet in depth or greater shall be set back from property lines by a minimum of 25 feet. This can be decreased with appropriate*

engineering. Setback dimensions shall be horizontal distances measured perpendicular to the site boundary.

E. *The top of cut slopes shall not be made nearer to a permit area boundary line than one fifth of the vertical height of cut with a minimum of two feet and a maximum of 10 feet. The setback needs to be increased for any required interceptor drains.*

F. *The toe to fill slopes shall be made not nearer to the permit area boundary line than one-half the height of the slope with a minimum of two feet and a maximum of 20 feet.*

G. *The Director may approve alternate setbacks at the request of the applicant. In approving these alternate setbacks, the Director may require an investigation and recommendation by a qualified engineer or engineering geologist to demonstrate that the intent of this section has been satisfied.*

H. *Any proposed finished slope that is steeper than two horizontal to one vertical shall be engineered.*

I. *The ground surface shall be prepared to receive fill by removing all organic material, non-complying fill, and scarifying topsoil.*

J. *Solid Waste as defined in this chapter, and detrimental amounts of organic material shall not be used as fill materials.*

K. *Fill slopes shall not be constructed on natural or cut slopes steeper than two units horizontal in one unit vertical (50 percent slope) unless the permittee furnishes a geotechnical engineering or an engineering geology report or both, stating that the site has been investigated and giving an opinion that a cut at a steeper slope will be stable and not create a hazard to public or private property.*

L. *At the request of the applicant, the Director may approve the use of alternate grading standards. These approvals shall be based on sound engineering practices and may require the submittal of additional documentation, reports, or testing.*

M. *No grading shall obstruct or alter any existing natural drainage way, stream, or any other natural body of water.*

N. *No grading shall alter or increase surface drainage onto any adjacent properties.*

Finding:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:
These plans will substantively comply with SCC Title 24 standards.

24.02.100 Grading Inspection

Grading projects for which a permit is required shall be subject to inspection by the Director. A licensed Washington State professional engineer shall provide professional inspections of grading operations if engineering is required elsewhere in this title. An inspection schedule shall be established for each project prior to permit issuance based on the following:

A. *A civil engineer shall provide professional inspections within such engineer's area of technical specialty, which shall consist of observation and review as to the establishment of line, grade and surface drainage of*

the development area. If revised plans are required during the course of the work, they shall be prepared by the civil engineer.

B. *A geotechnical engineer and/or engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include observation during grading and testing for required compaction. The engineer shall provide sufficient observation during the preparation of the natural ground and placement in accordance with the conditions of the approved plan and the appropriate requirements of this title. He or she shall also provide professional inspection of any excavation to determine if conditions encountered are in conformance with the approved report or plan. Revised recommendations relating to conditions differing from the approved engineering geology or geotechnical reports shall be submitted to the permittee, the Department, and the civil engineer.*

C. *The permittee shall be responsible for the work being performed in accordance with the approved plans and specifications and in conformance with the provisions of the title. When approved by the Director, the permittee may engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the Department. In the event of changing conditions, the permittee shall be responsible for informing the Department of such change and shall provide revised plans for approval.*

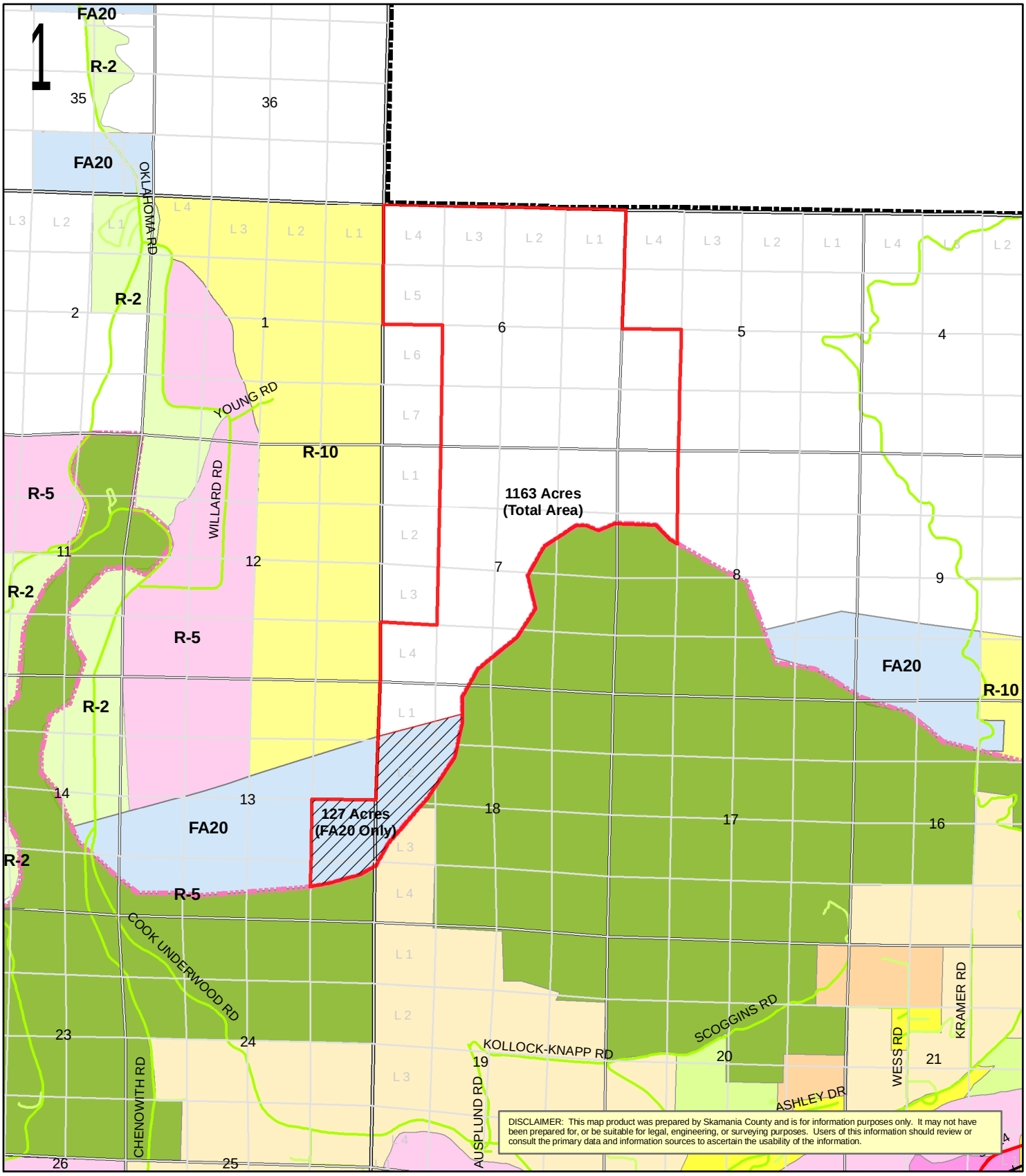
D. *The Department may inspect the project in various stages of work.*

E. *If, in the course of fulfilling their respective duties under this title, the civil engineer, geotechnical engineer, or engineering geologist finds that the work is not being done in conformance with this title or approved grading plans, the discrepancies shall be reported in writing within three working days to the permittee and to the Department.*

F. *If the civil engineer, geotechnical engineer, or engineering geologist of record is changed during grading, the work shall be stopped until the replacement has agreed in writing to accept the responsibility within the area of technical competence for approval upon completion of the work. It shall be the duty of the permittee to notify the Department in writing of such a change prior to the recommencement of such grading.*

Finding:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:
These plans will substantively comply with SCC Title 24 standards.



SKAMANIA COUNTY
Department of Community Development

Project name: Whistling Ridge Wind Project
Created by: N. Hollatz
Creation date: 5/4/2009

0 0.5 1 Miles

Legend
WindPrj
Zone
FA20
Unzoned/FA20
Roads - Public
NSA_Boundary

Appendix D-2
Land Use Consistency Determination
Skamania County, December 2009

RECEIVED
SKAMANIA COUNTY
DEC 28 2009
COMMUNITY DEVELOPMENT
DEPARTMENT

RESOLUTION 2009-54

(Certification of Land Use Consistency Review for the amended application for the Whistling Ridge Wind Energy Project. This resolution repeals Resolution 2009-22 in its entirety.)

WHEREAS, Whistling Ridge Energy Project, LLC ("Applicant") filed an Application for Site Certification ("ASC") to the Washington Energy Facility Site Evaluation Council ("EFSEC") on March 10, 2009 for the Whistling Ridge Energy Project ("Project") pursuant to RCW 80.50; and

WHEREAS, EFSEC has assumed lead agency status pursuant to the State Environmental Policy Act, RCW 43.21C for the environmental review of this Project. Skamania County anticipates participating in the SEPA process; and

WHEREAS, the Applicant filed an amended ASC to EFSEC on October 12, 2009 for the project; and

WHEREAS, said amended ASC removes all ground disturbing and review uses from any area within the National Scenic Area jurisdiction; and

WHEREAS, the Skamania County Community Development Director reviewed the amended ASC to determine the project's consistency with applicable County land use plans and zoning ordinances and prepared a Certificate of Land Use Consistency; and

WHEREAS, the Board of County Commissioners have reviewed the Community Development Director's Certification of Land Use Consistency for the amended application; and

WHEREAS, the Board of County Commissioners on December 22, 2009 considered the Community Development Director's determination at a regularly scheduled public meeting; and

WHEREAS, due notice of the Commissioner's meeting set forth above has been given as required by law; and

WHEREAS, the development of the Whistling Ridge Energy Project, if approved, will be specifically governed by a Site Certification Agreement signed by the Governor and the Applicant, including conditions of approval developed through the upcoming public process, including SEPA review; and

WHEREAS, more detailed findings of consistency are included in the Community Development Director's Certificate of Land Use Consistency, which is attached hereto and is incorporated herein by reference as if set forth in full; and

WHEREAS, this resolution repeals Resolution 2009-22 in its entirety; and

NOW THEREFORE, BE IT RESOLVED, the Board of County Commissioners, after due deliberation, adopts the Certificate of Land Use Consistency as a staff report to EFSEC, not a decision, and resolves that the Whistling Ridge Energy Project is consistent with the Skamania County land use plans and applicable zoning ordinances. A representative for Skamania County appointed by the Board of Commissioners is serving as a member of the Siting Council. Consequently, Skamania County does not, at this time, make any findings or determination regarding compliance with any other regulatory requirements or siting standards, and any potential conditions of approval recommended by Skamania County will be made at such time as the SEPA review is completed and after public meetings and hearings have been duly conducted by EFSEC, in accordance with Chapter 80.50 RCW.

PASSED IN REGULAR SESSION this 22nd day of December 2009.

BOARD OF COMMISSIONERS SKAMANIA COUNTY WASHINGTON CLERK OF THE BOARD

BOARD OF COUNTY COMMISSIONERS
SKAMANIA COUNTY, WASHINGTON

Chairman

Commissioner

Commissioner

ATTEST:

Clerk of the Board

APPROVE AS TO FORM ONLY:

Prosecuting Attorney

Skamania County
Community Development Department

Skamania County Courthouse Annex
Post Office Box 790
Stevenson, Washington 98648
509 427-3900 FAX: 509 427-3907

STAFF REPORT FOR LAND USE CONSISTENCY REVIEW

I. SUMMARY OF PROPOSED ACTION (Project description)

This Land Use Consistency Review Staff Report is to address the application for the Whistling Ridge Energy Project to the Washington State Energy Facility Site Evaluation Council. This is not a land use decision. It is a review to provide guidance to EFSEC as to the proposed project's potential consistency with Skamania County land use plans and zoning ordinances.

If the application had been submitted to the County, the project would require the following county issued reviews and permits: a SEPA Review, a Conditional Use permit (only for the portion of the project located within the zoned area), Building Permits, Critical Area Review, On-site Septic Permit, Well Drilling Inspection, and a Water Availability Verification Evaluation. Further, a Moratorium Lift application would be required as the alternative location for the Operations and Maintenance Building is located on tax parcel #03-09-00-0-0-0100-00, which currently has a Forest Practice Moratorium on the parcel. This Forest Practice Moratorium applies to the entire parcel and will expire in 2015.

The amended application would include all of the previously mentioned reviews. The project will no longer contain any ground disturbance or reviewable activities within the National Scenic Area.

As originally proposed by the application submitted March 10, 2009 to the Energy Facility Site Evaluation Council (EFSEC), Jason Spadero, President of SDS Lumber Co, and of Whistling Ridge Energy LLC, is proposing a facility, collectively called the Whistling Ridge Energy Project, of up to 50 1.2- to 2.5- MW wind turbines with a total capacity of 75 MW of electricity. The project would be located on a 1,152-acre site in unincorporated Skamania County owned by SDS Co, LLC and Broughton Lumber Company, on the forested ridges of Saddleback Mountain. Each turbine would be up to approximately 426 feet tall to the tops of the blades extended over the tower of the wind turbine. In addition to the turbines, the planned facility would include: electrical transformers, 34.5 kilovolt collector lines and systems (primarily underground), permanent meteorological towers, an Operations and Maintenance facility (including bathrooms and kitchen), a new well for potable water, an on-site septic system, a substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line, and approximately 2.4 miles of newly-constructed gravel roads. There are 7.9 miles of existing private logging roads and road improvements, 7.8 miles located in the project area and 2.5 miles of access roads or road improvements not in the

project area, but outside of the National Scenic Area boundary. All existing, improved, and new roads will provide access to the wind turbine locations during construction and for operations and maintenance.

An amendment to this application was submitted to EFSEC on October 12, 2009. The amendment discusses an alternative location for the Operations and Maintenance Building, as well as moving the proposed access road improvements outside of the National Scenic Area boundary. The first proposed location for the Operations and Maintenance building is adjacent to the substation on the project site. The alternative location for the Operations and Maintenance building would be approximately 0.9 miles off site, located on the proposed new connection from Willard Road to West Pit Road. This parcel is owned by Broughton Lumber Co. and is zoned Residential-5 (R5). The maintenance yard was originally proposed as two acres in size as is now proposed as five acres in size.

The original proposal stated that several wind turbines would be placed in a Residential 10 (R10) zoning designation on the project site. While researching the parcels using the County's Geographic Information System (GIS), legal descriptions and official zoning maps, no R10 zoning designation was found within the project site. This has been corrected in the amended submittal.

The original proposal states that roughly 400 acres of the project site is located within FOR/AG 20 zoning and Residential 10 zoning designations. The referral to Residential 10 zoning has been corrected in the amendment. However, Community Development staff research of the County's GIS and assessor maps show that approximately 1,036 acres of the project site is unzoned, and approximately 127 acres of the project site is zoned FOR/AG 20. County GIS and assessor maps show the project area to be approximately 1,163 acres, however, this is just an approximation based on legal descriptions since no boundary survey was conducted. This information does not affect the consistency review of the project; rather it is a clarification of the project based on County's consistency review.

The original proposal further included improvements to roads and intersections within the National Scenic Area in order to provide access to the project site. The roadways affected include Cook Underwood Road, Kollock-Knapp Road, Scoggins Road and private logging road CG2930. The October 12, 2009 amendment cites changes to the access roads that would take any ground disturbing activity outside of the National Scenic Area. Access to the site would now be provided from SR-14 to Cook Underwood Road to Willard Road and through a new connection to West Pit Road. No road improvements or changes would occur within the National Scenic Area boundaries.

The amended application proposes access to the project area via SR-14 to Cook-Underwood Road to Willard Road, with a new connection to West Pit Road. West Pit Road is an existing 2.5-mile-long logging road originally 8-12 feet wide. In summer 2009, the road was widened to approximately 20-26 feet wide. This road passes over a Class V stream with a current culvert, which will need to be widened as well.

Improvements to the county roadways and the private logging road would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components from SR 14 to the proposed project site. These improvements may

include 1) Rebuilding large sections of the existing roadway network, 2) Widening certain sections of the existing roadway network, 3) Flattening and/or rebuilding existing roadway topography both horizontally and vertically, and 4) Placing asphalt in select areas for equipment access. All improvements will be located outside of the National Scenic Area.

II. GENERAL INFORMATION

Owner(s):	SDS Lumber Co PO Box 266 Bingen, WA 98605 Broughton Lumber Co 92 Office Road Underwood, WA 98651
Applicant(s)/Applicant(s) Representative:	Jason Spadero, President, SDS Lumber Co and Whistling Ridge Energy, LLC PO Box 266 Bingen, WA 98605
Tax Parcel Number(s):	03-10-00-0-0-0300-00 (portion) 03-10-00-0-0-0400-00 (full) 03-10-00-0-0-0800-00 (portion) 03-10-00-0-0-1100-00 (portion) 03-09-00-0-0-2990-00 (portion) 03-09-00-0-0-0100-00 (alternative location for the Operations & Maintenance Building) Skamania County Road Right-of-Way
Location:	The subject parcels are located in the eastern portion of Skamania T3N, R10E & T3N, R9E, W.M.
Zoning:	127 acres of the proposed project area is zoned FA20. The alternative location of the Operations & Maintenance Building is zoned R5. The remaining 1,036 acres is un-zoned.
Comprehensive Plan Designation	Conservancy (outside NSA)
Square Footage/Acreage:	The entire project area is located outside of the NSA and is 1,152 acres (1,163 acres by County calculations), spanning portions of five parcels. If the alternative location for the Operations & Maintenance Building is used, it will span six parcels. Approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines.
Proposed Use	Semi-public utility facility
Number of Lots:	The project area spans portions of five parcels. If the alternative location for the Operations & Maintenance Building is used, it will span six parcels.

Density:	N/A
Sanitary Sewer District:	Individual On-Site Septic System for proposed Operations and Maintenance Facility
Domestic Water Supplies:	Applicant is proposing an individual well to serve the kitchen and bathroom facilities in the Operations and Maintenance Building.
Fire District:	Fire District #3
School District:	#31 Mill A and White Salmon School Districts
Drainage Basin:	Wind / White Salmon
WRIA:	Wind / White Salmon
WRIA Number	29B

III. HISTORY/BACKGROUND:

Skamania County is one of ten counties in Washington State that is not required to fully plan under the Growth Management Act. The County is not required to establish zoning classifications on all the land within its jurisdiction.

The 2007 Comprehensive Plan applies to all unincorporated land within Skamania County. Not all of unincorporated Skamania County has a zoning classification. The critical area regulations only apply outside of the NSA.

SDS Co. LLC submitted their application for the Whistling Ridge Energy Project on March 10, 2009. SDS Co. submitted an amended application to EFSEC on October 12, 2009. Skamania County Community Development Department is providing EFSEC with a consistency review of all county regulations that apply to the project. The County is not providing a decision on this project at this time.

The original application included roadway improvements on roads located within the National Scenic Area. The amended application has removed any roadway improvements and ground disturbing activity inside of the NSA. Therefore, portions of the previous staff report relating to the NSA activity, no longer apply.

IV. SEPA THRESHOLD DETERMINATION:

EFSEC issued a scoping notice on April 6, 2009 to begin the EIS review process. A revised notice was issued April 21, 2009.

V. PUBLIC HEARING NOTICE:

EFSEC published all required notices.

VI. NATURAL ENVIRNOMENT

A. Topography:

The resource maps indicate that the subject parcels within the project area, have slopes ranging from zero percent to over 40%. Under Skamania County's Critical Areas Ordinance (Title 21A), the subject parcels are located in a Class II Landslide Hazard Area. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is

prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. A description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. An evaluation of the analysis area's inherent erosion hazards;
c. A site plan of the area delineating all areas of the site subject to erosion hazard; and
d. Proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

B. Soils:
According to the Natural Resources Conservation Service (NRCS) Soil Survey of Skamania County, the soil types of the parcels are: McElroy gravelly loam (types 66, 67, 68), Timberhead gravelly loam (types 135. 136), Underwood loam (type 144). Each of these soils has a T Factor of 5. Under Skamania County's Critical Areas Ordinance, Title 21A, the subject parcels are located in a Class I Erosion Hazard Area.

C. Surface Water:
Within the proposed project area there is: One (1) Class 4N stream; 19 Class 5N streams; and five (5) unclassified streams.

D. Vegetation:
The project area is covered by second and third growth commercial timber stands.

E. Wildlife:
The entire project area is within Elk winter range habitat. No other habitat was found on resource maps.

F. Sensitive Areas:
No Sensitive Areas were found on the Resource maps within the proposed project area. No known cultural or archaeological resources were found within the project area.

VII. NEIGHBORHOOD CHARACTERISTICS

The Comprehensive Plan designation of this project area is Conservancy. The alternative location for the Operations and Maintenance Building is within Rural Lands II Comprehensive Plan designation. Some of the surrounding area is Rural Lands II, with the majority being Conservancy.

The southern project boundary line (including the southeast project line) borders the Columbia River Gorge National Scenic Area, but is not within the National Scenic Area.

VIII. TRANSPORATION PLANS

The original proposed access was from State Route 14 to Cook-Underwood Road, to Kollock-Knapp Road to Scoggins Road. This would have required road improvements within the National Scenic Area. The amended application has access to the proposed site provided from State Route 14 to Cook- Underwood Road, to Willard Road and through a proposed new connection to existing West Pit Road, located on SDS Lumber Company and Broughton Lumber Company property. The alternative Operations & Maintenance building location would be accessed off of Willard Road.

IX. UTILITIES

A. Stormwater:
Discharge of stormwater runoff would be regulated by EFSEC based on the Department of Ecology's stormwater pollution control program. The proposal indicates mitigation measures by Best Management Practices and by implementing a Stormwater Pollution Prevention Plan (SWPPP) during and after construction. The final design would conform to the applicable Ecology Stormwater Management Manual in effect at the time or as instructed by EFSEC.

B. Wastewater Disposal:
The Applicant is required to apply for an On-Site Septic System permit as the Operations and Maintenance Building will include bathroom and kitchen facilities. Prior to issuance of any building permit, the applicant is required to have an approved On-Site Septic System Design.

C. Potable Water:
Prior to the issuance of a building permit for the proposed Operations and Maintenance Building, the applicant is required to have an approved Water Availability Verification Evaluation (WAVE).

X. COMPREHENSIVE PLAN

The following Goals and Policies of the Skamania County Comprehensive Plan are applicable to the proposed project.

Chapter 2: Land Use Element
Goals and Policies
Conservancy Designation

Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).

Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possibly by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.

Finding:

The project area lies within the Conservancy Comprehensive Plan Designation. The alternative location for the Operation and Maintenance Building lies within the Rural Lands II Comprehensive Plan Designation. Within the conservation designation and the Rural Lands II designation, public facilities and utilities, and utility substations are allowed.

Conclusion:
The project is considered a semi-public utility facility and would therefore be consistent with the Conservancy Designation.

Goal LU.3: To coordinate public and private interests in land development.

Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.

Finding:
The project area is located outside of the Columbia River Gorge National Scenic Area boundary. The turbines would be painted gray to minimize aesthetic effects. The proposed project would be located within an area where roadways and high voltage regional transmission lines already exist, which would minimize the need for new disturbances.

Conclusion:
The project is consistent with this goal and policy.

Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.

Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.

Finding:
High-voltage regional transmission lines, owned and operated by Bonneville Power Administration (BPA) are located on the project site. Access roadways already exist, with the exception of the proposed connection from Willard Road to West Pit Road. The project uses existing patterns in Land Use, which helps to minimize the public costs of providing services and new infrastructure.

Conclusion:
The project is consistent with this goal and policy.

Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.

Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.

Policy LU.5.7: Adequate on-site wells and septic systems should be properly installed, monitored and maintained in accordance with local and state health departments.

Finding:
The proposed project is located in the Conservancy Designation, which allows for public utility facilities and utility stations. The surrounding areas are Conservancy Designation, as well as Rural Lands II Designation, which also allows for utility facilities and utility substations. The project site has been previously logged by forestry activities and the proposal would allow the forestry activities to continue. High-voltage transmission lines, cell towers and rock quarries currently exist in the area, so the project would be compatible with these uses.

The proposed Operations and Maintenance Building is located in the Rural Lands II Designation, which allows for public utility facilities and utility stations. It would include bathroom and kitchen facilities and would therefore be required to have an approved on-site septic system as well as an adequate potable water supply. If/when an application is submitted to this department, this would be a condition of approval.

Conclusion:
The project is consistent with the goals and policies. A valid OSS and proof of potable water would be a condition of approval.

Chapter 3: Environmental Element
Goals and Policies

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water and energy resources.

Policy E.1.4: Implement and preserve critical area buffers based on Best Available Science adjacent to critical areas to adequately protect such areas from development and land use impacts.

Finding:
Several streams exist on the proposed project site, with buffers ranging from 25' to 50', which must be maintained at all times unless exemptions are met or variances are granted.

Conclusion:
This proposal is consistent with the goals and policies.

Goal E.3: To minimize the loss of life and property from landslides, seismic, volcanic or other naturally occurring events, and minimize or eliminate land use impacts on geologically hazardous areas.

Policy E.3.4: Require geotechnical studies to determine construction methods and technologies necessary to further public safety in geologically hazardous areas. The development design and construction technology used shall be appropriate to the soil limitations on the particular site.

Finding:
The project should require a geotechnical assessment report and soil borings to be conducted on-site. The report should be reviewed and accepted by Skamania County prior to issuing any building permits. Any and all setbacks determined within the report must be followed.

The proponent had a geotechnical assessment report prepared for this project. At this time, the report has not been reviewed by Skamania County.

Conclusion:
The project is consistent with these goals and policies.

Chapter 4: Transportation Element

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Finding:
Most roadways that will be used for this proposal exist and some improvement will be necessary for the transportation of the equipment and construction materials. A short road span connecting West Pit Road to Willard Road is proposed for access to the site. Other proposed roadways for the site will be located on the project site. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant should consult with the Skamania County Public Works Department regarding the sufficiency of roads. Turbine equipment would likely be transported to either the Port of Longview or the Port of Vancouver, and much of it transported by barge up the Columbia River to the Applicant's existing barge and dock facilities in Bingen, Washington. If rail is used, it will be by existing rail lines.

Conclusion:
This proposal is consist with these goals and policies. The road improvements will enhance the level of service on these roads and benefit the community.

Chapter 5: Archaeology and Historic Preservation Element

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance:

Policy AHP.1.3: Coordinate county inventory efforts with Native American groups and governmental efforts.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging. No known archaeological or cultural resources were found on the Washington State Department of Archaeological and Historic Preservation (DAHP) resource maps that staff used to research the project area.

Further, if the project proponent applies for a Conditional Use permit, the application would be sent to various state agencies, federal agencies, and Native American Governments, allowing the opportunity to comment on the project. EFSEC should consult with these groups during the process.

Conclusion:
This project is consistent with these goals and policies.

Goal AHP.3: Protect historic, archaeological, and cultural resources through a comprehensive planning approach.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging.

Conclusion:
This project is consistent with these goals and policies.

XI. STATUTES/CODES:

Skamania County Code Title 21 – Zoning

Chapter 21.64 – Unmapped Classification (UNM)

21.64.020 – Allowable Uses

> *In the areas classified as Unmapped, all uses which have not been declared a nuisance by statute, resolution, ordinance, or court of jurisdiction are allowable. The standards, provisions, and conditions of this title shall not apply to unmapped areas.*

Finding:

1,036 acres of this project is unzoned and therefore there are no restricted uses. Utility facilities and utility substations have not been declared a nuisance by a known Washington State Court or by local ordinance or resolution or by any known state or federal statutes.

Conclusion:
The project is consistent with the zoning designation of UNM.

Chapter 21.56 – Resource Production Zone Classification (FOR/AG 10 & 20)
21.56.030 – Conditional Uses
(C) Semi-public facilities and utilities

Finding:
Approximately 127 acres of this project is located within the FOR/AG 20 zoning classification. The "A" string of the project within this zoning classification. The "A" string includes seven turbines. All other proposed turbines are outside of the zoned area. Semi-public facilities and utilities are a conditional use within this zoning designation. The applicant would need to submit a conditional use application for review by the Hearing Examiner for approval of this project if the County was conducting the project review. Conditional use permits are reviewed and issued by the County Hearing Examiner.

Chapter 21.36 – Residential 5 Zone Classification (R5)
21.36.031 – Conditional Uses
(G) Semi-public facilities

Finding:
The proposed alternative location for the Operations and Maintenance Building is located approximately 0.9 acres from the project site on a parcel zoned Residential 5. The proposed maintenance yard would be approximately 5 acres. Semi-public facilities are a conditional use within this zoning designation. The applicant would need to submit a conditional use application for review by the Hearing Examiner for approval of this project if the County was conducting the project review. Conditional use permits are reviewed and issued by the County Hearing Examiner.

21.16.070 - Hearing Examiner - Duties and Responsibilities
The Hearing Examiner shall hear and decide:

A. Applications for conditional uses. Conditional uses are those uses, which may or may not be compatible with permitted uses in a specific zoning designation. If the Hearing Examiner determines the use is not compatible with permitted or existing uses in the specific area of the proposed use then the proposed use shall be denied. Alternatively, if the Hearing Examiner determines that the proposed use is compatible with permitted and existing uses in the specific area of the proposed use then the proposed use then the proposed use may be approved or approved with conditions to make it make it compatible with the area.

1. In determining whether the use is compatible with the area, the proposed use shall:

a. *Be either compatible with other uses in the surrounding area or is no more incompatible than are other outright permitted uses in the applicable zoning district;*

Finding:
The proposal is to install up to 50 wind turbines on a parcel of land in unincorporated Skamania County, 1,036 acres are unzoned, and 127 acres are zoned FOR/AG 20. The Operations and Maintenance Building will either be located on the project site adjacent to the substation or in an area off Willard Road approximately 0.9 miles from the project area and is zoned R5. The entire proposal is located within the Conservancy Comprehensive Plan Designation, with the exception of the alternative location for the Operations and Maintenance building which is located in Rural Lands II.

Unzoned areas of Skamania County and the Conservancy Comprehensive Plan Designation allow for public utility facilities and utility substations. The FOR/AG 20 and the R5 zoning districts list semi-public utility facilities and utility substations as a conditional use and allow public facilities outright with no additional zoning review being required.

The surrounding areas are located within the Conservancy Designation, as well as the Rural Lands II Designation, both of which allow public utility facilities and utility substations. The property is currently uses for commercial forestry activities, and these activities will be allowed to continue once the turbines are constructed. Cell towers, high-voltage transmission lines and rock quarries exist in the area. There is a small portion of the project site that abuts Residential 10 (R10) zoning, which also lists semi-public utilities as conditional use.

Conclusion:
The proposal is compatible with other uses within the area, both within the Comprehensive plan designation and the zoning designation.

b. *Not materially endanger the health, safety, and welfare of the surrounding community to an extent greater than that associated with other permitted uses in the applicable zoning district.*

Finding:
The subject parcel is located in a geological hazard area due to the slope and soil type and requires a geotechnical assessment report.

The applicant is required to show proof of potable water and obtain an on-site septic system permit from the Skamania County Community Development Department through the building permit process. The proposal includes bathroom and kitchen facilities located in the Operation and Maintenance Building.

EFSEC has required an EIS to be prepared and will ultimately decide what conditions of approval would be necessary for the project to be found to not materially endanger the health, safety and welfare of the surrounding

community. By obtaining the water, septic and building permits, conducting the geotechnical analysis and best management practices during construction, the project could be found consistent with this provision.

Conclusion:
The proposal will not materially endanger the health, safety, and welfare of the surrounding community.

c. Not cause the pedestrian and vehicular traffic associated with the use to conflict with existing and anticipated traffic in the neighborhood to an extent greater than that associated with other permitted uses in the applicable zoning district.

Finding:
Access of the proposed site would be provided from State Route 14 to Cook-Underwood Road, Willard Road and with a new connection to existing West Pit Road, located on SDS Lumber Company and Broughton Lumber Company property.

All roadways that will be used for this proposal exist, with the exception of the new connection from Willard to West Pit Road and access roads within the project site boundaries, and some improvement will be necessary for the transportation of the equipment and construction materials. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant will consult with the Skamania County Public Works Department regarding the sufficiency of roads and road upgrade requirement. Other permitted uses include: single family residences in conjunction with forest or farm management, recreational facilities, semi-public facilities and utilities, saw mills, shake and shingle mills, chippers, pole and log yards, geothermal energy facilities, aircraft landing fields, cluster developments, child mini day care centers, and child day care centers.

Conclusion:
The proposal will not cause a conflict with existing pedestrian and vehicular traffic.

d. Be supported by adequate service facilities and would not adversely affect public services to the surrounding area.

Finding:
The proposal states that an Engineering, Procurement, and Construction (EPC) contractor will prepare a safety plan that would apply to all personnel working on-site. The plan would ensure compliance will all laws, ordinances, regulations and standards concerning health and safety. An Environmental Compliance Program would cover avoidance of sensitive areas during construction, waste handling and storage, stormwater management, spill prevention and control, and other components required by State and County regulations. An Emergency Response Plan would be established to ensure employee safety from the

following: medical emergency, major power loss, fire, extreme weather, earthquake, volcano, and bomb threat. This plan would be established prior to construction.

Condition:
All safety plans and programs are required to be in place prior to construction. These plans and programs should be included as a conditional of approval.

e. Not hinder or discourage the development of permitted uses on neighboring properties in the applicable zoning district as a result of the location, size, or height of the buildings, structures, walls, or required fences or screening vegetation to a greater extent than other permitted uses in the applicable zoning district.

Finding:
The proposal is to install up to 50 wind turbine structures on a project site spanning portions of five parcels. This use is classified as a semi-public utility facility within the FOR/AG 20 zoning designation. If the alternative location for the Operations and Maintenance building were selected, the project would span six parcels. This use is classified as a semi-public utility facility within the R5 zoning designation.

Other uses in the FOR/AG 20 zoning designation include, among others: forestry practices and associated management activities of forest crop, commercial and domestic agriculture, water resource management facilities, log sorting and storage areas, etc. Other uses in the R5 zoning designation include, among others: single-family dwellings, commercial and domestic agriculture, public facility and utilities, and accessory equipment structures, etc.

Surrounding zoning includes FOR/AG 20, as well as R10 (Residential 10) and R5 outside of the NSA. To the south of the project area, inside the NSA, the surrounding area is zoned Large Scale Agriculture, Commercial Forest, Small Woodland and Open Space. Current uses surrounding the project site include commercial forestry uses, agriculture including pear and apple orchards, and three small, unincorporated residential communities and other agriculture related dwellings.

Conclusion:
The proposal is compatible with other uses in the region and will not affect the allowed uses on those parcels. The proposal states commercial forestry activities will likely continue on the project site parcels as well.

f. Not be in conflict with the goals and policies expressed in the current version of the County's comprehensive plan.

Finding:
As discussed above, the proposal is consistent with the Skamania County Comprehensive Plan.

2. *Criteria for determining conditions to be imposed on conditional uses shall be based on the health, safety, and general welfare of the public, any environmental standards in force in Skamania County, other applicable provisions set forth in this Title and shall be subject to conditions which may include, but are not limited to the following;*

   a. *Limiting the manner in which the use is conducted including restricting the time an activity may take place, and restraints to minimize such environmental effects as noise, vibration, air pollution, glare, and odor.*

Finding:
The EIS and EFSEC will determine what conditions, if any, are required to be implemented for this project.

   b. *Establishing a special yard, open space, lot area or lot dimensions.*

Finding:
Not applicable

   c. *Limiting the height, size, or location of a building or other structure.*

Finding:
127 acres of this project site, which includes seven proposed turbines, is located within FOR/AG 20 zoning designation. Under the current FOR/AG 20 zoning designation, the required front yard setback is 35-feet from the centerline of the private road or 20-feet from the front property line with the front defined as the line which parallels a public road right-of-way or a private road easement, or that line where a road, driveway, or access panhandle enters a lot. The required rear setback under the current regulations is 20-feet from the rear lot line with the rear defined as the lot line which is opposite and farthest away from the front lot line.

The alternative location for the Operations and Maintenance building is on land designated Residential 5 (R-5). Under the current R5 zoning designation, the required front yard setback is 50-feet from the centerline of the public road right-of-way or 35-feet from the centerline of a private road right-of-way, or 20-feet from the property line, whichever is greater. The required rear setback is 20-feet and the required side yard setbacks are 20-feet.

The remainder of this parcel, 1,036 acres, is unzoned and therefore has setbacks as determined by the Building code list from Title 15. Building Code setback requirements for un-zoned lots 12,500 square feet or larger is:
Front Yard: No building or accessory building shall be constructed closer than 45 feet from the centerline of the public road right-of-way or 35 feet from the centerline of the private road (note including private driveways), or road or 15 feet from the front property line, whichever is greater;
Side Yard: On each side of the building or accessory building a side yard shall be provided for not less than 5 feet; and

Rear Yard: A rear yard shall be provided of not less than 15 feet, including accessory buildings.

Conclusion:
Under the current regulations, the proposed location meets the minimum requirements. However, EFSEC may require additional setbacks or micro siting of turbines.

d. Designating the size, number, location, and nature of vehicle access points.

Finding:
No new major roads are proposed at this time. Only a small connection from Willard Road to West Pit Road will be constructed for access. Other proposed roads include access roads within project boundaries. The EIS traffic studies and road design plan will determine any requirements for vehicle access points.

e. Increasing the amount of street dedication, roadway width, or improvements within the street right-of-way.

Finding:
The EIS traffic studies and road design plans will determine the necessary road improvements. No new roads are proposed at this time, other than the short connection from Willard Road to West Pit Road and roads within project boundaries.

f. Limiting or otherwise designating the number, size, location, height, and lighting of signs.

Finding:
Non-applicable

g. Limiting the location and intensity of outdoor lighting and requiring it to be shielded.

Finding:
Lighting of turbine strings will need to meet Federal Aviation Administration (FAA) requirements. Lighting on buildings is requested to be hooded and shielded. This is a request and not currently a requirement in the County zoning code.

h. Requiring berming, screening, landscaping, or another facility to protect adjacent or nearby properties and designating standards for its installation and maintenance.

Finding:
The residences closest to the project site are located approximately 0.48 mile and 0.8 mile from proposed turbine locations. A new home site location has been applied for, and would be approximately 2,000 feet (0.38 Mile) from the south property line. The unincorporated community of Willard is located approximately

2.25 miles northwest of the project site. The unincorporated community of Mill A is also located near the project site, approximately 1.5 miles west of the site. The homes near the project site are rural, primarily single family, between 30 and 50 years old, and low- to medium-density.

The residence closest to the alternative location for the Operations and Maintenance building is approximately 0.25 miles.

Conclusion:
In order to protect adjacent and nearby properties, the applicant should only excavate the minimum needed to install the wind turbines and accessory structures, and the Operations and Maintenance facility, maintain existing trees, and re-vegetate all undeveloped disturbed areas with native trees and shrubs along the west and south lot lines. However, since this land is being used for Commercial Forestry, the removal of timber in conjunction with this operation should not be restricted.

i. Designating the height, location, and materials for a fence.

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic reasons.

j. Protecting and preserving existing trees, vegetation, water resources, wildlife habitat, or other significant natural, historic, or cultural resources.

Finding:
The proposed project is located within a Class II Landslide Hazard Area and a Class I Erosion Hazard Area due to the soil type and requires a geotechnical assessment report. The entire project site is also located within elk winter range habitat. Several streams exist on site, which would require buffers ranging between 25' to 50'. There are no current County requirements to preserve trees or vegetation outside of critical resource stream buffers. No cultural or historic resources found in database research.

Conclusion:
In order to prevent possible wind and water erosion, the applicant should use Best Management Practices during all phases of construction and replant all undeveloped disturbed areas with native vegetation. The project requires a geotechnical assessment report to address the landslide hazard on the property. The applicant has already submitted a geotechnical assessment report, which has not been reviewed by the County.

Skamania County Code Title 21A – Critical Areas

21A.04.010 - General Provisions

A. RELATIONSHIP TO SHORELINES MANAGEMENT MASTER PLAN AND SHORELINES MANAGEMENT ACT PERMITS ORDINANCE.

In event of any conflict between this Title and regulations contained in the Shorelines Ordinance, those regulations that provide greater protection of Critical Areas shall apply.

Finding:
There are several streams located on the subject parcel. The proposal is to erect up to 50 wind turbine structures. No stream located on-site is a Shoreline of Countywide or Statewide significance and therefore the Skamania County Shoreline Management Program does not apply.

Conclusion:
Skamania County Critical Areas Ordinance, Title 21A, provides the greatest protection to the critical areas and only applies outside of the National Scenic Area.

21A.04.030 - STREAMS, CREEKS AND RIVERS

(4) Buffer Widths

(b) ... undisturbed buffers shall be preserved around all regulated streams, creeks and rivers.

(c) The required width of undisturbed buffer areas shall depend upon the class of water represented by the stream, creek or river protected, the type or scale of use or development proposed by an applicant and the vegetative community adjacent to the water body.

(iv) For Class IV streams, creeks and rivers, the standard buffer zone width shall be 50 feet.

(v) For Class V streams, creeks and rivers, the standard buffer zone width shall be 25 feet.

Finding:
The proposed project area includes several streams ranging from a 25' to 50' undisturbed buffer requirement. The proposal states that no new construction would occur within wetlands, streams, or associated buffers. Most of the existing road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold (100% or less of the original footprint).

West Pit Road is an existing logging road that will be used to access the site. The road was originally 8 to 12 feet in width, and has been widened to approximately 20 to 26 feet in width. Further widening of sections of the road is proposed to 25-feet in width, with 5' shoulders on each side. Also proposed is the widening of the existing culvert across the Class V stream on West Pit Road. No Critical Areas Variance will be required if the expansion/widening is less than 100% of the original size. If the expansion is greater than 100%, a Critical Areas Variance will be required.

Conclusion:
Maintaining critical areas buffers would be a condition of approval. If any expansion of existing roadways or culverts occurs within critical area buffers that are greater than 100% of the original size, a Critical Areas Variance will be required.

The applicant has already had a wetland delineation report prepared for the project. This report has not been reviewed by Skamania County at this time.

21A.05.050 – Fences in Deer and Elk Winter Range

(A) New development permits issued by the County shall include a requirement that, in deer and elk winter range, construction of new and replacement fences shall be subject to the following:

1. *New fences in deer and elk winter range shall be allowed only when necessary to control livestock or pets or to exclude wildlife from specified areas, such as gardens or orchards. Fenced areas shall be the minimum necessary to meet the needs of the project applicant.*
2. *New and replacement fences in winter range shall comply with the following, unless the applicant demonstrates the need for an alternative design:*
    a. *The top wire shall not be more than 42 inches high to make it easier for deer to jump over the fence.*
    b. *The distance between the top two wires shall be at least 10 inches to make it easier for deer and to free themselves if they become entangled.*
    c. *The bottom wire shall be at least 16 inches above the ground to allow fawns to crawl under the fence. It should consist of smooth wire because barbs often injure animals as they crawl under the fence.*
    d. *Stays or braces placed between strands of wire shall be positioned between fence posts where deer are most likely to cross. Stays create a more rigid fence, which allows deer a better change to wiggle free if their hind legs become caught between the top two wires.*
3. *Woven wire fences may be authorized only when a project applicant clearly demonstrates that such a fence is required to meet his or her specific needs, such as controlling hogs and sheep.*

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic reasons.

Conclusion:
If EFSEC requires fencing, a condition of approval would be to follow the above guidelines for fencing within deer and elk winter range.

The proponent has already had a wildlife survey completed. This report has not been reviewed by Skamania County at this time.

21.A.06 Geologically Hazardous Areas

21A.06.010 Erosion Hazard Areas

A. Class I Erosion Hazard Areas:

Class I Erosion Hazard Areas (EHAs) area areas that are subject to severe development constraints due to a site's susceptibility to erosion from wind and/or water.

Class I EHAs are identified in the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service, as having an index of greater than or equal to 3.75

21A.06.020 Landslide Hazard Areas

A. Class II Landslide Hazard Areas (LHAs) are areas with slopes 20% and 30% that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than 30%.

Class II LHAs shall be identified using the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service. Department personnel shall make a preliminary determination of percentage of slope. The applicant shall verify soil type and precise percentage of slope.

Finding:

The proposed project site is located within a Class I Erosion Hazard Area and a Class II Landslide Hazard Area under Skamania County Critical Areas Ordinance Title 21A. The resource maps indicate that the subject parcels have slopes ranging from zero percent to over 40%. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. A description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. An evaluation of the analysis area's inherent erosion hazards;
c. A site plan of the area delineating all areas of the site subject to erosion hazard; and
d. Proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

Conclusion:

The proposal discusses submitting a geotechnical assessment report and performing soil borings on site. This report must be reviewed and approved by Skamania County and would be a condition of approval.

The applicant submitted a Geotechnical Assessment Report, which has not been reviewed by the County at this time.

Skamania County Code Title 22 – National Scenic Area

The original proposal included road improvements on existing roadways within the National Scenic Area. However, the amended proposal changes the access roads and road improvements to roadways not located within the National Scenic Area. Therefore, as currently proposed, no National Scenic Area review would be completed and is not required.

Skamania County Code Title 24 – Clearing & Grading

24.02.50 Applicability

Unless exempted under SCC Section 24.02.060, no person shall perform any grading activity without having first obtained a permit from the Department. Exemption from the permit process shall not relieve any person the requirement for installation of appropriate erosion control measures for their project. No permit or exemption granted pursuant to this title shall remove an applicant's obligation to comply in all respects with the applicable provisions of any other federal, state, or local law or regulation.

24.02.060 Exemptions

The following activities are exempt from the permit requirements of this title. Materials from exempted excavations may require a separate permit for placement as fill.

- *A. Mining, quarrying, excavating, processing, or stockpiling activities of rock, sand, gravel, or clay if such operations are authorized by a valid Department of Natural Resources Surface Mine Reclamation Permit or Skamania County Conditional Use Permit or other provision of Skamania County Code.*
- *B. All State Department of Natural Resources regulated Class I, II, III, or IV special forest practice activity conducted in accordance with Chapter 76.09 RCW and WAC Title 222.*
- *C. Grading, clearing, filling or excavation of less than 500 cubic yards, only if located outside Critical Areas (SCC Title 21A) and regulated Shorelines (SCC Title 20).*
- *D. Emergency actions which must be undertaken immediately or for which there is insufficient time for full compliance with this title in the event that:*
    1. *There is an imminent threat to public health or safety.*
    2. *There is imminent danger to public or private property;*
    3. *There is an imminent threat of serious environmental degradation;*
        - *a. A person or agency determines that the need to take emergency action is so urgent that there is not sufficient time for review by the Department; such emergency action may be taken immediately. Any person or agency undertaking such action shall notify the Department within one working day following the commencement of the emergency action. Following such notification the Department shall determine if the action taken was within the scope of the emergency actions allowed in this subsection. If the Department determines that the action taken or part of the action taken is beyond the scope of allowed emergency action, enforcement action is authorized, as outlined in SCC Section 24.02.120.*

b. *If the action taken qualifies as an emergency, and would have otherwise required a grading permit under this Title, then an application for a grading permit will be submitted with in 30 days following the emergency event. The application requirements, review, issuance, and inspections will be conditioned as outlined in this Title.*

E. *All exemptions as enumerated in the Critical Area and Shoreline Ordinances.*

F. *Nothing herein may interfere or overrule the Right to Farm Ordinance.*

G. *Nothing in this ordinance shall be retroactive and all current projects are hereby vested*

Finding:
The proposal will include excavation work to install concrete foundations with a diameter of up to approximately 60 feet for each wind turbine. The Collector System will disturb an area approximately 30 feet in width, with 8.5 miles of underground collector cable trenches proposed. Approximately 2.4 miles of new gravel access roads will be constructed for construction, maintenance and operation as part of the proposal.

Conclusion:
As the volume and area of the clearing activities exceeds the exemption amount of volume and/or area, the applicant/property owner is required to obtain a Clearing and Grading Permit under SCC Section 24.02.050. EFSEC will make a determination on what conditions of approval are necessary.

24.02.070 Application Requirements

Unless exempted under SCC Section 24.02.060, all persons proposing to conduct grading and/or clearing activity within the jurisdictional boundaries of unincorporated Skamania County shall first apply for a grading permit. The applicant shall obtain a grading permit in conformance with this title prior to any grading activity.

A. *The permit application shall at a minimum include the following:*

1. *A completed application, signed by the property owner and the applicant, a vicinity map, environmental checklist (if required), and any relevant supplemental information required by the Director.*
2. *Grading plans as described in SCC Section 24.02.080.*
3. *A full identification and written description of the work to be covered by the permit for which the application is made.*
4. *A timeline for completion of the project.*
5. *Non-refundable application fee as determined by resolution of the Board of County Commissioners.*

Finding:
The applicant/property owner does not meet the exempt criteria for a Clearing and grading permit and is therefore required to submit a Clearing and Grading permit application.

Conclusion:
The proposed project will require a Clear and Grading permit application, which would be a condition of approval.

The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

A. Granting of Permits

1. *After an application has been filed and reviewed the Director shall ascertain whether such proposed grading work complies with the provisions of this title. If the application and plans so comply, or if they are corrected or amended so as to comply, and the proposal is consistent with all other relevant county codes, the Director shall issue a grading permit.*
2. *The applicant/property owner shall maintain the approved grading plans and permit available on the site, and provide an individual copy to any grading contractor who will be working at the site.*
3. *A grading permit shall be valid for a period of two years from the date of permit issuance, only for the grading work applied for. An extension may be granted for an additional 12 months for special circumstances. Request for extensions shall be submitted in writing to the Department prior to expiration of the current permit, setting forth the reasons and justification for the request. No permit may be extended more than once. Renewal of permits may be accomplished with existing plans and reports, if no changes are being made to the proposal, and no new significant issues are raised during the review.*

Conclusion:
In order to be in compliance with this section of the Clearing and Grading Ordinance, a condition of approval should be that the permit and grading plans are available on site and that the grading permit is valid for two years.

24.02.080 Grading Plan

An application for clearing and grading shall be accompanied by a grading plan. If the clearing and grading project involves engineered grading, than an engineered grading plan based on an engineering report or an engineering geology report shall be submitted with the application. Engineered grading plans shall be prepared and stamped by an engineering geologist, geotechnical engineer and/or civil engineer licensed to work in the State of Washington. Grading within a geological hazard critical area may require a geotechnical assessment report in compliance with the Critical Area Protection Ordinance (SCC Title 21A). A grading plan shall include:

A. An easily reproducible drawing at a scale of appropriate size to show location and details of all cuts and all fills including depth and finished slopes of all cuts and all fills.
B. A general vicinity map of the area and site plan of the project.
C. North arrow.
D. Dimensions and location of subject property boundary lines, location of the permit area boundary, existing and proposed roads, or driveways, easements, natural or man made bodies of water and drainages, critical areas, shorelines, and any existing or proposed structures, wells or septic systems on the site, and the distance between such features.

E. *Bodies of water, critical areas, structures, wells and septic systems on adjacent property and lying within 50 feet of the subject grading activity boundary that could be affected by the proposed grading operations.*
F. *Location and dimensions of buffer areas to be maintained or established, and location and description of proposed erosion-control devices or structures.*
G. *Map drawn with contour intervals (5 foot or less) that adequately depict existing and proposed slope for the proposal.*
H. *Total quantities, in cubic yards, and type of cut and fill material, including on-site grading material, and imported material. Cross section drawings that include:*
    1. *Maximum depth of fill and maximum height of cuts.*
    2. *Existing and proposed buildings and their setbacks from cut or fill slopes.*
    3. *Existing grades extending a minimum of 20 feet beyond the scope of work.*
    4. *Finished grades of cuts and fills extending a minimum of 20 feet beyond the scope of work.*
    5. *Retaining walls and the adjacent grade at least 20 feet on either side of the wall(s).*
    6. *Grades of all existing cut and fill areas expressed as a ratio of horizontal to vertical slope.*
I. *The disposal site for excavated material. Off-site disposal may require a separate grading permit.*

J. *The location of proposed erosion and sedimentation control measures showing compliance with the requirements of SCC Section 24.02.090.*
K. *Detailed plans of all surface and subsurface drainage devices, walls, cribbing, dams, berms, settling ponds, or other water or erosion control devices to be utilized as a part of the proposed work.*
L. *Any recommendations included in an engineering geology or geotechnical assessment or report for grading or developing the property. If required, assessment and reports shall be completed in compliance with SCC Title 21A prior to issuance of a clearing and grading permit.*

Finding:
Under Skamania County's Critical Area Ordinance (Title 21A), the subject parcel is designated as a Class I Erosion Hazard Area due to the soil susceptibility to wind and water erosion and a portion of the subject parcel is designated as a Class II Landslide Hazard Area due to 20% slopes underlain with clay type soils. A geotechnical assessment report is required for the proposed project. The project is further required to have effective erosion control measures in place during all phases of the project.

A geotechnical report has been prepared for this project, but has not been reviewed by Skamania County at this time.

Conclusion:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and

approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

24.02.090 Grading Standards

Unless otherwise recommended in an approved soils engineering or engineering geology report, grading shall conform to the following standards. Erosion control measures may be installed as outlined in this title, unless otherwise recommended by a project engineer.

A. *Appropriate erosion control measures shall be installed prior to any grading activity. All erosion control measures shall be maintained in place until vegetation is established for suitable erosion and sedimentation control. No sediment from grading operations shall be permitted to leave the site or enter any surface waters or wetlands. If the grading activity timeline includes winter months, then a "winter shutdown" standard for site erosion control will be provided by the applicant.*
B. *Sites shall have a finished grade that drains away from structural foundations for a minimum of 10 feet.*
C. *All sites shall be cleaned upon project completion, including installation of permanent native grass seeding, landscaping, or other organic means of erosion control.*
D. *Cuts or fills of five feet in depth or greater shall be set back from property lines by a minimum of 25 feet. This can be decreased with appropriate engineering. Setback dimensions shall be horizontal distances measured perpendicular to the site boundary.*
E. *The top of cut slopes shall not be made nearer to a permit area boundary line than one fifth of the vertical height of cut with a minimum of two feet and a maximum of 10 feet. The setback needs to be increased for any required interceptor drains.*
F. *The toe to fill slopes shall be made not nearer to the permit area boundary line than one-half the height of the slope with a minimum of two feet and a maximum of 20 feet.*
G. *The Director may approve alternate setbacks at the request of the applicant. In approving these alternate setbacks, the Director may require an investigation and recommendation by a qualified engineer or engineering geologist to demonstrate that the intent of this section has been satisfied.*
H. *Any proposed finished slope that is steeper than two horizontal to one vertical shall be engineered.*
I. *The ground surface shall be prepared to receive fill by removing all organic material, non-complying fill, and scarifying topsoil.*
J. *Solid Waste as defined in this chapter, and detrimental amounts of organic material shall not be used as fill materials.*
K. *Fill slopes shall not be constructed on natural or cut slopes steeper than two units horizontal in one unit vertical (50 percent slope) unless the permittee furnishes a geotechnical engineering or an engineering geology report or both, stating that the site has been investigated and giving an opinion that a cut at a steeper slope will be stable and not create a hazard to public or private property.*
L. *At the request of the applicant, the Director may approve the use of alternate grading standards. These approvals shall be based on sound*

engineering practices and may require the submittal of additional documentation, reports, or testing.

M. *No grading shall obstruct or alter any existing natural drainage way, stream, or any other natural body of water.*

N. *No grading shall alter or increase surface drainage onto any adjacent properties.*

Finding:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:
These plans will substantively comply with SCC Title 24 standards.

24.02.100 Grading Inspection

Grading projects for which a permit is required shall be subject to inspection by the Director. A licensed Washington State professional engineer shall provide professional inspections of grading operations if engineering is required elsewhere in this title. An inspection schedule shall be established for each project prior to permit issuance based on the following:

A. *A civil engineer shall provide professional inspections within such engineer's area of technical specialty, which shall consist of observation and review as to the establishment of line, grade and surface drainage of the development area. If revised plans are required during the course of the work, they shall be prepared by the civil engineer.*

B. *A geotechnical engineer and/or engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include observation during grading and testing for required compaction. The engineer shall provide sufficient observation during the preparation of the natural ground and placement in accordance with the conditions of the approved plan and the appropriate requirements of this title. He or she shall also provide professional inspection of any excavation to determine if conditions encountered are in conformance with the approved report or plan. Revised recommendations relating to conditions differing from the approved engineering geology or geotechnical reports shall be submitted to the permittee, the Department, and the civil engineer.*

C. *The permittee shall be responsible for the work being performed in accordance with the approved plans and specifications and in conformance with the provisions of the title. When approved by the Director, the permittee may engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the Department. In the event of changing conditions, the permittee shall be responsible for informing the Department of such change and shall provide revised plans for approval.*

D. *The Department may inspect the project in various stages of work.*

E. *If, in the course of fulfilling their respective duties under this title, the civil engineer, geotechnical engineer, or engineering geologist finds that the*

work is not being done in conformance with this title or approved grading plans, the discrepancies shall be reported in writing within three working days to the permittee and to the Department.

F. *If the civil engineer, geotechnical engineer, or engineering geologist of record is changed during grading, the work shall be stopped until the replacement has agreed in writing to accept the responsibility within the area of technical competence for approval upon completion of the work. It shall be the duty of the permittee to notify the Department in writing of such a change prior to the recommencement of such grading.*

Finding:

The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:

These plans will substantively comply with SCC Title 24 standards.

STOEL, RIVES
RECEIVED

JAN 2 5 2010

Appendix E
Agency Consultations

Appendix E-1
DAHP Concurrence on Area of Potential Effects
Applicant APE

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 1, 2010

Mr. James La Spina
Siting Specialist
Energy Facility Site Evaluation Council
905 Plum Street, Building 3
P.O. Box 43172
Olympia, WA 98504-3172

In future correspondence please refer to:
Log: 012610-17-EFSEC
Property: *Consultation for Area of Potential Effects Whistling Ridge Energy Project, Skamania County, Washington*
Re: Area of Potential Effects-Concurrence and Comments

Dear Mr. La Spina:

We have reviewed the material you forwarded to our office that describes the area of potential effect (APE) for the Whistling Ridge Wind Energy Project in Skamania County. We concur with the definition of the APE. We look forward to receiving any correspondence or comments from the concerned Tribes or other parties and the cultural resources survey report when it is available.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer. Thank you for your consultation. If you have any questions, please feel free to contact me.

Sincerely,

Gretchen Kaehler
Assistant State Archaeologist
(360) 586-3088
gretchen.kaehler@dahp.wa.gov

CC. Katy Chaney, URS Corporation
Jessica Lally, Wind Farm Archaeologist, Yakama Nation

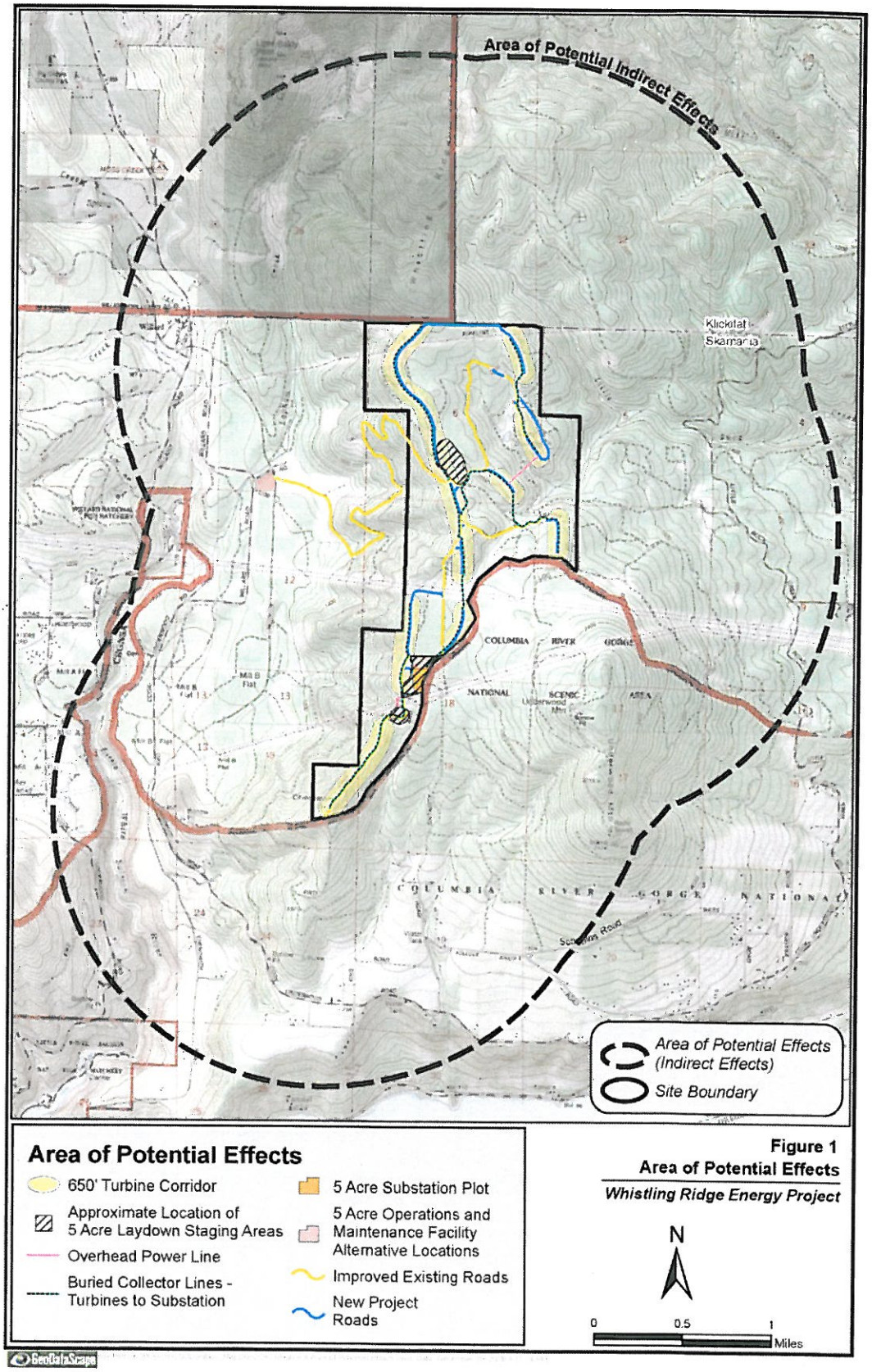


Figure 1
Area of Potential Effects
Whistling Ridge Energy Project

Appendix E-2
BPA Section 106 Consultation Letters

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Mr. Rob Whitlam, Ph.D.
State Archaeologist
Department of Archaeology & Historic Preservation
1063 South Capitol Way, Suite 106
Olympia WA 98501

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0256

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Dr. Whitlam:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your agency – the Washington State Office of Archeology and Historic Preservation. BPA also initiated consultation with The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, and The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well

as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for any of the contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

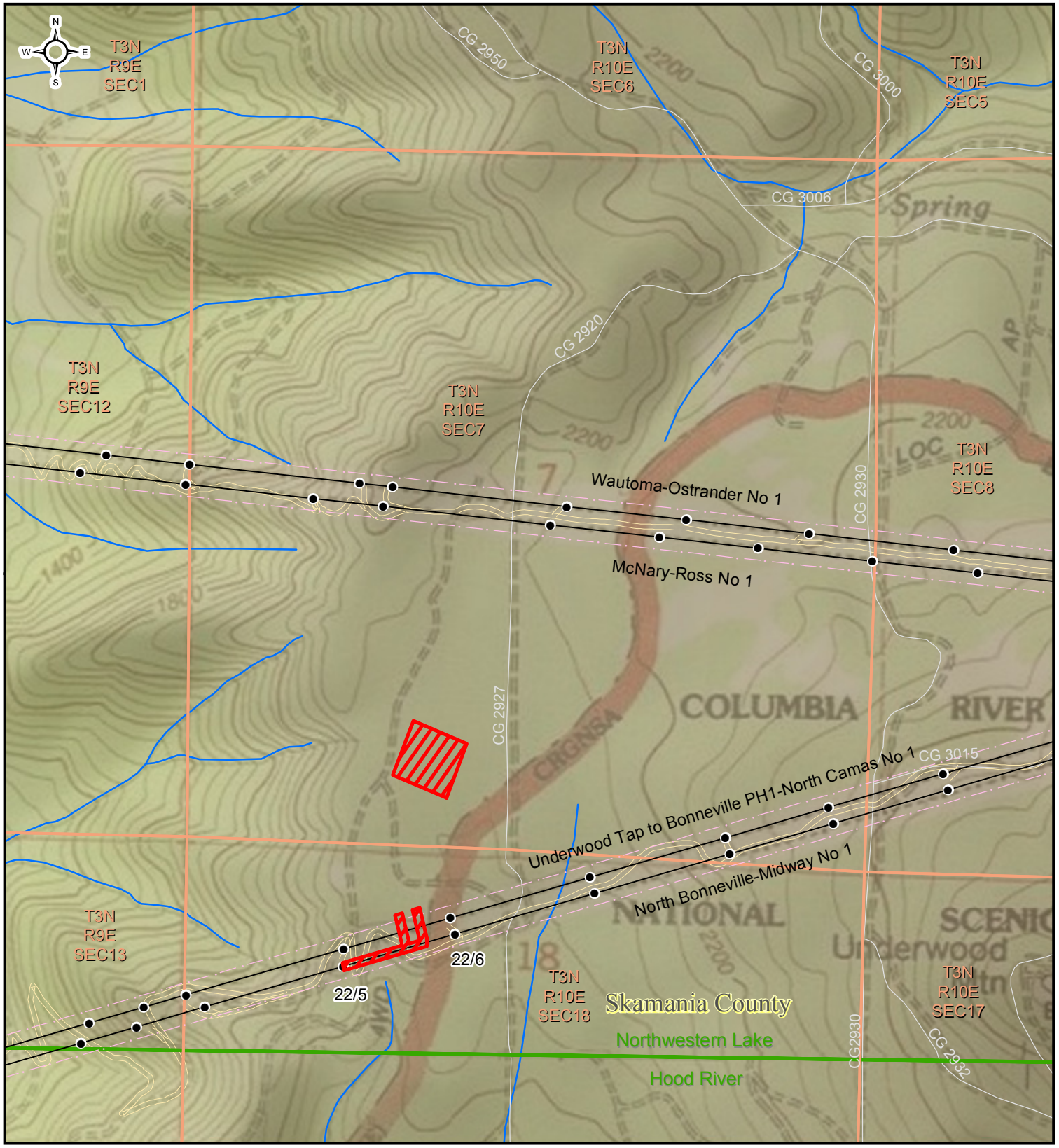
In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map



Proposed BPA Substation - Whistling Ridge Energy Project

Area of Potential Effects



- Area of Potential Effect
- Quad Name & Boundary
- Township/Range/Section
- BPA Right-of-Way Corridors
- BPA Towers
- Access Roads
- BPA Transmission Lines

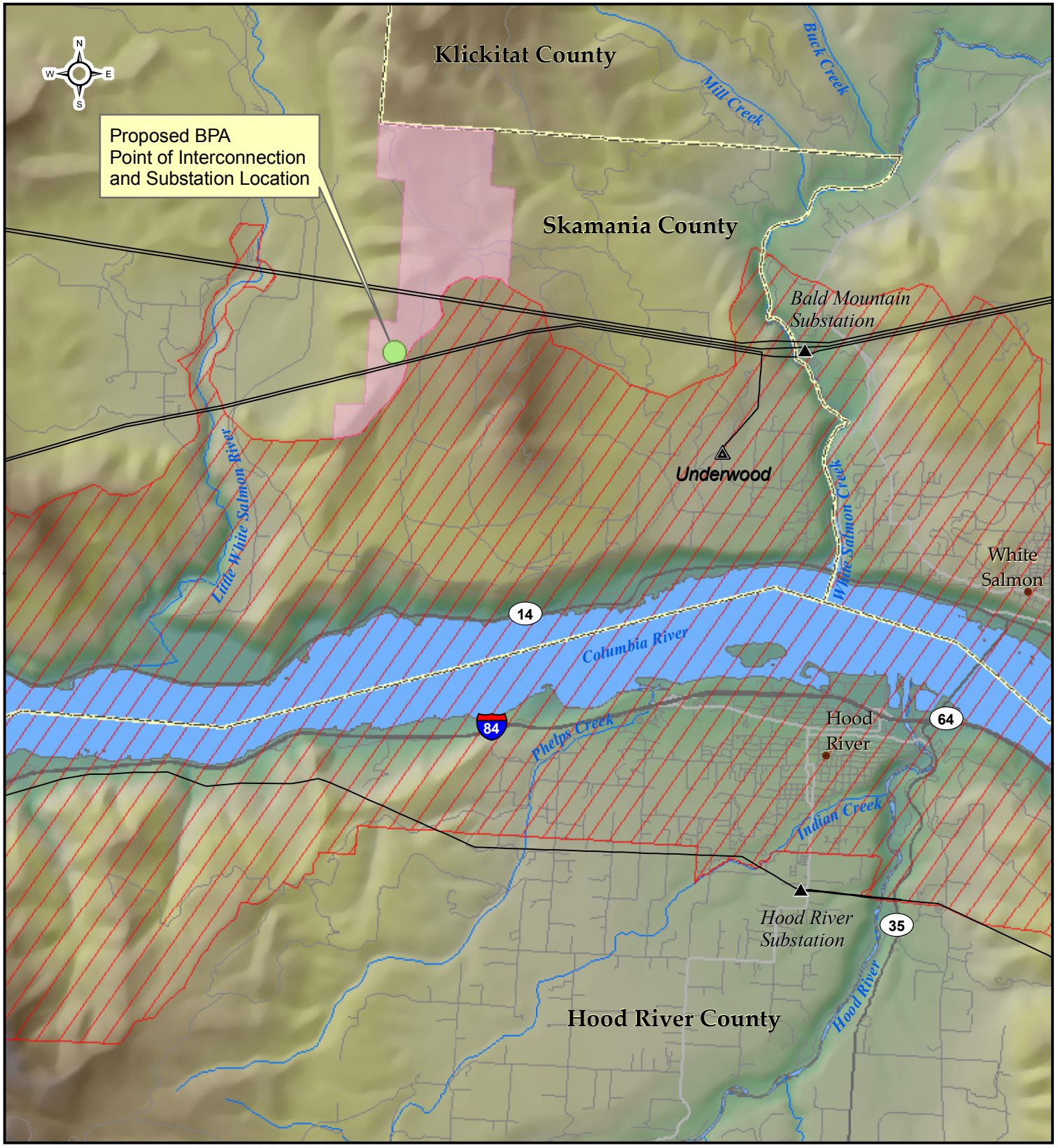
BONNEVILLE POWER ADMINISTRATION

June 28, 2010

0 500 1,000

Feet

File Path: \\bud\wg\gis\gis_data2\work\anna_h\APE\WhistlingRidge\Substation.mxd, User: AMH3994



Proposed Whistling Ridge Energy Project

Project Overview



- Proposed BPA Point of Interconnection and Substation Location
- Whistling Ridge Energy Project Study Area
- Columbia River Gorge National Scenic Area
- County Boundary
- BPA Substation
- Foreign Owned Substation
- BPA Transmission Lines

BONNEVILLE POWER ADMINISTRATION

May 5, 2010

0 0.5 1 2

Miles

File Path: \\bud\wg\gis\gis_data2\work\anna_h\Exhibits\WhistlingRidge\Project_Overview.mxd, User: AMH3994

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

August 9, 2010

Mr. Andrew M. Montano
Environment, Fish & Wildlife
Bonneville Power Administration
PO Box 3621
Portland, Oregon 97208-3621

Re: Whistling Ridge Substation Project
Log No.: 080910-26-BPA

Dear Mr. Montano;

Thank you for contacting our department. We have reviewed the materials you provided for the Area of Potential Effect (APE) for the proposed Whistling Ridge Energy Project Substation Project near Underwood, Skamania, County, Washington.

We concur with your determination of the Area of Potential Effect (APE) as described and presented in your figures and text.

We would also appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in compliance with the Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800.4.). Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and we look forward to receiving the results of the professional archaeological survey report, your consultation efforts, and your Determination of Effect.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov

cc: K. Cannell

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

December 10, 2010

In reply refer to: KEC-4

William Iyall, Chairman
Cowlitz Indian Tribe
PO Box 2547
Longview, WA 98632

Certified Mail
Return Receipt Requested
7010-1060-0000-5012-9336

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Iyall:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, December 10, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Cowlitz Indian Tribe

P.O. Box 2547 Longview, WA 98632
360.577.8140 577.7432 (f)

March 21, 2011

Andrew M. Montaño
Environmental Protection Specialist
Department of Energy
Bonneville Power Administration
PO Box 3621
Portland, OR 97208-3621

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington.

Dear Mr. Montaño:

In reference to the project stated above, the Cultural Resources Department of the Cowlitz Indian Tribe would like to state its interest.

The Cowlitz Indian Tribe recommends an Inadvertent Discovery Plan be attached to the permit; we have included language for your consideration.

Please contact us with any questions or concerns you may have. We look forward to working with you on this undertaking.

Thank you for your time and attention.

All My Relations,

dAVe burlingame
Director, Cultural Resources
360.577.6962
508.1677 [c]
577.6207 [f]

CC: Rob Whitlam, Department of Archaeology and Historic Preservation
Ed Arthur, Cowlitz Indian Tribe

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

Official File

August 2, 2010

In reply refer to: KEC-4

McCoy Oatman, Chairman
Cultural Resources Director
Columbia River Inter-Tribal Fish Commission
729 NE Oregon St., Ste 200
Portland, OR 97232

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0270

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Oatman:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, and The Confederated Tribes and Bands of the Yakama Reservation pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

Official File

August 2, 2010

In reply refer to: KEC-4

Carey Miller, THPO
Cultural Resources Protection Program
Confederated Tribes of the Umatilla Indian Reservation
46411 Timine Way
Pendleton, OR 97801

Certified Mail
Return Receipt Requested
7009-2820-0002-3432-8888

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Ms. Miller:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Robert Brunoe, THPO
Confederated Tribes of the Warm Springs Reservation of Oregon
P.O. Box C
Warm Springs, OR 97761

Certified Mail
Return Receipt Requested
7009-2820-0002-3432-8895

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Brunoe:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

Official File

August 2, 2010

In reply refer to: KEC-4

Keith Baird
Cultural Resources Director
Nez Perce Tribe of Idaho
P.O. Box 305
Lapwai, ID 83540

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0263

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Baird:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Confederated Tribes and Bands of the Yakama Nation
Established by the Treaty of June 9, 1855

Post Office Box 151
Toppenish Washington 98948

RECEIVED
JUN 17 2010
ENVIRONMENT
FISH & WILDLIFE

5/27/2010

Stephen Posner
Compliance Manager, EFSEC
905 Plum Street SE
Olympia, Washington 98504-3172

Andrew M. Montano
Environmental Project Manager
Bonneville Power Administration
P.O. Box 14428
Portland, Oregon 97293-4428

Dear Mr. Posner and Mr. Montano,

We have reviewed the recent Draft Environmental Impact Statement (DEIS) complied for the Whistling Ridge Energy Facility. In doing so, we noted under section 3.10.2.2 no mention has been made of the finding of the Yakama Nation Cultural Resources Program study which resulted in the findings of Traditional Cultural Property within the proposed wind project lands. The DEIS states that:

> *"A field investigation by Yakama Nation cultural resources specialists occurred in December 2009. The Yakama Nation's findings, currently in preparation, will supplement the information contained in this EIS."*

However, the results of the field investigation were reported to SDS Lumber and the Department of Archaeology and Historic Preservation in December of 2009, shortly after the site visit was completed. We, therefore, are taking this opportunity to resubmit this report to the Energy Facility Siting Evaluation Council (EFSEC) and the Bonneville Power Administration (BPA). It is our directive that this report be included in the Final Environmental Impact Statement as a portion of the consultation responsibilities held by BPA and EFSEC.

Sincerely,

Ruth Jim
Chairman, Yakama Nation Roads, Irrigation, and Lands Committee

Cc: Yakama Nation Cultural Resources Program
Gretchen Kaehler, Department of Archaeology and Historic Preservation
Richard Till, Fiends of the Columbia Gorge

Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

RECEIVED
JUN 17 2010
ENVIRONMENT
FISH & WILDLIFE

Memorandum

To: **Andrew Montano, Manager**
Environmental Project

From: **Harry Smiskin, Chairman**
Yakama Nation Tribal Council

Date: **June 15, 2010**

Subject: **Whistling Ridge Energy Project**

I, the Chairman of Yakama Nation Tribal Council, am requesting a continuance of thirty (30) days to review and comment on the Whistling Ridge Energy Project. My staff and I have not had the chance to meet on this important matter, and we would like to provide you with our input.

Chairman Harry Smiskin
P.O. Box 151
Yakama Nation
Toppenish, Wa 98948

Copy to: Tribal council
Lavina Washines
LAVINA WASHINES

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

August 23, 2010

In reply refer to: KEC-4

Mr. Harry Smiskin, Chairman
Yakama Nation Tribal Council
Confederated Tribes and Bands of the Yakama Nation
P.O. Box 151
Toppenish, WA 98948

Certified Mail
Return Receipts Required
7009-2250-0000-1562-5288

Dear Mr. Smiskin:

The Bonneville Power Administration (BPA) is nearing its deadline for comments regarding the Draft Environmental Impact Statement (DEIS) issued for the Whistling Ridge Energy Project. I would be interested in hearing from the Confederated Tribes and Bands of the Yakama Nation regarding your input to this project. I hope that you have had sufficient time to look at our DEIS and welcome any suggestions you may have. Additionally, I wanted to let you know that BPA has received concurrence to the Area of Potential Effects from the Washington State Historic Preservation Office regarding the location where our interconnection would take place if this proposed project were to move forward.

I welcome any questions and/or comments that you may have regarding this project. Please feel free to contact me directly at (503) 230-4145 or at ammontano@bpa.gov at any time.

Thank you for your interest in this project.

Sincerely,

/s/Andrew Montano 08-30-2010
Andrew M. Montaño
Environmental Project Manager – KEC-4

cc:
Ms. Kate Valdez, THPO
Mr. Johnson Meninick, Cultural Resources Program Manager
Ms. Lavina Washines, Yakama Nation

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Ms. V. Kate Valdez, THPO
Confederated Tribes and Bands of the Yakama Reservation
P.O. Box 151
Toppenish, WA 98948

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0058

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Ms. Valdez:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Confederated Tribes and Bands of the Yakama Nation
Established by the Treaty of June 9, 1855

Post Office Box 151
Toppenish Washington 98948

Andrew M. Montano
Environmental Protection Specialist
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

9/10/2010

RE: Proposed Whistling Ridge Energy Project Skamania County, Washington

Thank you for contacting Yakama Nation regarding the Proposed Whistling Ridge Energy Project. The Project is located within the Ceded Lands of the Yakama Nation, the legal rights to which were established by the Treaty of 1855, between the Yakama Nation and the United States Government. The Treaty set forth that the Yakama Nation shall retain rights to resources upon these lands and, therefore, it is with the assistance and backing of the United States Federal Government that Yakama Nation claims authority to protect traditional resources.

Yakama Nation does not agree with the APE defined by the Bonneville Power Administration (BPA). The Whistling Ridge Energy Project Draft Environmental Impact Statement (DEIS) implies that the Whistling Ridge project is dependent upon a BPA interconnection. Page 1-6 of the DEIS states,

> "*. . . it is critical to locate projects in areas were transmission lines currently exit. The Applicant thus needs to locate near exiting high-voltage transmission, such as the FCRTS.*"

Since the Whistling Ridge Project cannot proceed without BPA interconnection, we believe this project should be reviewed under NEPA, BPA involvement creating a federal nexus. Therefore, the appropriate APE for the BPA interconnection should include the entire Whistling Ridge Project area.

Yakama Nation CRP has provided both EFSEC and BPA information regarding the existence of Traditional Cultural Properties within the Whistling Ridge Project. We trust that prior to interconnection with this facility, BPA will ensure that Yakama Nation's concerns regarding the DEIS are addressed and that consultation regarding the identified cultural resources is completed.

If you have any questions, please feel free to contact me at 509-865-5121 x4737, or Yakama Nation Archaeologist, Jessica Lally at x4766.

Sincerely,

George Colby
Attorney for the Yakama Nation Executive Committee

RECEIVED
SEP 2 1 2010
ENVIRONMENTAL
FISH & WILDLIFE

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

Robert Whitlam, PhD.
State Archaeologist
Department of Archeology and Historic Preservation
1063 S. Capitol Way, Suite 106
Olympia, WA 98501

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5501

RE: **Proposed Whistling Ridge Energy Project, Skamania County, Washington**
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18
Log No.: 080910-26-BPA

Dear Dr. Whitlam:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed interconnection is a federal undertaking that has the potential to cause effects on historic properties and initiated consultation with your agency – the Washington State Office of Archeology and Historic Preservation. BPA also initiated consultation with The Confederated Tribes of the Umatilla Indian Reservation, The Cowlitz Indian Tribe, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission pursuant to 36 CFR 800.4(a)(4).

As acknowledged by your office on August 9, 2010, the Area of Potential Effects for the proposed interconnection will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The proposed interconnection is described below.

The proposed interconnection would include the construction of a new BPA substation located within the wind development's project area, which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional

transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This proposed interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. On September 10, 2010, BPA was contacted by The Confederated Tribes and Bands of the Yakama Reservation in which the Tribe expressed that the APE should include the proposed wind development (which encompassed some culturally-sensitive areas) in addition to the proposed interconnection. BPA met with representatives of the Tribe on May 2nd, 2011, to discuss the Tribe's request for an expanded APE. BPA discussed with the Tribe that BPA has no jurisdiction over siting of wind development facilities, a matter left to Washington EFSEC, and that BPA's APE is limited to the proposed interconnection.

After reviewing the findings of the cultural survey report, BPA finds that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this interconnection, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and the appropriate Tribes will be notified of any future findings.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosure:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington.

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

June 16, 2011

Mr. Andrew M. Montano
Environment, Fish & Wildlife
Bonneville Power Administration
PO Box 3621
Portland, Oregon 97208-3621

Re: Whistling Ridge Energy Substation Project
Log No.: 080910-26-BPA

Dear Mr. Montano;

Thank you for contacting our department. We have reviewed the professional archaeological survey report you provided for the proposed Whistling Ridge Energy Substation Project, Skamania County, Washington.

We concur with your determination of No Historic Properties Affected.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

dAVe Burlingame, Director
Cowlitz Indian Tribe
PO Box 2547
Longview, WA 98632

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5440

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Burlingame:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnections poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings. If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

Official File

June 2, 2011

In reply refer to: KEC-4

McCoy Oatman, Chairman
Cultural Resources Director
Columbia River Inter-Tribal Fish Commission
729 NE Oregon St., Ste 200
Portland, OR 97232

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5457

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Oatman:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings. If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

Official File

June 2, 2011

In reply refer to: KEC-4

Carey Miller, THPO
Cultural Resources Protection Program
Confederated Tribes of the Umatilla Indian Reservation
46411 Timine Way
Pendleton, OR 97801

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5464

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Ms. Miller:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings. If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

Official File

June 2, 2011

In reply refer to: KEC-4

Robert Brunoe, THPO
Confederated Tribes of the Warm Springs Reservation of Oregon
P.O. Box C
Warm Springs, OR 97761

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5471

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Brunoe:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings. If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño , June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

Official File

June 2, 2011

In reply refer to: KEC-4

Keith "Patrick" Baird, THPO
Nez Perce Tribe of Idaho
P.O. Box 305
Lapwai, ID 83540

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5488

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Baird:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes and Bands of the Yakama Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings. If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

Ms. V. Kate Valdez, THPO
Confederated Tribes and Bands of the Yakama Reservation
P.O. Box 151
Toppenish, WA 98948

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5495

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Ms. Valdez:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Umatilla Indian Reservation, The Nez Perce Tribe of Idaho, The Confederated Tribes of the Warm Springs Reservation of Oregon, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects for the proposed interconnection will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The proposed interconnection is described below.

The proposed interconnection would include the construction of a new BPA substation located within the wind development's project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This proposed interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require

several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. By letter dated May 27th, 2010, the Tribe submitted its Yakama Nation Cultural Resource Review and Consultation for the Whistling Ridge Energy Project. This report identified culturally-sensitive areas within the wind development's project area. By letter dated September 10, 2010, the Tribe expressed that the APE should include the proposed wind development (which encompassed the culturally-sensitive areas) in addition to the proposed interconnection. BPA met with representatives of the Tribe on May 2nd, 2011, to discuss the Tribe's request for an expanded APE. BPA discussed with the Tribe that BPA has no jurisdiction over siting of wind development's facilities, a matter left to Washington EFSEC, and that BPA's APE is limited to the proposed interconnection. BPA and the Tribe also discussed the Tribe's concerns about the culturally-sensitive areas in the wind development project area. We discussed BPA's lack of jurisdiction of siting authority in relation to placement of turbine strings. BPA agreed that it would disclose the Tribal concerns about these culturally-sensitive areas in our Final EIS, but BPA is unable to address these concerns as a matter of Section 106 consultation under the NHPA.

BPA recognizes that there are culturally-sensitive areas within the wind development's project area. However, for purposes of the proposed interconnection APE, based on all of the survey results, it is the opinion of the BPA Archaeologist that the proposed interconnection should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this proposed interconnection, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosure:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington.

Appendix E-3
BPA Section 7(a) Consultation Letters

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 8, 2010

In reply refer to: KEC-4

Mr. James Michaels
U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office
510 Desmond Drive SE
Lacey, WA 98503

Dear Mr. Michaels:

Bonneville Power Administration (BPA) is proposing to interconnect up to 70 megawatts (MW) of new wind energy from the proposed Whistling Ridge Energy Project onto the North Bonneville-Midway 230-kilovolt transmission line. This interconnection request was made by the SDS Lumber Company in Bingen, Washington, and interconnection would take place approximately five miles west of BPA's Underwood Substation in Skamania County, Washington. Subsequently, SDS Lumber Company created a new limited liability company called Whistling Ridge Energy LLC (WRE), which submitted an application with the State of Washington's Energy Facility Site Evaluation Council (EFSEC) for site certification on this wind facility project. WRE would finance, develop, own and operate the proposed wind project. The proposed wind facility would consist of up to approximately 50, 1.2- to 2.5-MW wind turbines up to 426 feet tall, as well as infrastructure such as newly-constructed and improved roads, transformers, underground collector lines, a substation, and an operations and maintenance facility.

The proposed Whistling Ridge Energy Project would be located on private land located approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington (*See* Figure 1). The Project would be located on commercial forestland in an unincorporated area of Skamania County, outside of the Columbia Gorge National Scenic Area. The Project Area encompasses approximately 1,152 acres in Sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in Section 13 of Township 3 North, Range 9 East.

To inform its decision on whether to allow the proposed interconnection, BPA is preparing a joint Environmental Impact Statement with the EFSEC as required under the National Environmental Policy Act (NEPA) of 1969, as amended. A species list for Skamania County, Washington, was obtained from the U.S. Fish and Wildlife Service (USFWS) web site (*http://www.fws.gov/wafwo/speciesmap/SKAMAN.html*) on December 30, 2009. Northern spotted owl (*Strix occidentalis caurina*) is listed as threatened, and designated critical habitat exists for this species within Skamania County. None of these species have been known to occur in the vicinity of the project site and there have been extensive surveys conducted as part of the

project permitting (See *Whistling Ridge Energy Project Draft Environmental Impact Statement May 2010, Chapter 3,* http://www.bpa.gov/go/whistling). BPA is seeking to initiate informal consultation under Section 7 of the Endangered Species Act (ESA) of 1973, as amended, to analyze the effects of both its actions and those of the developer on Northern spotted owl and their critical habitat because of the historic presence of Northern spotted owl core areas. Based upon collected information, BPA has determined that the proposed actions ***may affect but are not likely to adversely affect Northern spotted owl*** (*Strix occidentalis caurina)* or its critical habitat designated under the ESA. This letter provides documentation for this determination.

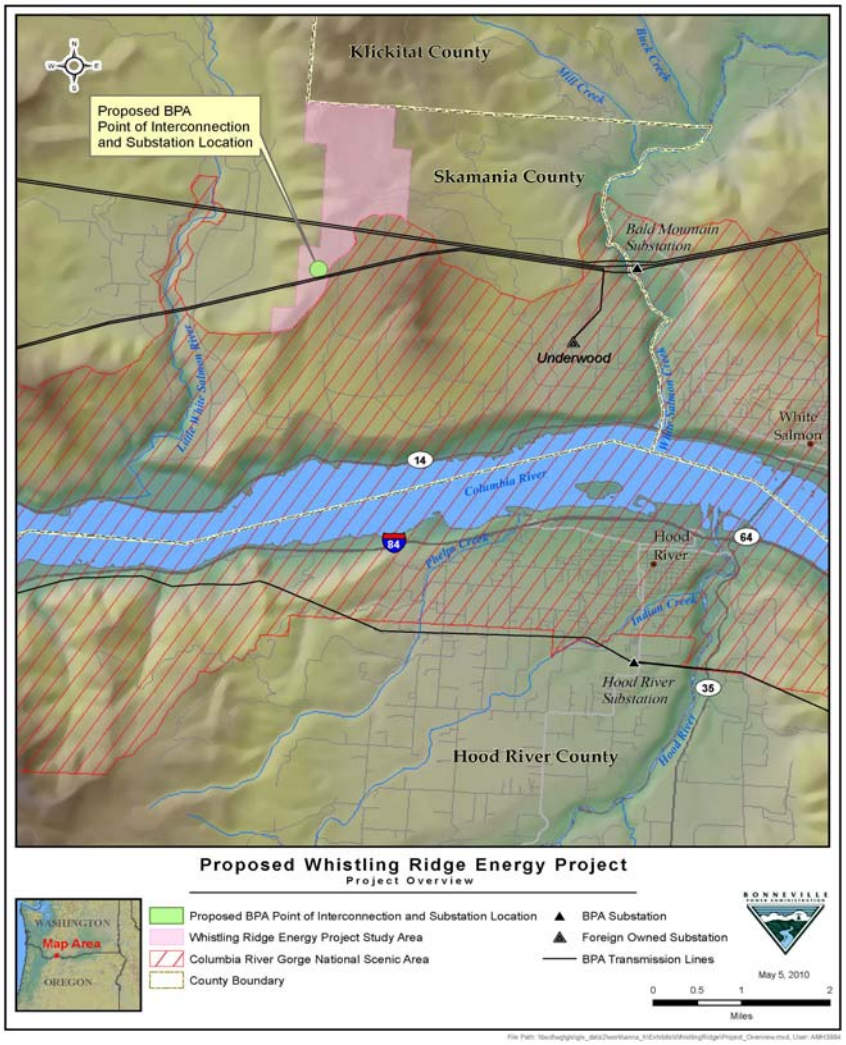


Figure 1. Whistling Ridge Energy Project Location.

EFFECTS DETERMINATION

Level of use of the Project Area by Northern spotted owl

Historically, Northern spotted owl activity cores were located on public lands (managed by Washington Department of Natural Resources (WDNR) and the U.S. Forest Service) to the north of the Project Area as seen in Figure 2. These owl cores were designated as the Mill Creek (MSNO#: 0991) and Moss Creek (MSNO#: 1003) cores and were located in Township 4 North and Range 10 East Section 28 and Township 4 North and Range 9 East Section 35, respectively. During both 2008 and 2009, surveys were conducted to these historically-used areas and no spotted owl observations or responses were recorded.

Surveys for the presence of Northern spotted owls were conducted during 2008-2009 within the Project Area. A total of 80 calling stations were established and surveyed during 2008 and no Northern spotted owl responses or observations were noted. Seven supplemental stations were added in 2009 adjacent to areas that were determined to have potential habitat. No observations or detections of Northern spotted owls at any of the 87 established calling stations were noted during 2009.

Northern spotted owl surveys were spread strategically throughout the nesting season in an attempt to see or hear spotted owls. The survey effort covered potentially suitable Northern spotted owl habitat within the approximately 22,123 acres of survey area. There were no Northern spotted owl observations or responses during any of the survey visits.

Additionally, surveys were conducted during the 2003-2004 survey periods. The project site was surveyed from March-July 2003 using the one-year survey methodology, and from March-August 2004 using the two-year survey methodology. USFWS protocol allows a six-visit survey followed by three-visit survey over two years to rule out northern spotted owls for the following two years (USFWS, 1992). No northern spotted owls were detected during the 2003-2004 surveys.

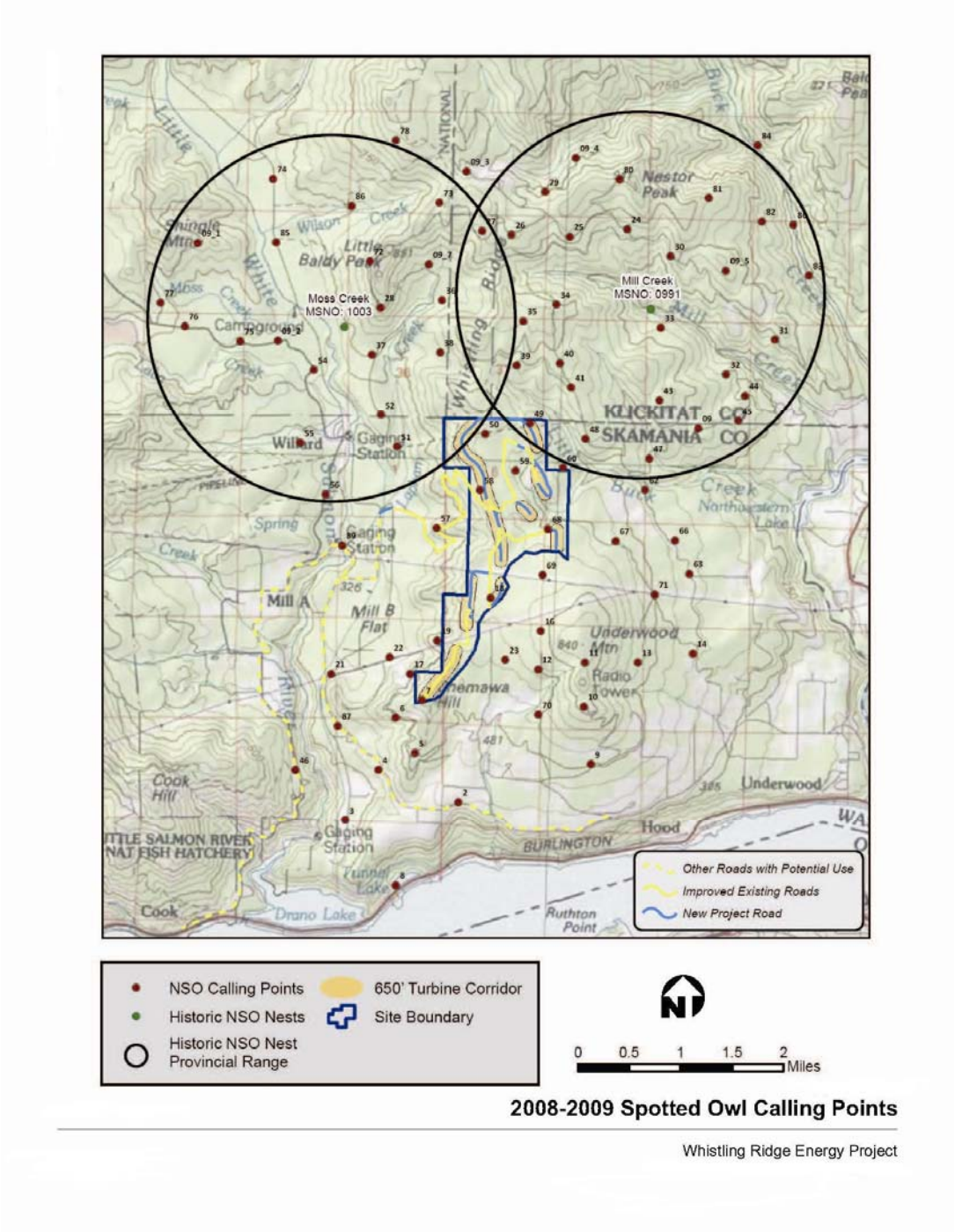


Figure 2. Locations of survey calling stations for Northern spotted owls during 2008-2009.

Effect of the Project on Northern spotted owl's primary food stocks, prey species, and foraging areas in all areas influenced by the Project

Reduction of suitable habitat poses a significant threat to the Northern spotted owl (habitat in which primary food stocks, foraging, and predation would occur). For the purposes of this Project, potentially suitable spotted owl habitat was determined to be coniferous stands with average tree DBH (diameter at breast height) greater than 12 inches and canopy closure of 60% or greater. These standards for suitable spotted owl habitat were based on the availability of forest stand classification GIS data obtained from SDS Lumber Company. The types of habitats required by spotted owls are typically not present over large areas on managed commercial forest lands. Areas that have been recently cut or areas of young conifer plantations that did not meet the minimum average DBH or canopy closure parameters were excluded from the 2008-2009 survey efforts mentioned above. The resulting designated survey areas did contain varying types of habitat that could potentially be used by spotted owls. With respect to the historical owl cores, data collected by the WDNR and by personnel from the National Council for Air and Stream Improvement (NACASI) indicated that no Northern spotted owl were detected in the Mill Creek core since the 2000 breeding season. Consequently, the Moss Creek core has not had a Northern spotted owl detected since the 2002 breeding season

During the 2008 and 2009 survey seasons, contract biologists recorded all owl species encountered and the sightings of or responses by potential Northern spotted owl predators. This included barred owls, great horned owls, northern goshawks and other raptor species. As stated above, no Northern spotted owl observations or responses were recorded. However, both of the historic Northern spotted owl cores showed an increased presence of barred owls. Based on the best available scientific information, competition from the barred owl (*Strix varia*) also poses a significant and complex threat to the Northern spotted owl.

Impacts from Project activities and implementation that may result in disturbance to Northern spotted owl and/or their avoidance of the Project Area

Whistling Ridge Energy LLC has sited its proposed project to avoid habitat areas deemed critical to the Northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no Northern spotted owls or activity centers present in the project area, no project construction or operation impacts are expected. Finally, the project would not impact the White Salmon spotted owl special emphasis area's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this project does not pose a risk of taking Northern spotted owls under Endangered Species Act Section 9.

Based on this information, BPA has determined that the proposed actions may affect, but is not likely to adversely affect the Northern spotted owl or its designated critical habitat. BPA is requesting your review on the information contained in this letter and your concurrence with our findings. Please contact me at (503) 230-4145, or e-mail ammontano@bpa.gov , if you have any questions or require additional information.

Sincerely,

/s/ Andrew M. Montaño, June 8, 2010
Andrew M. Montaño
Environmental Protection Specialist – KEC-4

Enclosure:
2009 Final Report – Results of Northern spotted owl, western grey squirrel and Northern goshawk surveys conducted for the Whistling Ridge Energy Project

Reference:
USFWS, 1992. Recovery plan for the Northern spotted owl. United States Fish and Wildlife Service.

cc: (w/o enclosure):
Jason Spadaro - SDS Lumber
SDS Lumber Company Business Office
P.O. Box 266
Bingen, WA 98605

Barbara Craig - Stoel and Rives
900 SW Fifth Avenue, Suite 2600
Portland, OR 97204

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

In Reply Refer To:
13410-2010-I-0447

JUL 19 2010

Mr. Andrew Montano
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Subject: Whistling Ridge Energy Project (Your Reference: KEC-4)

Dear Mr. Montano:

This letter responds to your request for consultation under section 7(a)(2) of the Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*) on the proposed Whistling Ridge Energy Project LLC (Project). Your biological assessment (BA), dated June 8, 2010, was received by the U.S. Fish and Wildlife Service's (Service) Washington Fish and Wildlife Office on June 9, 2010. You requested concurrence with your determination that the Project "may affect, but is not likely to adversely affect" the threatened northern spotted owl (*Strix occidentalis caurina)* (spotted owl). No designated spotted owl critical habitat occurs on or near the Project; therefore, no critical habitat will be affected.

This letter is based on information provided in the BA, the 2009 Final Report "*Results of Northern Owl, Western Gray Squirrel and Northern Goshawk Surveys Conducted for the Whistling Ridge Wind Energy Project*", the Draft Environmental Impact Statement, a field trip to the Project attended by staff of the Service and the Washington Department of Fish and Wildlife on May 14, 2009, and a meeting between Service and Washington Department of Fish and Wildlife staff on August 28, 2009.

Project Location

The proposed Project is located on private land, approximately 7 miles northwest of the city of White Salmon in Skamania County, Washington. The Project encompasses approximately 1,152 acres of land in sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in section 13 of Township 3 North, Range 9 East, Willamette Meridian.

TAKE PRIDE® IN AMERICA

Summary of the Proposed Action

The Bonneville Power Administration (BPA) is proposing to interconnect up to 70 megawatts (MW) of new wind energy from the proposed Project to the North Bonneville-Midway 230-kilovolt transmission line. The interconnect would occur at a new sub-station to be built about 5 miles west of BPA's Underwood Substation in Skamania County. The interconnect was requested by the Project proponent, SDS Lumber Company, in Bingen, Washington. The SDS Lumber Company has created a new limited liability company called Whistling Ridge Energy LLC (WRE) that would finance, develop, and operate the Project. The Project is expected to operate for at least 30 years. The proposed Project would consist of no more than 50, 1.2 MW- to 2.5- MW wind turbines up to 426 feet tall, as well as infrastructure such as newly constructed and improved roads, transformers, underground energy-collector lines, a substation, and an operations and maintenance facility. The Project area consists of 1,152 acres of mostly commercial forests in various age categories, of which 384 acres would be disturbed by the Project, and all but 61 acres would remain in commercial forest. Most of the property where the turbine strings are planned has been recently clear-cut harvested and will be further disturbed with the development of the turbine pads.

Status of Spotted Owls in the Project Area

Two spotted owl territories are located on Washington State Department of Natural Resources (DNR) and National Forest lands located north of and adjacent to the Project. The site center for the Mill Creek owl (MSNO#0991) is located in Township 4 North, Range 10 East, Section 28 and the site center for the Moss Creek owl (MSNO#1003) is located in Township 4 North, Range 9 East, Section 35. Both of these owl territories are within Washington State's White Salmon Spotted Owl Special Emphasis Area, which provides added protection for spotted owls located on private lands through the Washington State Forest Practices Rules. Both of the 70 acre core areas are located on DNR lands and are provided additional protection from their Habitat Conservation Plan for the State Trust Lands.

The estimated median annual home range size for the spotted owl in this physiographic province is approximately 6,657 acres, which for regulatory purposes is assumed to lie within a 1.8-mile radius circle. Best available science indicates that when the amount of suitable spotted owl habitat within a circle falls below 40 percent, there is a likelihood of "take" under section 9 of the ESA. Each of these territories contains more than 40 percent suitable spotted owl habitat (J. Spadaro pers. com. 2009). A small portion of the Moss Creek circle overlaps the northern end of the Project and contains dispersal habitat and some foraging habitat. However, removal of this small amount of habitat (2 acres) would not reduce the habitat acreage below 40 percent in either territory.

Protocol spotted owl surveys were conducted within these estimated home ranges during the 2003, 2004, 2008, and 2009 breeding seasons. Numerous barred owls *(Strix varia)* were detected, but no spotted owls were detected; however, because of the presence of barred owls with these territories, it is possible that spotted owls were present but did not vocalize. The 2009 surveys followed the Service's revised 2010 protocol to better elicit spotted owl responses in the presence of barred owls (USFWS 2010) (the consultant contacted the U.S. Fish and Wildlife

Service on May 29, 2009, how to call for spotted owls in light of the numerous barred owl detections north of the Project and was provided the changes to the 1992 surveying protocol prior to the release of the 2010 revised protocol on February 18, 2010). However, in 2010 surveys were continued in the Project area. On May 6, 2010, a single male spotted owl was detected while conducting a night visit in the far north edge of the Mill Creek provincial range on DNR property. On May 7th, the biologist conducted a follow-up visit during the daytime. The bird exhibited non-nesting behaviors. On May 29, the biologist conducted a second visit and located what appeared to be the same male owl that was detected on May 7th. The bird on both survey visits took and consumed mice, indicating that it is a single male not supporting young. Spotted owl survey protocol requires 3 sightings of a spotted owl single within the same area within the breeding season to be regarded as a territorial single. This does not change the analyses of effects of the Project to spotted owls, as addressed below, regardless of whether or not a territorial status is established.

Effects from Construction

Approximately 2 acres of spotted owl dispersal habitat (with some patches of foraging habitat) would be removed from the Moss Creek spotted owl site by the construction of the Project from the northern end of the turbine string. This habitat is located at the southern extremity of the circle and is on the edge of the Project that has already been clear-cut by SDS Lumber Company, and would not remove suitable spotted owl habitat below 40 percent in the territory (J. Spadaro pers. com. 2009). The discovery of the new owl in 2010 in the extreme north of the Moss Creek owl circle is located more than 2 miles northwest of the northern most turbine. Because of this, and since the remainder of the Project does not contain suitable spotted owl habitat, we believe that potential effects to spotted owls as a result of habitat loss or degradation is expected to be insignificant.

Effects from Maintenance

The effects of the operation and maintenance of the Project are anticipated to be minor. Maintenance of the Project would occur primarily around the turbine pads, inside the nacelle (the nacelle is the part of the turbine that houses the generator, transmission gears, and the shaft that turns the generator that, on its opposite end, bolts to the hub that the blades attach to) and the blades. In addition, because the landscape will be maintained as young second-growth forest we do not expect disturbance to nesting owls from maintenance because owls are not likely to nest in these younger forest stands (non-habitat).

Risk of Spotted Owl Collision with Wind Turbines

Bird mortality from collisions with wind turbines is well documented and varies greatly by bird species and flight behavior (Smallwood et al. 2009). Spotted owls are forest-dwelling birds that are strongly associated with older conifer forests. Spotted owls primarily use closed-canopy forested habitats throughout their entire lives for nesting, roosting, foraging, and dispersal (Forsman et al. 1984). Because spotted owls are non-migratory, forest-dwelling owls, they are at much lower risk of exposure to wind turbines than many other bird species, which typically use non-forested upland habitats for foraging and migration.

Spotted owls less commonly use recent clear-cuts or burned areas for foraging, but spotted owls do occasionally cross such areas while dispersing between patches of older forest (Forsman et al. 1984; 2002). Although spotted owls do occasionally disperse across open areas, they usually avoid crossing such areas by travelling through corridors of forested habitat (Forsman et al. 1984). The typical flight behavior of the spotted owls is described in the *Birds of North America*:

> "Quick wingbeats interspersed with gliding flight. Not a fast flier. Long flights unusual except during dispersal…Flight labored when attempting to fly to a higher perch or up to nest sites. When gaining altitude in the forest canopy, makes a series of short climbing flights rather than continuous flight. Flights above the forest canopy probably rare except during dispersal. (Gutierrez et al 1995, p. 9)."

During natal dispersal, spotted owls will occasionally cross open areas and, as noted above, may occasionally fly above the level of the forest canopy. Considering spotted owl flight behavior, above-canopy flights are most likely to occur in steep-walled valley settings, where the spotted owl may choose to fly across a valley above the level of the forest canopy on the valley floor. The Whistling Ridge site is located on a forested ridge top that will be maintained as a cleared area for the wind turbines. Spotted owls dispersing across the ridge are more likely to disperse through forested areas along the perimeter of the site, rather than crossing the open areas near the turbines. If a spotted owl were to fly through the turbine array, it would most likely cross at an altitude that is at or below the level of the adjacent forest canopy, and well below the height of the lower of the wind turbine blades (164 – 425 ft. above ground level).

To assess the risk of owl collision with the turbine blades or towers, we convened a review panel of three spotted owl biologists from this office and one spotted owl biologist from the Washington Department of Fish and Wildlife. Based on our knowledge of spotted owl flight behaviors and habitat preferences, the group concluded that the risk of spotted owl collisions with turbines at this site is low.

Considering the strong association of spotted owls with the forest canopy, and spotted owl flight behaviors, we conclude that it is unlikely that spotted owls would cross the Whistling Ridge site at an altitude that would put the owls at risk of collision with turbine blades. Therefore, the risk of a spotted owl collision at this site is considered to be discountable.

Concurrence

Considering the current status of spotted owls in the Project area, and the anticipated Project effects, we concur that the Project is not likely to adversely affect the spotted owl.

This concludes informal consultation pursuant to the regulations implementing the ESA (50 CFR 402.13). This action should be re-analyzed if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to a listed species or designated critical habitat that was not considered in this consultation; and/or, if a new species or critical habitat is designated that may be affected by this Project.

Other Comments

While reading through the DEIS for this Project, we found some issues that require your attention. On Page 4-4, first paragraph, last sentence "As described in Section 3.4 Biological Resources, no listed species or critical habitat are anticipated to be affected by the Project. This statement equates to a finding of no effect. To the contrary, the biological assessment prepared by BPA made a finding of "may affect, not likely to adversely affect"; hence, the need for this informal consultation.

On page 4-5, 4.5 Migratory Bird Treaty Act, both the interpretation of this Act and the effects of the Project to avian species are in error. Both avian studies and the analyses in Section 3.4 Biological Resources state that many avian species occur within the Project and that some of those individuals will be killed (collisions with blades or tower) and contrary to the statements provided in the Biological effects Section. Within this context, how is it concluded at 4.5, that impacts to migratory birds could only occur through temporary disturbance during construction?

On page 4-5, 4.7 Bald Eagle Protection Act, the last statement "Because the Project would not involve intentional acts or acts in wanton disregard of bald or golden eagles, this Project is not considered to be subject to compliance with the Act.", is an inaccurate statement. Federal Law Enforcement and the U.S Department of Justice decide whether or not an eagle killed by a project is subject to compliance under this Act.

The Service appreciates your efforts to protect listed species and the habitats on which they depend while meeting your mission to provide the public with reliable electricity. If you have any questions regarding this consultation or your responsibilities under the Act, please contact Jim Michaels of this office at (360) 753-7767.

Sincerely,

James L Michaels

Ken S. Berg, Manager
Washington Fish and Wildlife Office

LITERATURE CITED

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. Wildlife Monographs 87:1-64.

Forsman, E.D., R.G. Anthony, J.A. Reid, P.J. Loschl, S.G. Sovern, M. Taylor, B.L. Biswell, A. Ellingson, E.C. Meslow, G.S. Miller, K.A. Swindle, J.A. Thrailkill, F.F. Wagner, and D.E. Seaman. 2002. Natal and breeding dispersal of northern spotted owls. Wildlife Monographs 149:1-35.

Gutierrez, R.J., A.B. Franklin, and W.S. Lahaye. 1995. Spotted owl (Strix occidentalis). In: The birds of North America, No. 179 (A. Poole and F. Gills, eds.). The Academy of Natural Sciences, Philadelphia, and the American Ornithologists' Union, Washington, D.C.

Smallwood, K.S., L. Rugge, and M.L. Morrison. 2009. Influence of behavior on bird mortality in wind energy developments. Journal of Wildlife Management 73(7) 1082-1098.

Spadaro, J. 2009. Personal Communication with Jim Michaels with USFWS at site visit, May 14, 2009.

USFWS (U.S. Fish and Wildlife Service). 2010. Draft 2010 Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls, Version 1.0, February 18, 2010.

Appendix F
Consultant Disclosure Statements

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) __X__ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Chris Watson, Principal
Printed Name and Title

GeoDataScape Inc.
Company

4/20/2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Dale W Bennett
Signature

Dale W Bennett Sr Land Use Planner
Printed Name and Title

URS corporation
Company

4/13/2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

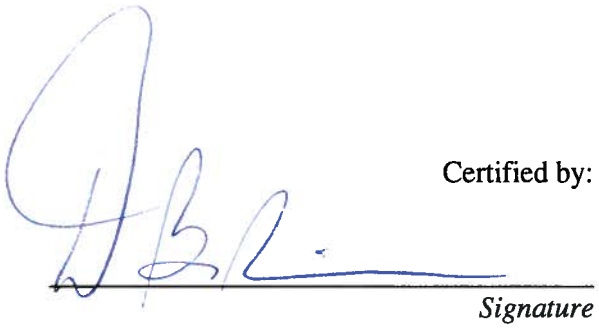
(a) ___X___ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Dan B. Meier Licensed Engineering Geologist
Printed Name and Title

URS
Company

April 15, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

A. David Every
Signature

A. David Every, Principal Ecologist
Printed Name and Title

URS Corporation
Company

4-13-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

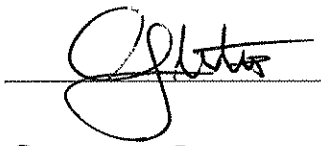
(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Eliza Ghitis, Geomorphologist
Printed Name and Title

Entrix, Inc.
Company

April 19, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Jeremy Pratt
Signature

Jeremy Pratt, Vice President
Printed Name and Title

ENTRIX
Company

4/13/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Jan Axtmann
Signature

Jan Axtmann Senior Project Scientist
Printed Name and Title

Entrix, Inc.
Company

4/13/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

R Tamignaux
Signature

Rachel Tamignaux, Project Coordinator
Printed Name and Title

Cardno ENTRIX
Company

6/7/2011
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

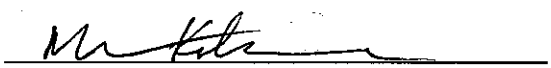
(a) ____X____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Melissa Klungle____Senior Staff Scientist
Printed Name and Title

__Cardno/Entrix_____
Company

_____06/07//11_____
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

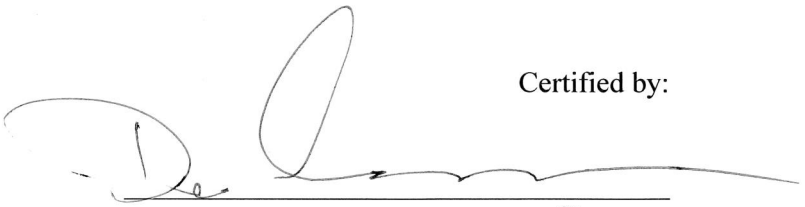
(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Deron Lawrence, Ecologist

Printed Name and Title

CH2M HILL

Company

7 June 2011

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Darcey B. Miller
Signature

Darcey B. Miller, Wetland Scientist
Printed Name and Title

Cardno ENTRIX
Company

6/7/11
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

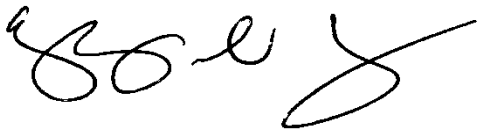
(a) ___X_____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



_____
Signature

Bradford L. Boyes, Sr. Air Quality Engineer
Printed Name and Title

Cardno ENTRIX
Company

June 7, 2011
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Signature

Ryan Shatt - Geologist
Printed Name and Title

ENXCO, Inc.
Company

4/13/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

David Harvey
Signature

David Harvey Senior
Printed Name and Title

Project Scientist ENTRIX
Company

4/12/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Sandra J. Slayton
Signature

SANDRA J. SLAYTON
Printed Name and Title

ENTRIX
Company

04-13-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Kirk Ranzetta
Signature

Kirk Ranzetta, Architectural Historian
Printed Name and Title

ENTRIX, Inc.
Company

April 12, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Chelsea Ayala, Senior Project Scientist

Printed Name and Title

ENTRIX INC.

Company

4-13-10

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Lucy Flynn Zuccotti
Signature

Lucy Flynn Zuccotti, Proj. Archaeologist
Printed Name and Title

ENTRIX
Company

4-14-2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ___X___ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Gretchen Lebednik
Signature

Gretchen Lebednik Senior Project Scientist
Printed Name and Title

ENTRIX, Inc.
Company

4/15/2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

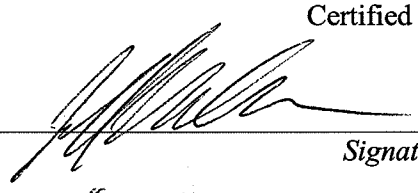
(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Jeff Walker, Biologist

Printed Name and Title

URS

Company

4/12/10

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Jeff Reams

Signature

Jeff Reams CEO

Printed Name and Title

Turnstone ECI

Company

4/12/10

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Katie Carroz
Signature

Katie Carroz, Socioeconomist
Printed Name and Title

Carroz Consulting LLC
Company

4-12-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Katy Chaney
Signature

Katy Chaney, Vice President
Printed Name and Title

URS Corporation
Company

April 12, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

MARK STORM (SENIOR PROJ. ENGR.)
Printed Name and Title

URS CORPORATION
Company

4/14/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

LOUISE KLING

Printed Name and Title

URS CORPORATION

Company

04-12-2010

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

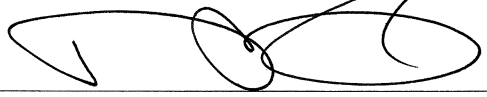
(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

DAVIS PEARSON – PLANNER

Printed Name and Title

URS CORPORATION

Company

4/12/10

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ___X_____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



_____
Signature

Sarah McDaniel, Archaeologist
Printed Name and Title

URS Corporation
Company

April 13, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

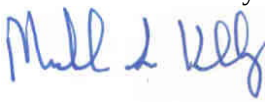
(a) ___X_____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



_____
Signature

Michael Kelly, Senior Archaeologist
Printed Name and Title

URS Corporation
Company

April 15, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Karen Kronner
Signature

President
Printed Name and Title

Northwest Wildlife Consultants, Inc
Company

4-12-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Robert Gritski
Signature

Robert Gritski
Printed Name and Title

Northwest Wildlife Consultants, Inc
Company

4-14-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Scott Downes
Signature

Scott Downes – Wildlife Biologist
Printed Name and Title

Northwest Wildlife Consultants, Inc.
Company

04-11-2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ____X___ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



_____
Signature
Tamara Enz, Biologist

_____
Printed Name and Title
WEST, Inc.

_____
Company
04/12/10

_____
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:



Signature

Gregory Johnson Senior Manager

Printed Name and Title

Western Eco Systems Technology Inc.

Company

4-12-10

Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Kimberly J Bay
Signature

Kimberly J. Bay
Printed Name and Title

WEST Inc.
Company

4/12/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _____ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Jeffery Gruver
Signature

Jeffery Gruver Research Biologist
Printed Name and Title

Western EcoSystems Technology, Inc.
Company

12 April 2010
Date

ENERGY FACILITY SITE EVALUATION COUNCIL
August 2011

Whistling Ridge Energy Project

Final Environmental Impact Statement

Appendix G

August 2011



Washington State Environmental Policy Act Lead Agency:
State of Washington, Energy Facility Site Evaluation Council

APPENDIX G – RESPONSE TO COMMENTS

TABLE OF CONTENTS

INTRODUCTION G-3

G.1 SUMMARY AND PURPOSE OF AND NEED FOR ACTION G-5

G.2 PROPOSED ACTION AND ALTERNATIVES G-72

G.3 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION G-103

G.3.1 EARTH G-103

G.3.2 AIR QUALITY G-119

G.3.3 WATER RESOURCES G-136

G.3.4 BIOLOGICAL RESOURCES G-146

G.3.5 ENERGY AND NATURAL RESOURCES G-284

G.3.6 PUBLIC HEALTH AND SAFETY G-321

G.3.7 NOISE G-330

G.3.8 LAND USE AND RECREATION G-356

G.3.9 VISUAL RESOURCES G-371

G.3.10 HISTORICAL AND CULTURAL RESOURCES G-444

G.3.11 TRANSPORTATION G-455

G.3.12 PUBLIC SERVICES AND UTILITIES G-470

G.3.13 SOCIOECONOMICS G-471

G.3.14 MITIGATION MEASURES G-510

G.3.15 CUMULATIVE IMPACT ANALYSIS G-519

G.4 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMITTING REQUIREMENTS G-570

G.4.1 ENDANGERED SPECIES ACT G-570

G.4.2 MIGRATORY BIRD TREATY ACT G-571

G.4.3 STATE, AREA-WIDE AND LOCAL PLAN & PROGRAM CONSISTENCY G-571

G.4.4 COLUMBIA RIVER GORGE NATIONAL SCENIC AREA ACT G-572

G.5 DISTRIBUTION LIST G-592

G.6 LIST OF PREPARERS G-592

G.7 GENERAL COMMENTS G-593

INDEX G-668

FIGURE G-1 ..... G-22

INTRODUCTION

This Appendix presents and responds to all substantive comments received during the public comment period for the Whistling Ridge Energy Project Draft Environmental Impact Statement. The substantive comments and their respective responses are organized and presented by topic or subject area following the organization of this EIS (based on the topic of the comment received). Each comment is identified by the following notation: *[LRT X, CMT X]*. Each letter that was received by both BPA and EFSEC was given a numerical letter identifier (*LTR X*). Furthermore, each substantive comment within each letter was given a numerical comment identifier (*CMT X*). Non-substantive comments (general comments) and their respective responses that were received for this proposed project begin on page 593 of this Appendix.

An index to Appendix G is provided to facilitate the identification of the numerical identifier of each letter. A table of contents to Appendix G is provided to present the topic chapter organization of the comments and their responses, as well as what page these topics can be found on. If a reader is interested in a particular issue or topic, they should refer to the table of contents of Appendix G. If a reader is interested in learning what letter number their comment letter was assigned, they should refer to the index of Appendix G. A digital copy of this Appendix can be downloaded from the project website, *http://www.bpa.gov/go/whistling*. By downloading a copy of this Appendix, the viewers may search for their parsed comments within the Appendix using the search function to locate references to their particular letter notation (*LTR X*). You may also request a digital copy of this Appendix by calling 1-800-622-4520 and asking for the document by name. Or, requests for electronic copies can be obtained by writing to:

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208
ATTN: Public Affairs Office – DKE-7

All comment letters received by both Agencies can be viewed in Appendix H of the EIS. Combined, both Agencies received the following amount of comments from the public's review of the Draft Environmental Impact Statement:

- 320 individual letters were received (not counting duplicate form letters).
- 608 letters were received (counting form letters from different individuals).
- 2,168 parsed comments were sent out for response and are addressed in this Appendix.

This page intentionally left blank.

G.1 SUMMARY AND PURPOSE OF AND NEED FOR ACTION

Comment: *Why did you decide this was the best spot? [LTR 22, CMT 2]*

Response: The lead agencies believe that the DEIS presented a reasonably thorough discussion of the consideration of alternatives for the proposed action, including why alternative locations were not being further studied. The reasons that the Applicant proposed the Project at this particular location are explained in Sections 1.4.1 and 2.3 of the EIS. As discussed in these sections, a variety of factors were considered in evaluating whether alternative locations might be feasible. To further clarify this consideration, Section 2.3.1 of the EIS has been revised to provide additional information on alternative locations that were considered for the proposed Project. Issues raised concerning alternative configurations for the proposed Project are addressed in other response to comments in this section.

Comment: *Why are other spots not as desirable? [LTR 22, CMT 3]*

Response: Please see response to Comment LTR 22, CMT 2 above.

Comment: *Why are they [the turbines] placed so that the majority of the central gorge will be seeing them? [LTR 22, CMT 5]*

Response: The concerns over turbine corridor A1-A7 are noted. As discussed in the EIS, however, the Project has been proposed as an "integrated whole", meaning essentially as a single power plant, not as a dissectible project where some turbines may be eliminated. An alternative that would eliminate turbine corridor A1-A7 therefore was considered and eliminated from further study. Nonetheless, in determining whether to issue a site certificate and enter a site certificate agreement for a proposed generation project, it is within authority of the State of Washington to condition approval of the proposed Project, consistent with RCW 80.50 and other applicable state statutes. In the draft certification agreement, EFSEC is empowered to include "conditions to protect state or local governmental or community interests affected by the construction or operation of the energy facility." See RCW 80.50.100. These conditions essentially serve to mitigate potential environmental or social impacts of the proposed Project. Accordingly, certain conditions, such as limiting the location of proposed turbine corridors, could be considered as a condition for Project approval (i.e., as a form of mitigation related to the Project's potential impacts).

Comment: *From an economic perspective, the wind farm is supposed to generate power for 20,000 homes. This seems like very few homes for the cost, environmental impact, and degradation of a rural landscape. What would the cost be of conservation efforts to save the equivalent about of energy? We would assume that it would cost far less to save an equivalent*

amount of power by practicing state of the art energy conservation measures than by generating new energy using wind turbines. Let's look at the real costs of wind power! We are residents of the Columbia Gorge and we oppose this project. [LTR 33, CMT 6]

Response: As discussed in Chapter 1 of the EIS, the lead agencies need to respond to an application and request to site and interconnect a proposed wind project. While conservation could help meet the region's need for power, it would not be responsive to the Applicant's proposal to develop a wind project. Although conservation is not an alternative to the agencies' proposed actions, it is acknowledged in the EIS as a likely method by which energy needs in the region could be met if the No Action alternative was selected.

Comment: *The DEIS erred in its analysis of the regional need for new sources of renewable energy. The DEIS cites the Draft Sixth Northwest Power Plan released in September 2009 by the Northwest Power and Conservation Council. What the DEIS fails to quantify is that this 20-year energy plan for our region concluded that, although population and energy demands will continue to grow in the Pacific Northwest, we can meet 80 percent of expected future energy demands through conservation efforts and improved energy efficiency. Conservation efforts not only have less environmental impact than building new energy sources, they are also considerably less expensive. Only about 20 percent of future needs must come from new sources of energy, according to the Council. And shown above, with 40 wind projects already constructed or proposed for this region, there are plenty of new sources to meet these needs. There is no demonstrated need for Whistling Ridge. The dirty little secret of wind power in the Columbia Plateau Ecoregion is that most of the electricity being generated here by wind turbines is not needed or used in the Pacific Northwest. Instead it is sold to utilities in California. There is regional need for new power sources; there is simply a California demand for electricity generated in Washington and Oregon. On page 3-91 of the DEIS, the applicant claims that the Klickitat County Energy Overlay Zone Final EIS "recently evaluated the projected energy demand in Klickitat County, Washington, the county immediately adjacent to Skamania County." (In fact, this evaluation is already more than six years old). The DEIS then mentions the EIS projection that "four wind power projects with total generating capacity of 1,000 MW" will be developed in Klickitat County by 2024. In fact, Klickitat County has already approved more than a dozen projects, with a total generating capacity of almost 2,000 megawatts. Rather than suggesting that more energy is needed regionally, this rapid development of wind power in Klickitat County indicates that more than enough wind power is already under development to meet the region's energy needs. [LTR 36, CMT 9]*

Response: The EIS analyzes the potential impacts of the proposed Project and is not intended to analyze regional need for renewable resources. Information presented in the EIS concerning the Northwest Power Plan is intended to provide context for the applicant's belief that there is sufficient need to support its proposal. The commenter's interpretation of the Northwest Power Plan and its relation to the Applicant's stated need for the Project is acknowledged.

Comment: *Thank you for the opportunity to comment on the DEIS for Whistling Ridge. After reading though this document, I was struck by the generic and generally outdated content. I understand the need to plagiarize other EIS's to lessen preparation efforts; however, it does worry me that this project is not being looked at for the uniqueness of this site, and the natural and scenic resources. [LTR 60, CMT 1]*

Response: The opinions of the commenter concerning the completeness and adequacy of the DEIS are noted. EFSEC and BPA believe that the DEIS contains a reasonably thorough analysis of the potential environmental impacts of the proposed Project, as required by SEPA and NEPA. As discussed in the DEIS, environmental information was compiled based primarily on site-specific field studies, literature reviews, and communications with various knowledgeable resource agencies. Any assumptions made in the analysis were explained to the extent appropriate, and every attempt was made to use the most current data and information reasonably available. Specific issues with the DEIS analysis that are raised in these comments are addressed in the appropriate sections of these responses to comments.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. [LTR 66, CMT 4]*

Response: The opinions of the commenter concerning the sufficiency of the DEIS are noted. EFSEC and BPA believe that the DEIS contains a reasonably thorough discussion of the potential environmental impacts of the proposed Project and allows for meaningful analysis of the Project and its impacts, as required by SEPA and NEPA. As such, the lead agencies believe that a supplemental draft EIS is not necessary. As discussed throughout these responses to comments, appropriate clarifications and modifications to the EIS analysis as a result of public comment are contained in the Final EIS for this Project, as allowed under both SEPA and NEPA.

Comment: *I also request that EFSEC and BPA extend the comment period in order to allow the public sufficient time to review and comment on the 1,578 pages of material contained in the DEIS and appendices. Please extend the comment period by 45 days. [LTR 66, CMT 5]*

Response: BPA and EFSEC initially allowed a 45-day public review and comment period for the DEIS, which is consistent with NEPA and SEPA regulations for allowing adequate time for DEIS review and comment. In order to further facilitate public involvement however, the lead agencies agreed to extend the end of the original comment period (July 19, 2010) for an additional 39 days (to August 27, 2010), thereby allowing a total of 91 days for public review and comment on the DEIS. The lead agencies provided timely and broad distribution of the DEIS, wide noticing, web postings, and periodic updates to ensure sufficient public awareness of the DEIS and comment period. The lead agencies also posted the DEIS on the agencies' websites and held public meetings on the DEIS to ensure that the public was provided with opportunities for involvement.

Comment: *Please hold another hearing, give us more than 3 weeks to analyze 1500 pages of technical material. [LTR 67, CMT 1]*

Response: EFSEC and BPA held two public meetings in mid June 2010 to receive comments on the DEIS. In addition, as discussed above, EFSEC and BPA provided a 91-day public review and comment on the DEIS (i.e. May 28, 2010 to August 27, 2010). EFSEC and BPA believe this provided sufficient opportunities for public review and comment.

Comment: *The applicant says that he cannot go below 70mW and is trying to disguise his unwillingness to minimize this project by saying that public utilities seeking to fulfill their RPS requirements need a minimum of this kind of output "to be attractive." [LTR 74, CMT 3]*

Response: As discussed in Section 2.3.2 of the EIS, the Applicant considers a 70-MW project as the minimum size required to make the proposed Project economically feasible. In addition, the Applicant believes this is the minimum size needed for utilities looking to fulfill RPS requirements, based on the Applicant's assessment of other wind projects that have successfully entered purchase agreements with utilities seeking to meet RPS requirements. The lead agencies believe these are reasonable requirements for the proposed Project.

Comment: *Pg. 1-7 states that "No other federal agencies have been identified as cooperating agencies for this EIS at this time." Cooperating, hmmm, is that because the NPS and FS have made concerned negative comments about this proposal as it now is written. [LTR 74, CMT 4]*

Response: No federal agencies are cooperating agencies for this EIS because no such agencies have formally expressed an interest in acting as a cooperating agency. As is noted in Chapter 1 of the EIS, however, the lead agencies, along with the Applicant, have conducted extensive outreach to various federal, state, local, and tribal agencies and entities to help identify any issues concerning the proposal to be addressed in the EIS.

Comment: *On [DEIS] page 1-8 it states that "Other federal, state or local agencies also may have permitting or other approval authority for the proposed Whistling Ridge Energy Program. Those agencies may use this EIS in order to fulfill NEPA or SEPA responsibilities." Those agencies have an obligation to the public to do their own due diligence and evaluations, not depend on the project proponent's potentially biased data. This EIS states that the BPA substation would cover "4.25 acres and be sufficient for future installation of equipment if required for future development." What kind of future development -- 50 more wind turbines? I am concerned with scope creep. With the national and state mandates on "going green" I can see how once they are in, it would be much easier to expand the number of turbines. I don't want to see this project look like the Klickitat projects [LTR 74, CMT 6]*

Response: A summary of the required permits and approvals for the proposed Project and the responsible federal, state or local agencies can be found in Table 4-1 in Section 4.0 of the EIS. Section 4.1 also describes the statutes under NEPA and SEPA that require state and federal agencies to "take action to assess, consider, and disclose the potential impacts of their proposed actions on the environment." While other federal, state or local agencies may choose to use this EIS to help fulfill their NEPA or SEPA responsibilities, those agencies would be responsible for independently evaluating the information and analysis it contains to determine if this EIS satisfies their regulatory responsibilities. Those entities may determine that additional studies, review or public involvement are required to satisfy their requirements. There are currently no future requests in BPA's interconnection queue for new generation to interconnect at BPA's proposed new substation, and the transmission lines in the area will be near capacity if the decision is made to interconnect the generation from the proposed Project. The operation of the FCRTS within BPA's Balancing Authority often necessitates changes, upgrades or expansions to existing electrical yards and components in response to regional operational changes or adjustments. In the event that BPA receives future requests to interconnect electrical generation or determines a need to make changes to the proposed substation in response to the operation of the FCRTS, the resulting federal action would require an independent review under NEPA.

Comment: *During a brief review of the referenced document, I was startled to note the appearance throughout, of a distinct bias. Right off the bat, in [DEIS] section 1.2.3.3, a discourse of almost a full page of text - five paragraphs worth - is entitled "Business Needs of the Applicant." No-one's "business need" is appropriate material for discussion in any EIS document, for what, I hope, are obvious reasons. (Only in a totalitarian regime is the "need" or desire of an individual more important than large-scale human, wildlife and scenic resources.) The only material in this section that is relevant- that dealing with the large number of temporary construction jobs that would result, and the small number of permanent jobs after project completion belongs elsewhere. [LTR 76, CMT 2]*

Response: The lead agencies believe that it is appropriate that the EIS identify the Applicant's stated reasons for proposing its wind project. These reasons help provide context for why the Applicant has made its proposal, and what objectives it hopes to achieve through its proposal.

Comment: *I plan to submit a lengthier statement dealing with additional issues by the July deadline. Thank you for the opportunity to comment, if only in a cursory manner. I realize that it would take a great deal of your time, but it would be wonderful if a more generous amount of time were allotted to speak, especially on an issue with so many facets of concern. [LTR 76, CMT 12]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *Amid the draft's generally lucid narrative is the following mysterious sentence on page 1-9: "The site has a long history of commercial logging and associated absence of native habitat, reducing or eliminating the need to clear additional forest land." Could someone decipher that for us? [LTR 79, CMT 13]*

Response: The Applicant has owned this land since the 1940s and prior to their ownership, the Project Area has been actively logged since the early 1900s. Areas of Development that are being proposed can be further broken down on Table 2-1. Current forest types within the Project Area are described on Figure 2-2 and harvesting schedules are described on Figure 2-3. The summation sentence referenced on DEIS page 1-9 as commented upon is pointing out that additional forest clearing may not necessarily be needed due to the current forest types currently seen within the Project Area as well as tree harvest schedules.

Comment: *We submitted Scoping comments, dated 5/15/2009, for this EIS. After reviewing the DEIS, we are of the opinion that, while the DEIS contains massive amounts of information on topics related to the issues we raised, the DEIS fails to directly address and respond to most of our concerns in a meaningful way. We have therefore resubmitted our previous comments in their entirety, and request that EFSEC and BPA revise the DEIS to respond directly and specifically to the concerns that our community has. Our residents have invested significant amounts of time, energy, money, and especially emotion in building homes and lifestyles focused on our rural, sylvan environment. While we have always known we would be affected by various rural activities such as agriculture and timber operations, we never anticipated that a major industrial activity like a wind farm could be located so near to us. We have grave concerns about several possible adverse effects of the project, and consequent reservations about the location of the Project. [LTR 119, CMT 2]*

Response: EFSEC and BPA considered all comments received during the scoping period for this Project, and made good faith efforts to attempt to ensure that the DEIS addressed all comments relevant to environmental concerns. In addition, many of the same issues raised in the scoping process were also raised in comments on the DEIS, and are thus addressed herein. In doing so, the lead agencies believe that they have adequately addressed comments made through the EIS process.

Comment: *Precedent. We believe it is critical that the EIS address the potential precedent that would be set by approval of this Project. Because it is the first wind farm in Washington to be located in a forest environment (we are told), adjacent to a National Scenic Area, and close to so many residences, a very detailed and thorough analysis of its potential impacts must be provided. Approval of the current application for this project will have precedential effect not only for projects in other regions, but also for expansion of this Project. SDS and DNR have acknowledged that they are investigating a major possible expansion of this Project onto DNR land. We do not know if SDS will seek to expand this Project even further on its own adjacent lands (which would be closer to our community.) However, we are worried that if this Project is approved now based on its smaller size, it will be very difficult to prevent expansions that might*

initially have been rejected based on an upfront perspective of the total impacts. Consequently, we request that the EIS take the broadest possible view when evaluating the impacts of this Project. [LTR 119, CMT 11]

Response: It is unclear at this time whether approval of the proposed Project would set a precedent for siting other wind projects in the area. Since all projects are evaluated on a case-by-case basis, approval of this Project does not dictate that any other Project that may be proposed in the future would also be approved. In addition, most developers are aware of the challenges of attempting to site wind projects in this general area. For the Applicant, proposing a wind project in this area may make sense, but other wind project developers may have differing opinions. Nonetheless, because there are no current proposals for other wind projects in the area; such future development is considered too speculative at this time.

Comment: *I request that EFSEC and BPA extend the comment period by 45 days, in order to allow the public sufficient time to review and comment on the 1,578 pages of material contained in the DEIS and appendices. [LTR 127, CMT 4]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *The public must also be kept informed about the environmental impacts of the project, so please extend the comment period by 45 days. [LTR 130, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *Related Concerns: 1. A first Gorge Windmill project will set a precedent. Other proposals and very likely other windmill farms will follow. New companies (for example a conglomerate such as General Electric) will be much less concerned about the welfare of this area than our neighbors at SDS. [LTR 135, CMT 3]*

Response: Please see response to Comment LTR 119, CMT 11 above.

Comment: *Huge steel towers with massive concrete bases would be with us a very long time. The costs of removing an obsolete windmill would be substantial. But how long would a wind tower be useful? [LTR 135, CMT 7]*

Response: As discussed in Section 2.1.7 of the EIS, the proposed Project, including the wind turbines, is expected to have a useful life of at least 30 years. However, it is possible (and generally likely) that in the future, aging project components would be replaced as needed, which

could extend the useful life of the Project for years or even decades beyond the current expected project lifespan.

Comment: *In our testimony of May 6, 2009 we specifically requested that three issues be directly addressed within the scope of the proposed Whistling Ridge Energy Project EIS. The current draft EIS does not adequately address the three issues. [LTR 139, CMT 1]*

Response: Please see response to Comment LTR 119, CMT 2 above.

Comment: *The third issue we raised was partially resolved, not due to your actions, but as a result of a decision rendered by DNR, which prevented, at least temporarily, the leasing of adjacent DNR land to SDS for placement of additional wind turbines. We are still greatly concerned that this proposed project is reportedly the first of its kind in forested habitats in Washington. This begs the need for intelligent planning, caution and due consideration given the potentially profound impact on watersheds, wildfire risk, bats, avian species, mammals and humans. We feel greatly disappointed that the current draft EIS appears to hide behind outdated and inadequate state regulations, and pray that EFSEC and BPA will yet demonstrate desperately needed leadership in adopting a quality and accurate model for wind turbine siting that is in harmony with the environment while providing ample protection for the health and quality of life of all Washington residents. [LTR 139, CMT 25]*

Response: Please see response to Comment LTR 119, CMT 2 above.

Comment: *There has not been enough time for the average citizen to go through the EIS! Most people I've spoken with haven't still have not seen the EIS. [LTR 142, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *At the last public hearing on Whistling Ridge, numerous public participants, including the Yakama Tribe asking for government to government contact, asked for more time to dissect the 1500+ DEIS for this proposed wind farm. Have you all made any decision to prolong the 30-day comment period? Frankly, 30 days is not enough time to dissect, digest, analyze, and make coherent comments upon, such a monster DEIS. I would like to see the public participation process extended to a more reasonable comment period. Thank you. [LTR 143, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *I am writing to request that you extend the comment period on the DEIS for the Whistling Ridge Energy Project. I received my hard copy of this 1500 page document on Monday, July 12, 2010. I requested it at the Underwood hearing on June 16th, after finding that looking at it online was not practical (hard to flip back and forth to cross-reference, etc.) and printing it on my printer impractical, too. When I tried to look at it at the library in White Salmon, I was only given the DEIS without the appendices. To summarize, I have been given less than a week to review a complex, 1500 page document. I am probably not the only one. We were assured at the hearings by Jim Luce that hard copies would be available on request. I think he thought we would get them in a more timely manner. A week is not enough time to assimilate the information, let alone formulate constructive comments. I respectfully request that your agencies extend the comment period at least 60 days. A cursory review of the document reveals much happy talk and shallow analysis of major issues associated with this project. I would like to provide detailed and meaningful input to this process, but will need more time. As I stated at the hearing, my community of Underwood, through which all construction traffic will be routed, feels like it is getting the bum's rush by your agencies and the applicant. As the first project of its kind in a forested, mountainous setting, on the doorstep of a internationally recognized scenic wonder, we hope that the process will be fair and thorough. [LTR 144, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *I am writing on behalf of Friends of the Columbia Gorge to request that the agencies extend the deadline for written comments on the Whistling Ridge Energy Project DEIS. We request an extension of 45 days in order to have sufficient time to review the 1,500 pages of material in the DEIS and appendices and make meaningful, informed comments. Until very recently, Friends' staff, consultants, and outside legal counsel have had a total of only two paper copies of the DEIS to use in our review. Essentially, nine different people in five different offices have had to share two paper copies. One of our consultants is often in the field and away from a computer; a paper copy has been essential for his review. Friends' staff attended the June 16 and 17 public hearings in Underwood and Stevenson. At those meetings, EFSEC Chair Luce stated that paper copies would be provided to the public upon request. Friends' staff requested three additional copies of the DEIS by checking the appropriate box on the sign-in sheets. On June 21, I requested by phone and email four paper copies of the DEIS from EFSEC. On July 7, not having received the copies, I reiterated the request by email. On July 12, Friends' staff finally received two additional paper copies. This was only one week before the comment deadline of July 19. We certainly understand that the EFSEC and BPA staff are overwhelmed with the regular press of business, not to mention furlough days and special projects. We do not fault the agency staff for the delays in distributing paper copies. However, we believe it is only fair for the agencies to extend the comment deadline, in order to give the public sufficient time to review and comment on the material in the DEIS. We are also sympathetic to the impact on the citizens of the Gorge. I have spoken to other people who received their first and only paper copy this week, after requesting it almost a month ago. Some citizens in rural areas of the Gorge are still using dial-up Internet access, or have no Internet access at all. For these citizens, obtaining electronic copies via the Internet was never an option. They are now left with an insufficient amount of time to digest 1,500 pages of material and write meaningful comments. Friends*

respectfully requests an extension of the comment period on the DEIS. Thank you for considering this request. [LTR 145, CMT 1]

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *I would like to request an extension of 30-45 days for the deadline for written comments on the DEIS for the Whistling Ridge Energy Project in order to have sufficient time to review, digest and then make meaningful comments on this proposal since this will be the one and only opportunity as a concerned Gorge resident to do so. This document along with its appendices is an enormous amount of material to try and make informed comments on since I only received my hard copy a matter of several weeks ago and I have dial-up internet at my home in the West end of Skamania county and simply can't download this material in any sort of realistic timeframe. I attended both the June 16th and 17th public hearings in Underwood and Stevenson where several other concerned citizens voiced their concerns that this is not an adequate amount of time for proper public review. As a resident of the Columbia River Gorge living in Skamania county for the past 16 years, I respectfully request that you allow for an extension for the public comment period on this DEIS of the Whistling Ridge Wind Energy Project. [LTR 146, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *I am writing to request an extension to the comment period for the WRE DEIS. I was able to obtain a hard copy of the DEIS from EFSEC's kind staff at the Underwood DEIS public meeting in mid-June. Since that time, of slightly less than 30 days, I have read through and marked up my copy, but still have not finished compiling and commenting, due to the complexity and size of the DEIS. Please provide additional time for the public to offer meaningful comments. [LTR 147, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *This office represents Save Our Scenic an interested party to the proposed Whistling Ridge Energy project. Given the length of the DEIS and the detailed materials found therein, we join in the request of Friends of the Columbia Gorge (Friends) to extend the comment period for 45 days to allow full opportunity to comment on this DEIS as well as to provide additional notice to interested persons. [LTR 148, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *Based on the foregoing, SOSA requests that the comment period for the DEIS be extended for at least 45 days. [LTR 148, CMT 4]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *They own lots of land (70,000 acres, according to Wally Stevenson) and can find another way to make money on it. There is another reason I question this project. The Northwest Power and Conservation Council's 6th Plan ranks conservation ahead of wind power in terms of cost-effectiveness. I work on verifying conservation technologies and, for the most part, they do work. The hardest part has been finding someone to do the work (thankfully that is now changing) but the results have been proven in a number of regional studies that extending back to the early 1980s. There is still a lot of conservation to procure, and the economics are considerably more favorable than the economics of wind, especially when real utilization factors are employed. (That is, turbines even in very windy places only generate usable electricity about 40% of the time; most turbines have much lower utilization rates.) I urge EFSEC to consider these issues seriously when ruling on the siting application. [LTR 153, CMT 2]*

Response: Please see response to Comment LTR 33, CMT 6 above.

Comment: *I also request that EFSEC and BPA extend the comment period in order to allow the public sufficient time to review and comment on the 1,578 pages of material contained in the DE IS and appendices. Please extend the comment period by 45 days. [LTR 154, CMT 2]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *The DEIS erred in its analysis of the regional need for new sources of renewable energy. The DEIS cites the Draft Sixth Northwest Power Plan released in September 2009 by the Northwest Power and Conservation Council. What the DEIS fails to quantify is that this 20-year energy plan for our region concluded that, although population and energy demands will continue to grow in the Pacific Northwest, we can meet more than 80 percent of expected future energy demands through conservation efforts and improved energy efficiency. Conservation efforts not only have less environmental impact than building new energy sources, they are also considerably less expensive. Less than 20 percent of future needs must come from new sources of energy, according to the Council. And shown above, with 40 wind projects already constructed or proposed for this region, there are plenty of new sources to meet these needs. There is no demonstrated need for Whistling Ridge. The dirty little secret of wind power in the Columbia Plateau Ecoregion is that most of the electricity being generated here by wind turbines is not needed or used in the Pacific Northwest. Instead it is sold to utilities in California. There is no regional need for new power sources; there is simply a California demand for electricity generated in Washington and Oregon. On page 3-91 of the DEIS, the applicant claims that the Klickitat County Energy Overlay Zone Final EIS "recently evaluated the projected energy*

demand in Klickitat County, Washington, the county immediately adjacent to Skamania County." (In fact, this evaluation is already more than six years old). The DEIS then mentions the EIS projection that "four wind power projects with total generating capacity of 1,000 MW" will be developed in Klickitat County by 2024. In fact, Klickitat County has already approved more than a dozen projects, with a total generating capacity of almost 2,000 megawatts. Rather than suggesting that more energy is needed regionally, this rapid development of wind power in Klickitat County indicates that more than enough wind power is already under development to meet the region's energy needs. Existing wind projects in this region are already producing so much surplus power that there are times when these projects must be turned off to protect the regional grid. For example, see these recent articles on the surpluses in the Columbia River corridor: http://green.blogs.nytimes.com/2010/07/07/sudden-surplus-calls-for-quick -thinking/, and http://www.oregonlive.comlbusiness/index.ssf/2010/06/swollen_columbia_river_chums_html. [LTR 161, CMT 10]

Response: Please see response to Comment LTR 36, CMT 9 above.

Comment: *The DEIS overwhelms the public with quantity but not quality. I am grateful for the extended comment period. Nevertheless, it is not reasonable to expect members of the general public to be able to digest and respond intelligently within just a few weeks to a record that is thousands of pages long and years in the making. Despite this huge volume of material, there is very little scientific literature cited in the DEIS, and even less that is peer-reviewed science. The applicant has cherry-picked a few statistics and extrapolations from industry-sponsored reports and ignored the independent science and actual mortality studies that suggest major cumulative impacts are likely for wildlife given the pace and scope of wind power development in this region. Thank you for the opportunity to comment on this project. [LTR 161, CMT 14]*

Response: Please see response to Comment LTR 60, CMT 1 above.

Comment: *Joint EFSEC/BPA preparation. As the DEIS introduction at paragraph 1.1 clearly states, both the Energy Facility Site Evaluation Council (EFSEC) and the Bonneville Power Administration (BPA) have jointly prepared the DEIS to be consistent with the requirements of both the Washington State Environmental Policy Act (SEPA) and the National Environmental Policy Act (NEPA). Although the document is consistent with SEPA requirements, its form has been modified, adjusted and expanded where appropriate to ensure compliance with NEPA as well. Accordingly, the DEIS is now a federal NEPA document and not just an EIS generated by the project applicant. [LTR 162, CMT 8]*

Response: The lead agencies believe that they have produced a reasonably thorough analysis of the proposed Project that adequately considers all points of view. BPA and EFSEC staff actively and extensively participated in the preparation of the EIS, as required by SEPA and NEPA. Both SEPA and NEPA allow for the use of environmental information, in whatever

form, from the Applicant for use in the preparation of an EIS. In fact, SEPA allows for an applicant to prepare the EIS. Nonetheless, where the lead agencies used information provided by the Applicant or its consultants, this information was thoroughly reviewed and independently evaluated by the agencies to ensure its competency and accuracy. This approach is consistent with the intent of SEPA and NEPA that acceptable environment work not be redone, but that it instead simply be verified by the lead agency. The lead agencies have taken full responsibility for the scope and content of the EIS, and have fulfilled their respective responsibilities for EIS preparation under SEPA and NEPA.

Comment: *In addition, the DEIS has been prepared in direct collaboration with a sufficiently wide range of state and federal wildlife agencies and tribal governments (8), including: the Washington Dept. of Archeology and Historic Preservation, Washington Department of Fish and Wildlife, Washington State Department of Natural Resources, Washington State Department of Transportation, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and the Yakama Nation. The pre-development biological survey work was done in collaboration with the Washington and U.S. Fish and Wildlife Departments. [LTR 162, CMT 8]*

Response: Please see response to Comment LTR 74, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 163, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 165, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 167, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 169, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Based on the foregoing, SOSA still believes that the correct procedure to be followed, and one authorized by the rules under both SEPA and NEPA, is to issue a supplemental DEIS (SDEIS) correcting basic errors in the issued DEIS. The SDEIS would be subject to comment by interested agencies and members of the public. [LTR 176, CMT 4]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Third, the DEIS cites numerous public documents that the project will supposedly comply with, including the Fifth Northwest Electric Power and Conservation Plan (DEIS at 1-4), the draft Sixth Northwest Electric Power Plan ("NPCC 2009", DEIS at 1-5), the "establishment of Renewable Portfolio Standards (RPS) at the state level" (DEIS at 1-5), the requirement for "qualified alternative energy products" pursuant to state law (DEIS at 1-5). Each of these regulations and policies is substantially similar to the relationship between Pierce County and the developer in the Weyerhaeuser case. The DEIS touts the current proposal as meeting public needs and legislative mandates. WRE cannot promote the project "public" for one purpose, but claim it is "private" for another, especially where careful review of alternatives is required by SEPA and NEPA. [LTR 176, CMT 8]*

Response: The public documents referenced by the commenter are not identified as documents that the Project will comply with; rather, as indicated on page 1-4 of the EIS, these documents have been identified by the Applicant as sources that the Applicant believes point to the regional need for renewable resources such as the proposed Project.

Comment: *The current EIS should be withdrawn and a supplemental EIS complying with NEPA/SEPA rules and guidelines must be circulated for comment. [LTR 176, CMT 8]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *The failure of the BPA and EFSEC to consider alternatives, including alternate locations and different configurations are fatal flaws in the DEIS. [LTR 176, CMT 8]*

Response: The lead agencies believe that the EIS considers a reasonable range of alternatives and adequately describes these alternatives, consistent with the requirements of both SEPA and NEPA. Issues raised in these comments specific to alternatives considered but eliminated from detailed study in the EIS are addressed in other response to comments in this section.

Comment: *Fourth, there is considerable discussion of the need for the project's resources on a regional basis. See DEIS at 1-4 and 1-5. However, there are real questions as to need for this variable energy facility. At the outset, it appears that most wind energy is not, as indicated at page 1-4 of the DEIS, used or useful in the Northwest. As indicated in the April 12, 2010 submission of BPA to the Federal Energy Regulatory Commission (FERC) on their docket Docket No. RM1 0-11-000 regarding regulation of "variable energy resources" (VER) at page 2: The need to clearly define balancing authority roles and responsibilities is especially important to BPA, because approximately 80 percent of the almost 2,800 MW of wind generation currently on BPA's system is exported to other balancing authorities, and BPA's preference customers should not bear costs of integrating wind generation that is exported to serve load outside of BPA's balancing authority. Thus the EIS must consider whether the WR project or other wind projects actually meet loads in the Northwest. In addition, as the BPA submission to FERC makes clear, it is necessary for balancing power to be available to meet loads when the wind does not blow. As noted by BPA in their comments on Docket No. RM1 0-11-000, at page 5, there are additional problems with balancing loads when wind energy resources are exported to California or to other sink authorities. These facilities might include increased reliance on hydro resources or peaking facilities such as gas turbine plants. The EIS should consider whether additions of a VER like WR will result in the need for other peaking facilities to balance loads and whether the addition of a VER like WR is consistent with meeting demand. [LTR 176, CMT 9]*

Response: Please see response to Comment LTR 36, CMT 9 above.

Comment: *[In reference to DEIS Section] 1.4, ALTERNATIVES ANALYSIS, [t]he Alternatives Analysis is limited to a No Action alternative. While the DEIS states that other locations, project sizes and project configurations were considered, it fails to identify these alternative locations or configurations, or adequately explain why they were not worthy of additional analysis. As described in more detail below, the off-site and on-site alternative analyses should be expanded to include in-depth descriptions of the criteria used to select the proposed site and the proposed project configuration, as well as a focused discussion about why other sites and project configurations were excluded from further review. [LTR 177, CMT 2]*

Response: The lead agencies believe that the DEIS presented a reasonably thorough discussion of the consideration of alternatives for the proposed action, including why alternative locations were not being further studied. The reasons that the Applicant proposed its wind project at this particular location is explained in Sections 1.4.1 and 2.3 of the EIS. As discussed in these sections, a variety of factors were considered in evaluating whether alternative locations might be feasible. To further clarify turbine string site selection, six suitability requirements

were considered. They are as follows: lands owned by the Applicant or Broughton Lumber; within three miles of BPA transmission lines; outside of CRGNSA boundary; suitable terrain; road access; and contains at least 1,000 "suitable" land. Furthermore, "suitability" is described as follows:

- Low suitability properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 200 and 500 feet, and have road access. These parcels are designated in yellow on the "Tract Suitability Analysis" map (see Figure G-1).
- Potentially suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 500 and 1,000 feet, and have road access. It should be noted that these parcels could be ruled out as being unsuitable based on other factors not assessed in this analysis, such as slope direction or parcel size. These parcels are designated in brown on the "Tract Suitability Analysis" map (see Figure G-1).
- Suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have a terrain difference of between 500 and 1,000 feet, and has what appear to be better road access than properties identified as "potentially suitable". These parcels are designated in dark pink on the "Tract Suitability Analysis" map (see Figure G-1).
- Highly suitable properties: These are parcels that are within 3 miles of transmission lines, are outside the NSA boundary, have terrain differences between 1000 and 2000 feet above surrounding terrain and contain the highest hills/ridgelines within the study area, and have good road access. These are the best possible locations within the study area for wind facility development. Of the analyzed parcels, only 1 parcel fell into this category. These parcels are designated in blue on the "Tract Suitability Analysis" map (see Figure G-1).

The proposed Whistling Ridge Energy Project site was identified by the Applicant for its location within the "highly suitable properties". This site was then forwarded for further environmental analysis including wildlife surveys. Issues raised concerning alternative configurations for the proposed Project are addressed in other response to comments in this section.

Comment: *[In reference to DEIS Section] 1.4.1, Proposed Action, [t]he second bulleted factor in this section indicates that the site must be large enough to accommodate enough wind turbines to produce a minimum of 70 MW of electricity. Because the wind does not blow at a constant rate, wind turbines rarely operate at 100% percent capacity. Accordingly, references to wind generating capacity should be expressed in nameplate generation capacity. [LTR 177, CMT 3]*

Response: The second bullet in Section 1.4.1 has been edited to reflect that the 70-MW reflects the minimum nameplate capacity generation.

Comment: *The fourth bulleted factor in this section states: "The site has a long history of commercial logging and associated absence of native habitat, reducing or eliminating the need to clear additional forest land." This and similar statements regarding the "absence of native habitat" are made in several places in the document (e.g., [DEIS Section] 3.4.1.1), and the statement is misleading. With the exception of the weeds identified at the site and disclosed elsewhere in the document, grass, forb, shrub, and tree species at the site are predominantly native. A more accurate statement would be that the site is heavily managed and manipulated and is not in a natural state, being maintained in a state of disclaimed and with monotypic forest stands. The affected environment description provided in Chapter 3 ([DEIS Sections] 3.4.1.1 and 3.4.1.2) is far more accurate. [LTR 177, CMT 4]*

Response: The text in Section 1.4.1 (DEIS page 1-9) has been modified to reflect the fact that native species still occur in the Project Area even though it is heavily managed for timber production. The fourth bullet on page 1-9 of the DEIS has been revised to delete the phrase "and associated absence of native habitat" and now reads: "The site has a long history of commercial logging, reducing or eliminating the needs to clear additional forest land. Native species remain; however, the native habitat has been disturbed through commercial forestry activities."

Comment: *The final paragraph in this section states that the project would have a total nameplate capacity of "up to 75 MW." The second bulleted factor in this section states that project's minimum nameplate capacity is 70 MW. It is unclear how these two figures relate to one another. The project's maximum and minimum nameplate generating capacity levels should be clearly identified and described in a single location. [LTR 177, CMT 5]*

Response: Please see response to Comment LTR 177, CMT 3 above. Additionally, for more clarification, the 75-MW figure is the size of the Project that has been proposed by the Applicant. The 70-MW figure is the minimum capacity that the Applicant believes is necessary to have a financially viable project.

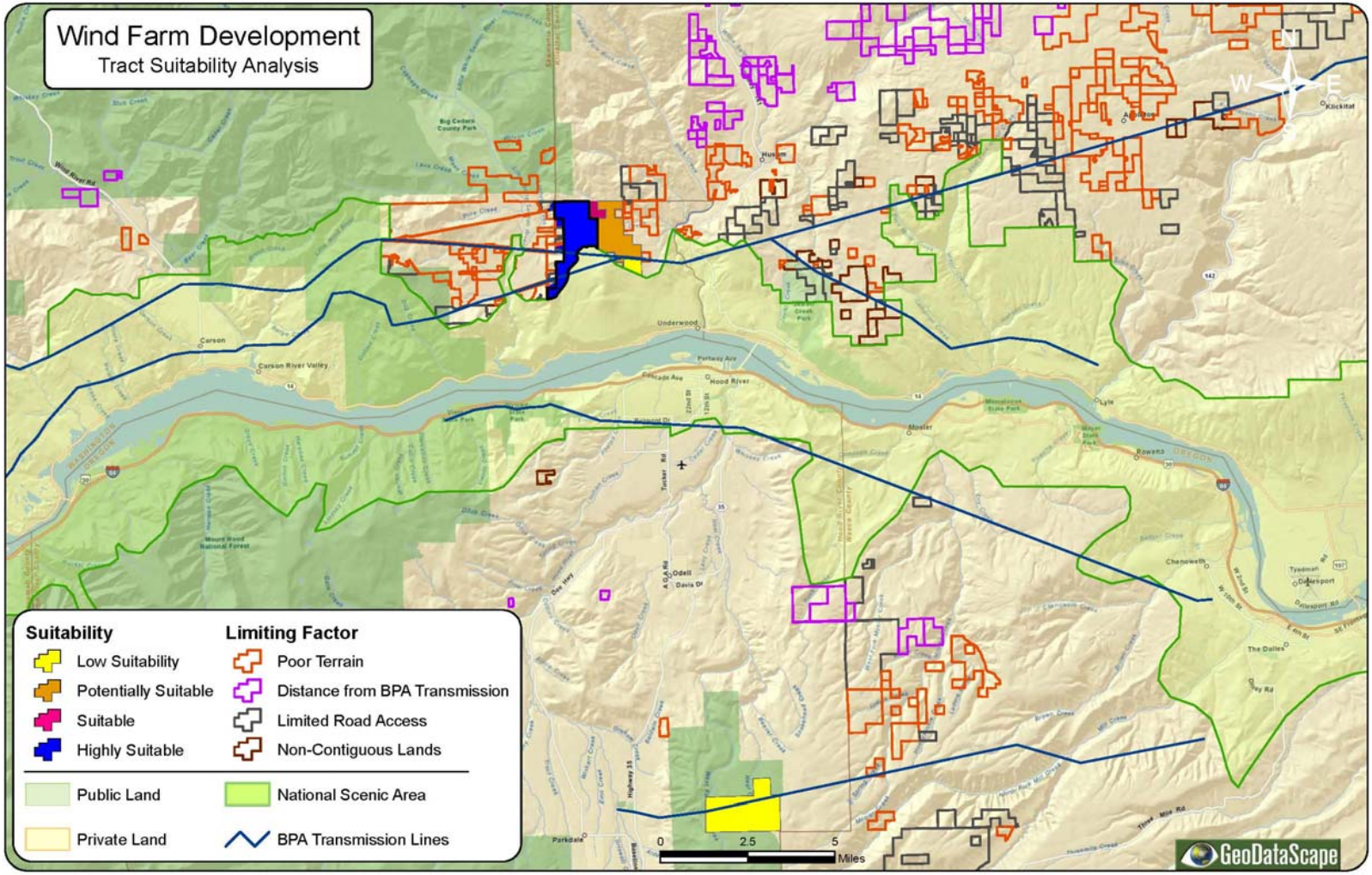


Figure G1. Project Siting for the Whistling Ridge Energy Project using Tract Suitability Analysis.

Comment: *[In reference to DEIS Section] 1.4.1.1, Wind Turbines, [t]he generating capacity should be referenced as nameplate capacity. This section should also clarify whether the size of the turbines will be consistent throughout the project or whether the size will vary from tower to tower. [LTR 177, CMT 6]*

Response: The text in Sections 1.4.1.1 and 2.1.3.1 regarding wind turbines has been updated to reflect the nameplate generating capacity of the wind turbine models and the correlation between output and turbine size. The turbines throughout the Project would all be the same model, although height may vary in response to terrain. These clarifications have been incorporated into Section 2.1.3.1.

Comment: *[In reference to Section] 1.4.2, No Action Alternative, [t]his section states that the only circumstance the project will not be built is if the responsible agencies (BPA or EFSEC) withhold their authorization. There are a multitude of reasons why a proposed project may not be built. This statement is not accurate and should be removed from the FEIS. [LTR 177, CMT 7]*

Response: It is acknowledged that many factors could result in the Project not being built, and nothing in the EIS is intended to indicate that project disapproval by the lead agencies - EFSEC and BPA - would be the only reason the Project may not be built. Nonetheless, for the purposes of defining the No Action alternative in the EIS, the key consideration is what the result would be if either or both of the lead agencies decide not to approve the proposed Project. Thus, the EIS references the No Action alternative in this manner.

Comment: *[In reference to DEIS Section] 1.4.3, Alternatives Considered But Eliminated From Detailed Study, [t]his section explains why the no action alternative was the only alternative analyzed. In doing so, it references a set of technical and economic requirements that purportedly eliminated all other potential project sites from consideration. None of the eliminated off-site locations, however, are identified, and the DEIS does not contain the underlying technical and economic data the Applicant used to eliminate the undisclosed sites from further consideration. At a minimum, the FEIS should include detailed information regarding the economic and technical data underlying the site selection criteria, as well as the locations of all potential alternative sites considered so that the decision to limit review to the No Action alternative can be independently verified. [LTR 177, CMT 8]*

Response: Please see response to Comment LTR 22, CMT 2 above.

Comment: *[In reference to Section] 1.4.3.1, Alternative Project Locations, [t]he DEIS states that the Applicant applied the following criteria to determine whether alternative project locations were available for EIS review: adequate wind supply, applicant ownership of land, ability to operate wind turbines without impacting commercial timber operations, and proximity*

to high voltage transmission lines. The DEIS analysis and discussion of the alternative location selection process is set forth in a single sentence: No other sites were identified that are under the ownership of the Applicant or as close to transmission infrastructure facilities. DEIS at p. 1-14. This summary analysis should be expanded to include a detailed description of the criteria used to select the project site, the location of the alternative sites that were considered, and discussion regarding why these alternative sites were ultimately eliminated from further consideration. [Footnote: Ideally, this discussion would include information sufficient to independently verify the decision to eliminate these alternative sites from further consideration. This would include the location of SDS holdings in Southern Washington and Northern Oregon, wind resources available in those areas, the location of transmission lines, economic parameters for the project, as well as economic information regarding the project's interrelationship with timber harvesting activities.] [LTR 177, CMT 9]

Response: Please see response to Comment LTR 22, CMT 2 above.

Comment: *[In reference to Section] 1.4.3.2, Larger or Smaller Generation Facility Size, [t]he FEIS should be expanded to address on-site alternatives that reduce the number of turbines and/or reconfigure the turbine strings. The purpose of the alternatives analysis is to explore whether the needs of the project can be accomplished through less environmentally impactful means. During the scoping hearings, the public and National Parks Service raised concerns regarding the project's visual impacts, particularly regarding the location of Turbine String A. [Footnote: Turbine String A is also unique in that it contains the turbines in closest proximity to residential dwellings and is located on a parcel of land that is zoned FOR/ AG 20, which would require issuance of a conditional use permit under Skamania County's land use laws. See DEIS at p. 3-153.] This section asserts that the project must be reviewed as an "integrated whole" from which no piece may be eliminated and that if turbines are removed from the project design, "other locations must be found to replace those turbines to maintain the minimum necessary capacity." These assertions are unsupported by analysis and appear to be inconsistent with the project description in both the Site Certification Application (SCA) and the DEIS. Both the SCA and the DEIS state that the project will have a total nameplate generating capacity of approximately 75 MW and will be comprised of up to 50 towers equipped with turbines with nameplate generating capacities ranging from 1.2 to 2.5 MW. [Footnote: The SCA at Section 2.3.3.1, for example, states that "[t]he project would consist of up to 50 wind turbines" and that each turbine would have a nameplate generating power of somewhere between 1.2- to 2.5 MW. (Emphasis added). The DEIS contains an identical description? See DEIS at § 1.4.1.1. Both the SCA and DEIS also state that the project must have a generating capacity of "up to 75 MW." See SCA at §2.3.2 (Project Overview – "up to 75 MW"); DEIS at §l4.l ("minimum of 70 MW;" "up to 75 MW").] Assuming that a 2 MW turbine is selected, the maximum generating capacity of 75 MW could be satisfied with the installation of 38 turbines (resulting in a reduction of 12 turbines). [Footnote: Recently permitted projects appear to be installing turbines with nameplate generation capacities of 2.0 MW or larger. The Desert Claim Wind Power Project, for example, will be installing 2 MW turbines. See Desert Claim Wind Power Project Final Supplemental EIS at 2-13. The recent expansion to the Wild Horse Wind Power Project also used 2.0 MW turbines.] If a 2.5 MW turbine is selected, the number of towers could be reduced to 30. Reducing the number of turbines without sacrificing nameplate generating capacity is not*

merely hypothetical. The Kittitas Valley Wind Power Project recently reduced its total number of turbines from a maximum of 65 to a maximum of 52 turbines without any change in nameplate generating capacity. The FEIS should include a discussion regarding how the project may be reconfigured through the use of turbines with larger generating capacities. The FEIS should include information regarding the strength and viability of wind resources found throughout the site. This would include information gathered from the on-site meteorological tower regarding the strength, quality, direction and location of on-site wind resources. [LTR 177, CMT 10]

Response: Please see response to Comment LTR 22, CMT 5 above.

Comment: *[In reference to Section] 1.4.3.6, Alternative Access Roads, [p]rivate logging road CG 2930 should be subject to detailed review as an alternative access road. The original Site Certification Application proposed accessing the site using this route. On October 12, 2009, the Applicant submitted an amended application that abandoned the CG 2930 route in favor of the West Pit Road with the stated purpose of removing the entire project outside the CRGNSA boundary. See October 12, 2009 Letter from Whistling Ridge Energy Project to EFSEC re: Submittal of Amended Application 2009-01. Although removing this route from the project plan may dispose of certain regulatory hurdles, the West Pit Road is a longer route that traverses steeper terrain and will likely have a higher environmental impact than the CG 2930.5 [Footnote 5: Long sections of West Pit Road crosses land designated as a Class II landslide hazard area. See DEIS Figures 3.1-1, 3.1-4 and 3.11-2]. Accordingly, this CG 2930 should be evaluated as an alternative. 1.6 SUMMARY OF POTENTIAL PROJECT IMPACTS AND MITIGATION MEASURES Earth - p. 1-22 -Impact of Proposed Project: Much of the West Pit Road is located in a Class II Landslide Hazard Area. This section should summarize and address anticipated impacts, if any, related to Class II Landslide Hazard Areas. [LTR 177, CMT 12]*

Response: Use of CG 2930 was evaluated in the original Application for Site Certification as "Route 2." This route would have connected the site to Cook-Underwood Road via Kollock-Knapp Road, Scoggins Road and CG2930. CG2930 is a private logging road that crosses property owned by the Applicant and is currently used for commercial timber production and harvest. As described in Section 2.3.6 on Page 2-23 of the DEIS, use of Route 2 would require minor roadway improvements that would not directly impact any non-Project landowners. However, these roadway improvements would require construction within the National Scenic Area. Therefore, Route 2 was eliminated as a construction roadway access alternative purpose and need for proposed action, or clearly greater environmental impacts.

Comment: *[In reference to Table 1-1 on Page 1-22 of the DEIS under "Air Quality: Impact of No Action Alternative"], [t]his section identifies impacts from construction of fossil fuel power plants as a potential impact under the no action alternative. There is nothing in the record establishing that proposed project is being built in lieu of fossil fuel powered plant or that its construction will reduce the number of fossil fuel powered generation facilities in the future. Indeed, intermittent nature of wind generated power may require the construction of fossil fuel facilities to provide a backup power source. [Footnote: The No Action Alternative analysis*

appearing on p. 3-92 and in other section of the DEIS contains a more accurate description of the possible impacts if no action is taken: It is likely that the region's power needs would be met through energy efficiency and conservation measures, existing power generation, or the development of new power generation. Base load demands would likely be filled through expansion of existing, or development of new thermal generation such as gas-fired combustion turbine technology. The impacts would depend on the type, location, and size of the facility proposed.] [LTR 177, CMT 13]

Response: Comment acknowledged.

Comment: *[In reference to Table 1-1 on Page 1-23 of the DEIS under "Biological Resources: Impact of No Action Alternative"], this section states that there "would likely be some mortality to birds and bats due to turbine collision and displacement." This should be revised to state that operation of project "will result in mortality to some birds and bats..." [In reference to Table 1-1 on Page 1-24 of the DEIS under "Biological Resources: Design and Mitigation Measures], remove qualifier "extensive" from pre-project assessment of wildlife habitat conducted under WDFW Wind Power Guidelines. [In reference to Table 1-1 on Page 1-24 of the DEIS under "Biological Resources: Design and Mitigation Measures], a Technical Advisory Committee (TAC) is described, including a description of the stakeholders comprising this group. Because the overarching concern for biological resources is bird and bat mortality, a representative of the Audubon Society should be specified and included in the TAC. [Footnote: The TAC should also be expanded to include representatives from local public interest groups, including interveners Friends of the Columbia Gorge and Save Our Scenic Area.] [In reference to Table 1-1 on Page 1-25 of the DEIS under "Biological Resources: Design and Mitigation Measures], the post-construction avian mortality monitoring should include bat mortality monitoring as so little is known about bat species' composition and mortality risk at the site. The monitoring program should also analyze the accuracy of the pre-construction risk and mortality predictions. Because the project is being proposed in a new habitat type (forested) for Washington wind energy projects, and because so little is known about bat use of the site, bird and bat monitoring should be conducted for five (5) years, rather than the proposed two (2) years. [LTR 177, CMT 14]*

Response: The text in Table 1-1 on DEIS page 1-24 has been revised to indicate that the proposed Project "would result in mortality to some birds and bats." Additionally, the formation and membership of the TAC is subject to the Washington Department of Fish and Wildlife Wind Power Guidelines and would be governed by that agency. Both post-construction monitoring and the convening of a TAC to evaluate the mitigation and monitoring program were included as mitigation measures in the DEIS. See Section 3.4.3 Mitigation Measures.

Comment: *[In reference to Section 1.6, Table 1-1], Visual Resources - p. 1-28 - Impact of Proposed Project: This section should clearly state that as proposed the project will have low to moderate visual impacts from key viewpoints, including key viewpoints within the CRGNSA. 1.7 SUMMARY OF UNAVOIDABLE ADVERSE IMPACTS This section should plainly identify and*

summarize unavoidable adverse impacts. References to beneficial impacts should be removed. The description of unavoidable visual impacts (Table 1-2, p. 1-35) should be re-drafted to read as follows: This project will have unavoidable adverse visual impacts on the surrounding area. Visual impact analysis establishes that the project will have low to moderate visual impacts from key viewpoints, including viewpoints within the CRGNSA. [LTR 177, CMT 15]

Response: Table 1-2 references Section 3.9.5, which states that there would be some visual impact to surrounding areas where turbines were visible, but that these impacts would not be higher than low to moderate for most of the viewpoints examined.

Comment: *[In reference to Section] 1.8, CUMULATIVE IMPACTS, [t]he discussions of existing development in section 1.8.1.1 and reasonably foreseeable future development in section 1.8.1.2 appear to be inconsistent. In section 1.8.1.1, the authors considered wind projects located 35 to 70 miles from the proposed project in their cumulative analysis. In section 1.8.1.2, however, the authors chose to disregard two proposed wind power projects (Juniper Canyon and Summit Ridge) because they are "too far away (generally more than 20 miles) from the Whistling Ridge Energy Project site to result in cumulative impacts." Given that the cumulative analysis of existing impacts considered projects that were located 70 miles away, the analysis of cumulative impacts relating to reasonably foreseeable future development should apply similar criteria or include an explanation as to why different criteria were applied. [In reference to Section] 1.8.1, Projects Considered, [t]he cumulative impact section should discuss the intermittent nature of wind energy generation and the need for easily dispatchable hydro-electric or fossil fuel generating plants to meet demand when the wind is not blowing. [LTR 177, CMT 16]*

Response: The cumulative impact analysis in Section 3.14 f the EIS considered the impacts on the environment from the Whistling Ridge Energy Project when added to both existing and reasonably foreseeable future projects. Section 3.14 of the EIS has been revised to reflect that the cumulative impact analysis includes existing and reasonably foreseeable future development generally within approximately 20 miles of the Project Area, but also existing and reasonably foreseeable wind projects that are farther than 20 miles from the Project Area for the purpose of assessing cumulative impacts to visual resources. In reference to the commenter's concern regarding the intermittent nature of wind energy generation, please see Section 3.14.3.5, Fish Species in the Cumulative Impacts section of the DEIS. Currently, the Columbia River hydrosystem has sufficient reserve capacity to provide for fluctuations in wind generation.

Comment: *We find that, in many areas, the present DEIS is completely insufficient and we urge that the NEPA/SEPA responsible officials prepare a supplemental DEIS. The following pages of written and charted comments, plus Exhibits, are intended to address some, but not all, of the deficiencies noted in the particular sections within the WRE DEIS that address Bats. In all cases, the deficiencies are explained. In most cases, particular remedies are suggested. Because no remedy is proposed by SOSA does not mean there should not be one implemented by the NEPA/SEPA responsible officials. [LTR 178, CMT 2]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Thank you for this opportunity to comment on the DEIS. SOSA trusts that the DFEIS and FEIS will provide facts and analysis on the issues raised herein. Science based studies require a statement of all assumptions made to design a study and collect, analyze, and interpret data. This is completely nonexistent in the DEIS and Appendices. [LTR 178, CMT 8]*

Response: Please see response to Comment LTR 60, CMT 1 above.

Comment: *[In reference to DEIS] Section 1.1.1 ...and there is a proven wind resource at the site. The use of the word "proven" should require substantiation. A review of government websites, like the National Renewable Energy Labs (NREL), found at windpowermaps.org, shows a wind rating for the WRE site as Marginal to Fair. They should provide met tower data, and the location of such. The only currently observed tower, from a public vantage point, is located on the highest predicted wind power location within the site, so additional met tower data should be provided at the lowest predicted locations as well. Given the Federal Investment Tax Credit, it is imperative that the public grants are used up on the best potential wind resources first, which this site is NOT (according to government predicted models). The Applicant should justify with supportably detail data to demonstrate otherwise. [see also comment at 1-9 (1.4.1)] Remedy - Wind Resource must be quantified by met tower data in multiple locations, and with wind direction in all THREE axes. Then these data must be compared to the alternative of wind resources in the Eastern portion of WA State. Wind power versus wind speeds must be discussed and compared. [LTR 178, CMT 32]*

Response: The purpose of Section 1.1 of the EIS is to provide a brief introduction to Purpose and Need for the Action being proposed and is not intended to provide a comprehensive evaluation of the proposed Project details. There were several criteria applied to determine whether the Whistling Ridge Project or other alternatives were technically and economically feasible, and these criteria are discussed in Section 1.4.3 of the EIS. The criteria included the need for a "steady supply of robust wind power, and on a site on which construction can reasonably occur," that "the Project must be located on land the Applicant owns and controls...," and that "the Project must be located in proximity to existing high-voltage transmission lines." While both Washington EFSEC and BPA need to respond to the applicable Applicant requests for authorizations and approvals regarding the proposed Project, neither have the jurisdictional authority to determine or require that the Applicant justify that the proposed Project is one of the "best potential wind resources."

Comment: *[In reference to DEIS] Section 1.3.2, [t]hose agencies may use this EIS in order to fulfill their NEPA or SEPA responsibilities. Providing that the final EIS is a fair, accurate, clear, and truthful document of the issues. Remedy - Issue a complete and accurate final EIS as the document used by Decision-makers in the Adjudicative process. [LTR 178, CMT 34]*

Response: Consistent with SEPA and NEPA requirements, the lead agencies fully intend to produce an objective and reasonably thorough Final EIS for the proposed Project.

Comment: *[In reference to] Section 1.4, [t]wo alternatives are evaluated in this EIS: the Proposed Action (authorizing construction and operation of the proposed Whistling Ridge Energy Project and associated components) and the No Action alternative. Proposed Action and No Action alone does not satisfy SEPA or NEPA requirements. The extent of available lands in the analysis should be determined by partnerships or contracts between Applicant and other parties/investors. Remedy - Reference SOSA comment letter addressing the topic specifically, in detail [LTR 178, CMT 35]*

Response: The lead agencies believe that the EIS considers a reasonable range of alternatives and adequately describes these alternatives, consistent with the requirements of both SEPA and NEPA. Issues raised in these comments specific to alternatives considered but eliminated from detailed study in the EIS are addressed in other response to comments in this section.

Comment: *[In reference to] Section 1.4.1, [t]he site has a proven, robust wind resource - No legal data exists for A1-7, South of South BPA line, due to no conditional use permits issued by Skamania County, confirmed by Public Information Request, Drach to Skamania County Planning Dept. July 2010. Any Met tower Data in the Appendices? NREL wind power maps show the WRE site ranging from Marginal to Fair, as compared to typical Eastern WA projects listed as Fair to Good (www.windpowermaps.org) see also comment at 1-7 (1.3.1) Remedy - Wind Resource must be quantified by met tower data in multiple locations, and with wind direction in all THREE axes. Then these data must be compared to the alternative of wind resources in the Eastern portion of WA State. Wind power versus wind speeds must be discussed and compared. [LTR 178, CMT 36]*

Response: A quantified comparison of the wind resource to other sites in the state with reasonably foreseeable wind development is not required by Washington EFSEC as a condition of the evaluation of the proposal, which is discussed in Section 1.2.1 of the EIS. Similarly, under BPA's tariff, BPA offers transmission interconnection to the FCRTS on a first-come, first-served basis, as discussed in Section 1.2.2 of the EIS. It is the Applicant's responsibility to determine the technical and financial feasibility of the proposed Project, with the most important consideration likely being the quality of the wind resource at the site.

Comment: *[In reference to] Section 1.4.1.3, [t]he Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection. The explanation of this requirement is unclear. Remedy - Provide a graphic of the substation site and locations of extra towers required. Identify if this is related to both potential substation locations. [LTR 178, CMT 37]*

Response: The existing transmission lines that traverse the Project Area, the Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV and the North Bonneville-Midway 230-kV transmission lines, will have to be raised if this Project is approved. The reason being that the appropriate clearance will be needed to in order to make the interconnection loop-in to these lines from the proposed BPA substation that would be required for this proposed Project. The raising of the existing transmission lines would be needed only for the proposed BPA substation.

Comment: *[In reference to Section 1.4.1.5], less than 5,000 gallons per day is anticipated for kitchen and bathroom use. No mention of quantity of water used to wash/clean Wind Turbine Blades and Towers. No mention of detergents involved in cleaning operation, nor potential release of chemicals into ground water from Turbine cleaning operations. Remedy - All uses of water at the site must be discussed, and the impacts of ALL water releases into the environment must be identified and addressed. i.e. washing the exterior of the Industrial Equipment. [LTR 178, CMT 38]*

Response: It is not anticipated that washing or cleaning of the turbine blades or towers will be required due to the high level of precipitation in the area.

Comment: *[In reference to] Section 1.4.2, [t]his [No Action] alternative would not help the state of Washington in achieving the renewable energy goals mandated by the state's RPS. This is true for the ALL Alternatives, Action or No Action. There is no control over which state gets credit for the Renewable Energy from WRE, the power is sold to the highest bidder. EFSEC would need to condition WRE's permit to sell its power only to Washington State entities, resulting in possible legal complications. Remedy - The EIS cannot claim that WARPS are benefitted as a result of this Project as proposed. This must be removed as a discussed Benefit of the Project, unless an approved permit conditions the sale of WRE power ONLY to Washington State CONSUMERS, via utility contracts. [LTR 178, 39]*

Response: Section 1.2.3.1 of the EIS discusses the Washington RPS primarily as an example of RPS legislation recently enacted by several western U.S. States, and since it is possible that a Washington state utility may seek in-state resources to fulfill RPS requirements. However, there is no certainty at this point as to what utility may purchase the output of the proposed facility.

Comment: *[In reference to] Section 1.4.3.1, [l]and in proximity to existing high voltage transmission lines Proximity simply translates to a financial impact, which would be covered as a potential negative in a proposed alternative. Simply not including an alternative due to cost is not complying with SEPA and NEPA. It is up to the decision-makers to determine if those potential extra costs outweigh any potential benefits of the alternate location. Remedy - The DEIS should identify viable Alternatives by including projects in lower impact areas. In the case of a location distant from the GRID, presumably a larger MW capacity would be contemplated*

to justify the extra cost, and these analyses should be made available to all to understand. [LTR 178, CMT 41]

Response: Please see response to Comment LTR 22, CMT 2 above.

Comment: *[In reference to DEIS] Section 1.4.3.2, [t]hese objectives include providing a minimum level of generation to be attractive to utilities seeking to fulfill their RPS requirements… Documentation should support these claims as to the minimum level power generation, as well as the Entities (presumed Buyers) which have conditioned future potential agreements upon said minimum level of power generation, and the service area of said Entities. (i.e.. WA, CA, AZ, etc.) Remedy - The EIS should include written statements from prospective Utilities which might purchase power from WRE, stating whatever conditions should exist for a Purchase Agreement to be negotiated at some future date. [LTR 178, CMT 42]*

Response: The Applicant's objectives reflect their analysis of their business case for the proposed Project. The minimum level of generation for utilities looking to fulfill RPS requirements is based on the Applicant's assessment of other wind projects that have successfully entered purchase agreements with utilities seeking to meet RPS requirements. Information concerning the Applicant's expected return on investment is considered confidential business data by the Applicant. Contrary to the commenter's assertion, this proposed Project is a private project that, while it may have some incidental public benefits in the sense of helping develop renewables, is not being developed as a public project.

Comment: *[In reference to] Section 1.4.3.2, [i]n order to provide this return, the Applicant has determined that the project must be capable of producing a minimum of 70 MW. Unsubstantiated claim, this is a private project operated for the public good, therefore financial analysis and justification is NOT exempt from review. (i.e. for WA RPS mandates) Remedy - The EIS should include written statements from prospective Utilities which might purchase power from WRE, stating whatever conditions should exist for a Purchase Agreement to be negotiated at some future date. [LTR 178, CMT 43]*

Response: Please see response to Comment LTR 178, CMT 42 above.

Comment: *[In reference to DEIS] Sections 1.4.3.6 2 and 2.3.6, Alternative Access Roads, Route 1: Ausplund Road to a private logging road vacated by Skamania County in 1987, which crosses private property (not owned by the Applicant) that is currently used for residential, agricultural orchards, and commercial timber production and harvest There is at least a 500' portion of the old Ausplund Road that does not exist, it is overgrown with trees. (Picture attached) The portions of Ausplund Road Private are not available to the Applicant. Road building and improvements within the CRGNSA have been acknowledged by the Applicant as not allowed. This is simply NOT a viable Alternative, and therefore does not satisfy the SEPA*

requirements. Applicant failed to include viable alternatives, like Little Buck Creek Road, which publicly connects with their land, and would reduce traffic congestion on Cook-Underwood Road, since it turns off early in the proposed route. Remedy - The EIS must remove Ausplund Road from consideration, and replace it with a known viable alternative, namely Little Buck Creek Road, or other real, existing route. [LTR 178, CMT 45]

Response: As explained in Section 2.3.6 (pages 2-22 and 2-23 of the DEIS), the use of Asplund Road (Route 1) has been eliminated from further consideration because use of this route would have required road improvements on private property not owned by the Applicant.

Comment: *[In reference to] Sections 1.4.3.6 2 and 2.3.6, Alternative Access Roads, Route 2: Kollock-Knapp Road to Scoggins Road to a private logging road called the CG2930 road on County Assessor's maps, which crosses property owned by the Applicant that is currently used for commercial timber production and harvest Kollack-Knapp Road was officially retracted by the Applicant in its Amended Application submitted around October 2009. By the Applicants own statements, it is NOT a viable Alternative, and therefore does not satisfy the SEPA requirements. Applicant failed to include viable alternatives, like Lacock-Kelchner Road, via Little Buck Creek Road, which publicly connects with their land, and would also reduce traffic congestion on Cook-Underwood Road, since it turns off early in the proposed route. Remedy - The EIS must remove Kollack-Knapp Road from consideration, and replace it with a known viable alternative, namely Lacock-Kelchner Road, or other real, existing route. [LTR 178, CMT 46]*

Response: As stated in Section 2.3.6 (pages 2-22 and 2-23 of the DEIS), the use of Kollack-Knapp Road (Route 2) has been eliminated from further consideration. Therefore, no improvements to County roads within the Scenic Area would be required. See Section 1.4.1.6 for a description of the proposed haul route.

Comment: *[In Table 1-1 on Page 1-22 of the DEIS under "Earth: Construction"], a detailed geotechnical investigation would be performed to identify any subsurface conditions. This is yet another example of a deficiency in the DEIS - no one can assess the environmental impact of massive recontouring, excavating and road building on steep slopes, until the geotechnical assessment is completed and included in the DEIS. This Study must be done, and included in the FEIS. Moderate to Severe changes to topography are likely, given the steep terrain and soil types. Prevailing winds would place the Turbines on the steepest Western slopes of the Ridge, and/or risk loss of critical performance if set too far to the leeward side of the Ridge. Economic viability could be at risk if geotechnical report finds problems. Please note that the economics appear marginal, so the risk level could be high. Remedy - The steep ridges of the proposed WRE project present significant geotechnical challenges that do not exist for projects placed in farming area. The EIS must include real and likely ground-displacing activities, the volumes of material to be moved, the locations of displaced material, the depths needed to secure*

foundations, etc. if for no other reason than to ensure the Applicant that realistic construction costs do not render the project economically unviable. [LTR 178, CMT 47]

Response: As discussed in Section 2.1.2 of the EIS, final siting of the wind turbines and associated facilities would be done following completion of the EFSEC Site Certificate. Prior to this final siting process, as a condition of the Site Certificate and as discussed in Section 3.1.3, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other project facilities such as access roads (including improvements to West Pit Road), these facilities will be redesigned or relocated to avoid this risk. As discussed in Section 2.1.3.7, all road improvements required for the proposed Project would be designed and constructed under the direction of a licensed engineer, in accordance with the Skamania County Private Road Guidelines and Development Assistance Manual. All county roads requiring improvements would be designed and constructed in accordance with the WSDOT Design Manual.

Comment: *[In reference to Table 1-1 on page 1-23 of the DEIS under "Biological Resources: Impact of No Action Alternative"], [p]otential Impacts from construction of fossil fuel power plants. Please clarify the language, as SOSA's interpretation is that the Applicant would thus potentially pursue a fossil fuel (natural gas) plant at this site, if No Action on the Wind Plant was followed. One may already be being planned even if the Wind plant is permitted. Remedy - Clarify the statement by indicating if this is a general statement, or specific to the vicinity of the proposed WRE project. (i.e. within 10 mile radius) [LTR 178, CMT 48]*

Response: There are no proposed plans for any fossil-fuel generation at the Project Area. The referenced comment above related to Table 1-1 has been modified to say "Other power generation facilities could be constructed and operated in the region to meet long-term needs for power, including other wind projects or generation using fossil fuels." Additionally, see Section 3.4.2.2 for a discussion of the impacts of the No Action Alternative on Biological Resources. As stated on DEIS page 3-81, "Other power generation facilities could be constructed and operated in the region to meet long-term needs for power, including other wind projects or generation using fossil fuels."

Comment: *[In reference to Table 1-1 on page 1-23 of the DEIS under "Construction"], [m]icrositing of turbines and associated facilities would allow sensitive resources discovered during construction to be avoided. Applicant states in DEIS that the micrositing corridor is very narrow along the ridge line due to steep slopes on both sides. Any discovery of sensitive resources, or even geologic hazards, could disrupt or preclude a major portion of the entire Project, thus placing it in financial jeopardy. Compared to Facilities cited in farm lands and grass/shrub/steppe topography, this site has almost no flexibility to adjust to problems discovered during construction. Remedy - No concrete remedy to suggest, and no pun intended. [LTR 178, CMT 49]*

Response: The 650-foot width of the turbine corridor allows sufficient flexibility in siting individual wind turbines and access roads to avoid sensitive resources that may be discovered during construction.

Comment: *[In reference to Table 1-1 on page 1-24 of the DEIS under "Operation"], [t]here would likely be some mortality to birds and bats, though not in sufficient quantities to affect population viability. This is a sweeping and dangerous generalization. PLUS, what constitutes a given species' viability has NOT been defined anywhere in this DEIS. Such a subjective assertion does injustice to the scientific principles and integrity required in any EIS. The data is sufficient to clearly show greatly elevated bird and bat numbers compared to recent wind projects in Klickitat County, WA. And the actual mortalities far exceeded predicted mortalities at those sites. One should assume a similar trend for these Projects in close proximity. It is a great leap to go from predicting mortality to predicting a species' viability. In this Project site, how many Goshawks can society loose? How many Townsend Big Eared Bats can society loose before they are non-viable? It really depends on who you ask. Rather than forcing the issue, society should first choose and deplete the sites for Wind Turbines where man has already developed – meaning – use up the nation's farmland for wind energy before clear cutting the forest to do so. Remedy - The EIS should remand the Bat studies for completion again, using the mature technology of the Anabat 2 hardware, and Analook software, which is capable of identifying species of Bats, not just a threshold 35KHz between big and small bats. A significant discrepancy between the WEST 2008 and 2009 studies is the duplicative sensors and the filtered noise percentages, confirming the underlying assumptions between the two studies changed dramatically, but were not discussed. [LTR 178, CMT 50]*

Response: Section 3.4.4, Unavoidable Adverse Impacts, has been revised to change the language regarding population viability (DEIS page 3-83). The second paragraph has been revised to read: "No population impacts are expected to birds through turbine collisions. Adequate information is not known on bat population sizes to determine whether population response would be anticipated."

Comment: *[In reference to DEIS] Section 1.6, Table 1-1, "Operation," [t]urbine fires are possible, however…are extremely rare. This issue is serious, because even if the potential occurrence is low, the risk to ALL residents of Underwood's lives and properties is extremely high. Any standardized risk assessment model uses the product of "occurrence" and "severity of occurrence" to assess risk. (for example - FMEA - Failure Modes Effects Analysis) It appears the Applicant wants to oversimplify this issue by not considering the issue in a proper manner. This Project is proposed in a Forest environment: an ignitable fuel source in close proximity to the Turbines. There are areas in the Project site that cannot be clearcut to reduce the fire risk - namely the western slopes where identified slide hazards exist, and there are unlogged lands on the western slopes owned by Washington state DNR. (between North BPA line and South BPA line ~1 mile?) The statement about being extremely rare is based upon typical wind farm topography and elevation. The steep terrain, and unconfirmed meteorological data, combined with elevated fuel loads compared to the norm, may likely result in a catastrophic wildfire event.*

Without comparable scenarios, existing data should not be relied on. In the alternative, the Applicant could continue its current site condition by maintaining the massive clearcutting already undertaken throughout most of the Project area. This, however, would result in the effective "permanent" removal of the "forest" ecosystem, and those environmental impacts would then need to be addressed, and presumably mitigated. Again, cost is a major part of the equation, and this Applicant has already said they are on the edge of viability. One can insure property, but not lives. Remedy - The DEIS should consider the Environmental Impacts of the project, as if the entire site were removed from Forestry altogether, and the ground maintained with minimal fuel loads. [*LTR 178, CMT 52]*

Response: Section 3.6 of the EIS describes the Project Area and the potential fire impacts from the proposed Project but does not specifically describe response measures for each possible scenario. There are numerous precautions that will be included in the Fire Protection and Prevention Plan that would be developed by the Applicant for EFSEC approval, as mentioned in Section 3.6.3, but this plan would not be prepared unless the decision is made to build the proposed Project. The Certificate Holder will be required to develop and implement an operations phase Fire Control Plan in coordination with state and local agencies to minimize risk of accidental fire during operation and to ensure effective response to any fire that does occur. The Site Certification Agreement will include a provision that no later than sixty (60) days prior to the beginning of Commercial Operation, the Certificate Holder shall submit the Fire Control Plan to EFSEC for review and approval. The fire protection plan and implementation of additional fire precautions will also be coordinated with the Skamania County Fire Marshall and DNR in response to fire conditions in the Project Area.

Comment: *[In reference to DEIS Section] 1.6, Table 1-1, Visual Resources: Operation. At a distance beyond 2500 feet, shadow flicker is considered. Even if shadow flicker were a proven impact, none of the planned turbines are within 2500 feet of existing residences. The statement fails to identify a permitted residential structure, applied well prior to WRE's Application, that is within 2000 feet of the proposed Facility. Remedy - Consider adding the following language to the end of the existing sentence: "… and the permitted residence at 2000 feet could be mitigated by appropriate vegetative screening placed by the Applicant on its land, adjacent to the affected residence." Since this 80 acres of land, in the Project Site, was just logged in June/July 2010, new vegetation will need to be planted if this measure is deemed appropriate. [LTR 178, CMT 53]*

Response: Section 3.6.2.1 discusses the use of operational controls that could be implemented to reduce shadow flicker. This includes controlling turbine speed or orientation during specific periods.

Comment: *[In reference to DEIS] Section 1.6, Table 1-1, "Operation," EMF from the project will be lower than those of many common household appliances and would have no health or safety impacts. Please provide/include data to support this assertion. Not only Electromagnetic Fields (EMF) should be included, but also stray electrical voltage produced during normal operations, during lightning storms, and especially power must be dumped into*

the ground during temporary grid overload conditions. One of SOSA's members, Tom Drach, and his family live at a residence roughly 2500 feet from proposed Turbines. There is strong evidence to suggest such stray electricity would pose a safety impact, due to potential failure of Electrical services and systems dependent upon such. For example, Ground-Fault Electrical Devices required by WA Code. The geology of this area is known to contain faults and fractures, which would tend to carry electrical energy much, much further than in an homogenous isotropic type soils, which is likely assumed in the Applicant's analysis. Remedy - Any proposed permit should include provisions for nearby residents to fully remedy issues related to stray voltage and stray electro-magnetic energy, with the entire cost burden placed on the Applicant. [*LTR 178, CMT 54]*

Response: EMF readings for transmission lines and common household appliances are shown in Table 3.6.4. Readings for transmission and distribution lines are shown to be lower than some common household appliances. The source of this information is the National Institute of Environmental Health Sciences. If the proposed Project were to be approved, EFSEC would provide plan review and inspection of construction activities for all Project buildings, structures, underground and overhead electrical lines, sanitary waste water discharge systems, and other Project facilities to ensure compliance with the Site Certificate Agreement. Construction would be in accordance with the approved design and construction plans, the IBC (International Building Code) and UBC (Uniform Building Code of 1997) and other relevant regulations. EFSEC may contract with Skamania County to provide these services. If Skamania County is unable to provide timely review and inspection services, EFSEC would coordinate with the County on the selection of other appropriate agency or firms to provide such services. Any additional information regarding EMF and BPA's transmission lines can be found on BPA's website at: *http://transmission.bpa.gov/LanCom/Safety_Around_Power_Lines/emf.cfm*.

Comment: *[In reference to DEIS Section] 1.6, Table 1-1, Visual Resources: Operation. The turbines would be visible from some viewpoints, including some within the CRGNSA. This project has the potential to create low to moderate levels of visual impact at key viewpoints. The statements made here should be quantified, or terminology defined more precisely. The wording tends to minimize the issue, and "low to moderate" should have some reference scale for decision-makers to know how to gage severity on a commonly understood basis. Such subjectivity, especially in a summary, can lead to erroneous interpretations. (Decision makers with limited time to review may rely on the Summary to inform them as to the critical issues involved) Remedy - Quantify the visual impacts in table format for each Key Viewing Area within the CRGNSA, as well as other noteworthy points in view of the proposed project. Remove subjectivity by implementing an intuitive, commonly understood reference scheme. [LTR 178, CMT 55]*

Response: "Low" and "moderate" impacts were defined in Section 3.9.3.1 on DEIS page 3-175. Additional discussion on the definition of these terms in the summary would not add clarity to the document, but would be repetitious.

Comment: *[In reference to DEIS] Section 1.6, Table 1-1, Public Services and Utilities: Operation, [t]he project's assessed value could be as much as $87.5 million, and this would generate approximately $800,000 per year in tax distributions….. AND Table 1.1 Socioeconomics: Operation, [t]he proposed project would have an estimated value of $87.5 million, which would represent an increase of 6.5% in assessed value in the County. At current tax rates, the increase in property tax revenue to the County would be $731,500 annually. The statement in Table 1.1 must accurately reflect the likely financial benefit, rather than the theoretical maximum, so the decision makers can weigh the true benefit appropriately. WRE's number grossly exaggerates the tax benefit to municipal, County, and local jurisdictions. The SEPA responsible official should contact Mr. Gabe Spencer, Skamania County Assessor, to confirm these numbers are not accurate. A member of SOSA had a conversation with Mr. Spencer on June 24, 2010, and left with the following understanding: Scenario 1, Project remains privately owned during operation then Assessed Value will be a negotiated 10 year average value which will remain constant for the first 10 years to offer more uniform cash flow for the County Budget versus Straight Line or MACRS depreciation methods. (ref Klickitat County model) Furthermore, by complex Budget laws, residents in the Underwood District would otherwise be potentially subject to the shortfall in revenue as depreciation mounted from the Project. (Surely this would be a strong negative for Underwood Community) So, under the 10 year average scenario, WRE's tax payments would be closer to $350,000 per year, NOT $800,000. Scenario 2, The Project is acquired by a WA state recognized public utility, like PSE. The tax for this is not determined by local real tax law, but by a complex formula within the State Dept. of Revenue (WDOR). According to Ms. Chris Miller, Columbia County, WA Assessor, their Projects which have fallen under WDOR jurisdiction have only provided their County with approximately one-third (33%) of the revenue claimed by the Applicant using the same assumptions as WRE has here. So this value would be ~$266,000, NOT $800,000 per year. Remedy - The SEPA Responsible Official should consult with the Skamania County Assessor to determine the potential financial outcomes, and report as such in the EIS. The only data provided in the EIS is clearly based on the Applicants information to the SEPA responsible official, and does not reflect the two MOST likely scenarios. If the present DEIS scenario is maintained, it should reflect a declining tax payment based on equipment depreciation, and the real, long-term burden on the Underwood residents thru increased levy rates. [LTR 178, CMT 56]*

Response: Table 1-1 serves only as a summation of the environmental consequences that are expected to occur from the Proposed Action. Section 3.13, Socioeconomics, gives more information pertaining to the expected economic benefits to Skamania County. Specifically, Section 3.13.1.4, Public Finance and Fiscal Conditions, discusses expected tax revenue benefits to Skamania County in more detail. Furthermore, the expected economic impacts to Skamania County are discussed in Section 3.13.2, Impacts.

Comment: *[In reference to DEIS] Section 1.6, Table 1-1, "Public Services and Utilities," "Operation: Fire Protection," [f]or the Operation phase of the project, nowhere is there listed an intent to construct and maintain a water reservoir or storage capacity for on-site fire suppression of the Project site if a Turbine fire failed to be contained. Given the fuel loads present, and lack of water, any Fire Protection and Prevention Plan should be required to*

include a storage reservoir suitable for use by both land-based equipment and fire-suppression helicopters. Due to steep terrain, the turbulent updrafts present along the ridgeline would limit the ability of fixed-wing aircraft to assist in fire suppression at key areas of the Project site. Simply complying with existing DNR regulations, as the Applicant suggests, does not suffice, for the DNR statues could not have contemplated the operation of Industrial-grade mechanical and electrical equipment of this magnitude operating in a forested environment, and 24 hours a day, a good portion of which without human observation. Remedy - Include the requirement for, and analyze the impacts of, establishing a fire suppression reservoir, or holding tanks to combat runaway fires. [*LTR 178, CMT 57]*

Response: Please see response to Comment LTR 178, CMT 52 above.

Comment: *[In reference to DEIS] Section 1.6, Table 1-1, Public Services and Utilities: Operation, [t]he project would employ eight to nine employees; most would be hired from the local area. Please also include the number of Full-Time Equivalences (FTE's) that these eight to nine employees would provide. This is the best way to clarify for the decision-makers how much benefit is realized thru Project operation. Remedy - Include Full-Time Equivalents (FTE's) as part of the description of Operations Personnel. [LTR 178, CMT 58]*

Response: Full-time equivalent (FTE) is utilized to measure a worker's involvement in a project. An FTE of 1.0 means that the person is equivalent to a full-time worker; while an FTE of 0.5 means that the worker is only employed half-time. Typically, different scales are used to calibrate this number, depending on the type of institution (schools, industry, research) and scope of the report (personnel cost, productivity). Furthermore, the Government Accountability Office (GAO) defines FTE as the number of total hours worked divided by the maximum number of compensable hours in a work year as defined by law. For example, if the work year is defined as 2,080 hours, then one worker occupying a paid full time job all year would consume 1.0 FTE. Two employees working for 1,040 hours each would consume 1.0 FTE between the two of them (where each worker would be working only half-time). Section 3.13.2.1, Impacts of the Proposed Action, presents this information in yet another way. The estimated annual labor cost of these 8-9 workers is expected to range from $167,000 to $188,000 per employee. Further discussion of these estimations and methodologies for predicting labor costs can be seen in Section 3.12.3 Mitigation Measures.

Comment: *[In Section 1-6, Table 1-1, under] "Socioeconomics: Operation," [b]ased on a review of available studies, operation of the project is not expected to create adverse impact to property values. Data on this subject is limited for a number of reasons. Significant differences in underlying assumptions hold for the WRE project. As such, "... a Property Value Guarantee (PVG) should be required of the developer. A State[-]controlled fund or developer bond should be required to guarantee no undue delay in PVG payment(s) to legitimately affected homeowners, and/or to buy out homeowners located within 2-miles of any turbines if they elect to relocate away from the turbine project(s) and cannot sell for the pre-project market value of their properties. Such a guarantee is nominal in cost, relative to total project costs, and are used*

to condition high impact land use approvals such as landfills and even limestone quarries, as well as other wind energy developments." References - Exhibit 2F, attached as separate PDF file due to size. Citation from McCann Appraisal LLC Property Value Report to Adams County Board, IL, June 8, 2010, copy included in Appendix [website added here: http://nowindfarms.com/blog/testimony-of-michael-mccann-on-property-value-impacts-in-adams-county-il/#]. This report includes several other recommendations, appropriate for conditioning the WRE Application, to protect residents if Developer claims are later determined to be incorrect. Remedy - The EIS should include, in the Appendix, a reference Template on a Property Value Guarantee, which generally outlines the structure and authority of such a Guaranteed by the Applicant. Decision-makers should have a clear idea of the likely protections which would be result, in the event they choose to implement such, as part of any conditioning of a project permit. [LTR 178, CMT 59]

Response: RCW 80.50.100 mentions the following: "The council shall include conditions in the draft certification agreement to implement the provisions of this chapter, including, but not limited to, conditions to protect state or local governmental or community interests affected by the construction or operation of the energy facility, and conditions designed to recognize the purpose of laws or ordinances, or rules or regulations promulgated thereunder, that are preempted or superseded pursuant to RCW 80.50.110 as now or hereafter amended. However, RCW 80.50.100 only addresses "community interests" which does not include personal property values. Therefore, discussions related to Property Value Guarantees are not handled by EFSEC or BPA and are outside the scope of this EIS.

Comment: *[In reference to DEIS] Section 1.7, Table 1-2, Public Health and Safety, [u]navoidable adverse impacts to environmental health are anticipated to be minimal. Please amend or clarify this statement, as it OMITS any reference to Public Safety. (The Element of the Environment heading is: Public Health and Safety) Plus, should one assume that the word "environmental" used in the DEIS is synonymous with "Public"? Remedy - Please correct the wording to address Public Health and Safety, rather than environmental health.* [*LTR 178, CMT 60]*

Response: The text in Table 1-2 of the DEIS, Public Health and Safety, has been updated to clarify the impacts of the potential Project to Public Health and Safety. Similarly, the heading for the row in Table 1-1 on page 1-25 of the DEIS has been changed from "Environmental Health" to "Public Health and Safety" for consistency. No changes to the description of impacts in the second column of Table 1-1 of the DEIS have been made because each of the impacts described are understood to be potential impacts to "Public Health and Safety," and are described in more detail in Section 3.6 of the EIS.

Comment: *[In reference to] Table 1-2, Noise: …and operation noise is predicted to be less than the nighttime threshold of 50 dBA Leq, per Washington State and Skamania County regulations. Short-term noise impacts during construction is exempt so long as it occurs during daytime hours, and operation noise is predicted to be less than the nighttime threshold of 50 dBA*

Leq per Washington State and Skamania County regulations. Even though Oregon has much more progressive laws on noise and setbacks, the minimum legal standard in WA is the (woefully inadequate) Washington Administrative Code (WAC 173-60). WA noise standards. The public welfare is better served by, and EFSEC is encouraged to so condition, the Environmental Protection Agency Guidelines: In April 1973, the local EPA Region X office published a document titled, "Environmental Impact Statement Guidelines." This document discusses potential impacts from noise increases in terms of expected community response to the introduced noise source. This regional EPA guideline document suggests the following potential community responses to ranges of noise increases: Up to 5 dBA increase – few complaints if gradual increase; 5 to 10 dBA increase – more complaints, especially if conflict with sleeping hours; Over 10 dBA increase – substantial number of complaints According to the EPA Region X document, generally no mitigation is required if the increase is less than 5 dBA. Some mitigation should be considered for increases of 5 to 10 dBA. Increases greater than 10 dBA would be considered serious and would warrant close attention. Reference - Kittitas Desert Claim 2004 FEIS at 3-192 : Environmental Protection Agency Guidelines All Verbal and Written comments submitted by Keith Brown and/or Teresa Robbins for the WRE DEIS, are incorporated by reference here by SOSA. Remedy - Consider requiring the Applicant to follow the document titled, "Environmental Impact Statement Guidelines," which would limit noise to 10 dBA over typical background levels (25 dBA nighttime, 35 dBA daytime, typ. for rural areas) Thus making the condition for noise not to exceed 35 dBA at night, and 45 dBA during the day. The WAC code did not contemplate noise sources from Wind Turbines, and their proximity to residential use. Furthermore, SOSA incorporates the recommendations of Keith Brown and Teresa Robbins by reference, regarding all the aspects of the noise subject. [LTR 178, CMT 61]

Response: In the absence of statutory noise limits, such as regulations and ordinances, for a project vicinity or jurisdiction, the acoustical expert would draw from practical experience, refer to appropriate standards, and use professional judgment or opinion to develop appropriate acoustical guidance criteria that may be used to assess noise impacts. However, for this Project vicinity, there is existing State and County regulation regarding acceptable noise levels, and they are clearly defined as absolute criteria. The mentioned EPA guidelines are only guidance, and their suggested relative-type criteria can be complicated to implement for determining impact assessment due to the nature of ambient environmental noise: it is subject to variance from a number of factors including seasonal presence of noisy wildlife (frogs, insects, migratory birds, etc.), climate (temperature, humidity), ground wind speed, levels of outdoor human activities (within a community or at an individual property), surface traffic, aviation over-flights, seasonal HVAC usage (air conditioners during the summer months) and precipitation (rainfall on roofs, road surfaces, etc.).

Comment: *General Comment on DEIS - Certain claims by the Applicant can neither be substantiated with certainty or refuted with certainty. In these cases, the Council should neither consider a claim to be a benefit or a detriment to the proposed Project. For example, Global warming, reduction in CO2 emissions, as supported by several scientific papers concluding that the "jury is still out" on some of these issues. Remedy - The EFSEC Council should consider these types of claims as neither a significant benefit or a significant detriment to the proposed Project. [LTR 178, CMT 135]*

Response: EFSEC will consider the reasonableness of expected Project benefits and detriments in conjunction with the broad interests of the public as part of its recommendation to the Governor concerning the proposed Project.

Comment: *General Comment on DEIS - Applicant must provide met data and "wind power" analysis (confidentially if needed) to EFSEC Council to justify why this site is sooooo much better that others, that it could justify or warrant consideration in light of all the issues against. Wind Power is defined as the integral of wind "energy" with time. This is commonly approximated as a function of average wind speed spanned out over a long time period. One must note that the calculated wind speeds (or power) just north of the north BPA line are a maximum for the project site, and the average for the site, as a whole, would be considerably less. Remedy - Financial justification for the Project needs to be disclosed and verified. [LTR 178, CMT 139]*

Response: The purpose of the EIS that has been prepared is to evaluate the potential environmental impacts that could occur from the lead agencies' actions concerning the proposed Project, not to require financial or resource justification for the proposed Project itself. In other words, neither SEPA nor NEPA require that an EIS prove or validate the applicant's business case for its proposal.

Comment: *General Comment on DEIS - It appears that many general and specific issues raised in the Scoping Report are not addressed, or not adequately addressed. To ensure the integrity of the Scoping Process, SOSA recommends the DEIS or "FDEIS" include a "Response Matrix" which would indicate the location (s) within the DEIS where the response, rebuttal, or otherwise answer to EACH scoping comment can be found. Remedy - Close the loop with the public comments by indicating responses in a "Response Matrix" as described to the left. [LTR 178, CMT 140]*

Response: Please see response to Comment LTR 119, CMT 2 above.

Comment: *General Comment on DEIS - Issues raised in the Scoping Process, under the Category of "Documents" (Issue Code "DX"), are not broken down in any detail. Lack of categorization of the individual documents, and subjects within, could have led to an important issue not being addressed. As part of the "Results Matrix" comment above, any matter raised in the "DX" issue code should be re categorized separably into the other Categories, and likewise noted where these issues are addressed in the DEIS. [LTR 178, CMT 141]*

Response: Please see response to Comment LTR 119, CMT 2 above.

Comment: *Furthermore, a supplementary DEIS or a new DEIS should be issued and public comment provided. [LTR 178, CMT 141]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *In reference to Exhibit 21, Page 1 - Pink Color Routes are the non-viable Alternate Routes identified in the DEIS.(at 1-16) Ausplund Road is NOT a possible alternative, given new road building within the NSA would be required, which the Applicant has acknowledged is not allowed for this use within the NSA. Pictures of the now overgrown portion of Ausplund road is shown on following pages. DEIS states in 1.4.3.6 (at 1-16) that both Alternatives have been eliminated as an alternative due to road construction requirements within the NSA. As such, the DEIS is deficient in that no Construction Roadway alternatives are identified or considered. SOSA has identified two alternatives - namely Schoolhouse to Little Buck Creek Road, and Lalock-Kelchner Roads, both of which will take traffic out of the NSA and allow the Applicant to build roads on property which it ALREADY owns, all the way to the proposed Project site. [LTR 178, CMT 143]*

Response: The Applicant has evaluated numerous alternative access roads and believes that the currently proposed access route described in Section 1.4.1.6 is the best option.

Comment: *We find that, in many areas, the present DEIS is completely insufficient and we urge that the NEPA/SEPA responsible officials prepare a supplemental DEIS. [LTR 178, CMT 146]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *The DEIS is so deficient that it cannot be used as the basis for a decision on the project. The proposed project should be denied outright, but if it is to be given further consideration, a supplemental or revised DEIS is required. [LTR 179, CMT 5]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Unfortunately, this Draft Environmental Impact Statement fails to take the hard look required by NEPA and SEPA. The DEIS is fundamentally flawed because it improperly narrows the scope of study, ignores and trivializes the impacts of the project, ignores or summarily dismisses detailed comments from the public and expert agencies, and was largely drafted and/or influenced by the applicant and the applicant's consultants behind closed doors and is therefore extremely biased in favor of the project. [LTR 179, CMT 5]*

Response: Please see response to Comment LTR 60, CMT 1 above.

Comment: *The National Environmental Policy Act. A major purpose of the National Environmental Policy Act ("NEPA") is to ensure that federal agencies conduct fully informed environmental decision-making. NEPA promotes its sweeping commitment to "prevent or eliminate damage to the environment and biosphere" by focusing the attention of federal decision makers and the public on the environmental and other impacts of proposed agency action. 42 U.S.C. § 4321. By focusing agency attention on the environmental and socioeconomic impacts of a proposed action, NEPA ensures that the agency will not act on incomplete information, only to regret its decision once finalized. See Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989). To that end, "[t]he sweep of NEPA is extraordinarily broad, compelling consideration of any and all types of environmental impacts of federal action." Calvert Cliffs' Coordinating Comm. v. U.S. Atomic Energy Comm'n, 449 F.2d 1109, 1122 (D.C. Cir. 1971). An agency must "take the initiative of considering environmental values at every distinctive and comprehensive stage of the process." Id. at 1111. [LTR 179, CMT 11]*

Response: The objectives and requirements of NEPA and SEPA are noted. The lead agencies believe that all applicable NEPA and SEPA requirements have been met.

Comment: *The State Environmental Policy Act. The Washington State Environmental Policy Act ("SEPA") applies to state and local governmental actions and decisions. SEPA's general purpose is to require consideration of environmental factors at the earliest possible stage in order to allow decisions to be based on a complete disclosure of environmental consequences. See Stempel v. Dept. of Water Resources v. City of Kirkland, 82 Wn. 2d. 109, 118 (1973). Agencies are required to engage in an open and public study of environmental impacts at the earliest possible time. RCW § 43.21C.030(b); see also WAC § 197-11-300. Agencies must assess the likely cumulative, direct, indirect, short-term, and long-term impacts to the environment. WAC 197-11-030(2)(b), (2)(g); see also State Environmental Policy Act Handbook (SEPA Handbook) at 2 (2003). Agencies must also evaluate alternatives and mitigation measures. WAC 197-11-055(2)(c); see also SEPA Handbook at 2. Agencies "shall not limit" consideration only to impacts within the boundaries of the agencies' jurisdiction. WAC 197-11-060(4). For projects with likely significant impacts, environmental impact statements are required to ensure that government agencies and interested citizens have an opportunity to thoroughly review environmental impacts of proposed actions at the earliest possible stage; the agency must use the EIS in planning actions and making decisions. WAC 197-11-400(4). "The primary purpose of an environmental impact statement is to ensure that SEPA's policies are an integral part of the ongoing programs and actions of state and local government." WAC 197-11-400(1). The EIS must be impartial and must inform decision makers of alternatives and mitigation measures that avoid or minimize impacts of a proposed action. WAC 197-11-400(2). The EIS must not merely rationalize a predetermined outcome. WAC 197-11-402(10). ("EISs shall serve as the means of assessing the environmental impact of proposed agency action, rather than justifying decisions already made.") Rather, the EIS must include sufficient objective analysis to actually inform the agency's decision making process. The EIS must be completed early enough to serve as a practical contribution to the decision making process. WAC 197-11-406 ("The statement shall be prepared early enough so it can serve practically as an important contribution to the decision making process and will not be used to rationalize or justify decisions already made."); see also King County v. Boundary Review Board, 122 Wn.2d 648, 666, 860 P.2d 1024 (1993); Barrie v.*

Kitsap County, 93 Wn.2d 843, 854, 613 P.2d 1148 (1980); Mentor v. Kitsap County, 22 Wn.App. 285, 291, 588 P.2d 1226 (1978). For projects with potentially significant or serious impacts, SEPA requires the same hard look that NEPA does. "The level of detail shall be commensurate with the importance of the impact," and in the face of any scientific uncertainty, the EIS must disclose the uncertainty and analyze the worst case scenario and the likelihood of its occurrence. WAC 197-11-402(2) and 197-11-080(2). [LTR 179, CMT 12]

Response: Please see response to Comment LTR 179, CMT 11 above.

Comment: *The DEIS is Improperly Designed so that the Applicant's Private Economic Interests Unlawfully Dictate the Purpose, Need, Alternatives, and Eventual Outcome for the Proposed Action. A. The Purpose and Need Statement in the DEIS is Being Improperly Driven by the Applicant's Private Economic Interests. NEPA requires federal agencies to "rigorously explore and objectively evaluate all reasonable alternatives" to a proposed action. 40 C.F.R. § 1502.14(a). In order to do so, the agency must first reasonably and objectively define the purpose and need of a proposed action. See Simmons v. United States Army Corps of Eng'rs, 120 F.3d 664, 666 (7th Cir. 1997) (citing Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 195–96 (D.C. Cir. 1991)). The chosen statement of purpose and need effectively dictates the range of alternatives evaluate in an EIS. Id. "[A]n agency cannot define its objectives in unreasonably narrow terms." City of Carmel-By-The-Sea v. United States Dep't of Transp., 123 F. 3d 1142, 155 (9th Cir. 1997). "An agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative... would accomplish the goals of the agency's action, and the EIS would become a foreordained formality. Nat'l Parks & Conservation Ass'n v. Bureau of Land Mgmt., 606 F.3d 1058, 1070 (9th Cir. 2010). Moreover, an agency may not allow the economic needs and goals of a private applicant to define the purpose and need, and hence the inevitable outcome, of an EIS. Id. Unfortunately, that is exactly what is happening with this EIS. [LTR 179, CMT 13]*

Response: EFSEC and BPA have identified their respective need for action in a manner entirely consistent with SEPA and NEPA. As discussed in Section 1.2.1 of the EIS, EFSEC's need for action is to respond to an application by WRE for a site certificate. As discussed in Section 1.2.2 of the EIS, BPA's need for action is to respond to WRE's request for an interconnection of its proposed Project to the Federal Columbia River Transmission System (FCRTS). Each agency also has separate purposes (i.e., objectives) that it will bear in mind and attempt to meet in reviewing and making a decision on the Project. Given the agencies' need for action in this case (i.e., to approve or deny an application and request), the range of alternatives considered in detail in the EIS is not unreasonable. In addition, the agencies considered a number of other alternatives but eliminated those alternatives from detailed study in the EIS, as discussed in Section 2.3.

Comment: *The DEIS lists the applicant's "needs," including the "business needs of the applicant" (such as "diversifying the holdings" of the Applicant) as stated needs for the project, and lists no agency-defined objectives or needs other than complying with applicable laws. The*

DEIS fails to even acknowledge that the agencies have no obligation or responsibility whatsoever to meet the applicant's needs or desires. As a result, the Applicant-identified needs are defining and driving the characteristics of this project and the alternatives thereto. This approach is inappropriate and unlawful. [LTR 179, CMT 14]

Response: Please see response to Comment LTR 179, CMT 13 above.

Comment: *Interestingly, some of the Applicant-identified needs are suspect. For instance, the Applicant identifies a need for utilities in Washington State to provide more alternative energy to their customers. DEIS at 1-4–1-6. But nowhere has the Applicant specified or publicly committed to sell the electricity from this project within Washington State. As it stands, well over half of all the wind energy produced in Washington and Oregon is currently being sent to California. If a similar fate occurs with the electricity from the Whistling Ridge project, then the Washington state requirements for alternative energy are wholly irrelevant to the project. The applicant cannot have it both ways. It cannot assert that meeting Washington state renewable portfolio standards is a need for the project, and yet refuse to commit energy from this project to remain in Washington state. [LTR 179, CMT 15]*

Response: Please see response to Comment LTR 178, CMT 39 above.

Comment: *The DEIS repeatedly states or implies that the project would reliably produce between 70 MW and 75 MW of energy. See, e.g., DEIS at [Pages] 1-9, 3-90, 3-271. The DEIS significantly overvalues the generating potential of the project. Wind energy facilities cannot continually generate energy at their rated capacity. Generally, wind energy facilities generate energy at 30% of capacity. So for this project, the actual energy output would be only 21 MW. Every assertion or implication in the DEIS that the Whistling Ridge project would produce 70 or 75 MW of energy must be corrected to reflect the likely actual production of the facility. This correction must also be reflected in the purported need to produce at least 70 MW of energy for the project to be marketable. In any event, the facility would likely deliver 21 MW of energy to the grid. [LTR 179, CMT 16]*

Response: The commenter is referring to the distinction between the total capacity of a generator (expressed in terms of megawatts, or "MW"), and the average capacity of a generator (expressed in terms of average MWs, or "aMW"). The EIS correctly uses these terms and accordingly does not overstate the generating capacity of the proposed Project.

Comment: *Further, the Applicant's purpose and need statement appears to be defined only in terms of conveying power from a wind energy generation facility. This purpose and need is too narrowly limited, and avoids the question of whether there truly is a need for a wind energy project. As a result, the purpose and need statement improperly limits the alternatives considered by the agencies. [LTR 179, CMT 17]*

Response: The Applicant-identified needs contained in Section 1.2.3 of the EIS are not only defined in terms of conveying power. These needs also involve developing renewable resources and diversifying the Applicant's business. However, it is true that the Applicant has specifically proposed a wind generation project, and that is what is evaluated in the EIS. Regardless, no matter how the Applicant defines its needs, it is the agency's need for action that defines the range of alternatives to be considered in an EIS.

Comment: *The Stated Purposes Fail to Acknowledge EFSEC's Duty to Protect State or Local Governmental or Community Interests. One of EFSEC's mandates is to "protect state or local governmental or community interests affected by the construction or operation of the energy facility." WAC 463-64-020. Any site certification agreement must contain conditions to meet this mandate. Id. The DEIS fails to even mention this mandate, let alone apply it. This mandate should be expressly included in the stated purpose and need for action on page 1-3 of the EIS, and should be applied and reflected throughout the DEIS. [LTR 179, CMT 19]*

Response: EFSEC SEPA rules provide the option for the Applicant to prepare EIS documents, with oversight from the EFSEC responsible official. The DEIS was prepared in this manner. EFSEC and its independent consultant reviewed all DEIS information including visual resources before the DEIS was issued by EFSEC and BPA. However, neither EFSEC nor its independent consultant performed the actual visual analysis.

Comment: *Originally, the agencies stated that the Applicant and its consultants would be preparing the EIS. However, because the public objected to this arrangement and pointed out that it would violate NEPA, the agencies made the following announcement in the DEIS May 21, 2010 cover letter: While EFSEC and BPA are the entities that have prepared the Draft EIS, these agencies have worked collaboratively with Whistling Ridge Energy LLC to obtain necessary information about the project and its potential impacts for the EIS. Initially, EFSEC had intended to allow Whistling Ridge Energy LLC to prepare the EIS, as allowed by SEPA; however, after public concern was raised, EFSEC and BPA decided that the lead agencies would be directly responsible for preparing the EIS. Accordingly, we have used environmental information provided by Whistling Ridge Energy LLC and its consultants in the EIS as appropriate. All such information has been independently evaluated and reviewed for accuracy by the lead agencies, as well as by an independent, third party consultant retained by EFSEC. This statement invites more questions than it answers. What was the exact nature and extent of the involvement of WRE and its consultants in the preparation the DEIS? Did they simply supply environmental "information," as stated in the cover letter, or did they supply analysis, findings, and/or conclusions for the DEIS? [LTR 179, CMT 30]*

Response: The lead agencies believe that they have produced a reasonably thorough analysis of the proposed Project that adequately considers all points of view. BPA and EFSEC staff actively and extensively participated in the preparation of the EIS, as required by SEPA and NEPA. Both SEPA and NEPA allow for the use of environmental information, in whatever form, from the Applicant for use in the preparation of an EIS. In fact, SEPA allows for an

applicant to prepare the EIS. Nonetheless, where the lead agencies used information provided by the Applicant or its consultants, this information was thoroughly reviewed and independently evaluated by the agencies to ensure its competency and accuracy. This approach is consistent with the intent of SEPA and NEPA that acceptable environment work not be redone, but that it instead simply be verified by the lead agency. Accordingly, the lead agencies appropriately took full responsibility for the scope and content of the EIS, and have fulfilled their respective responsibilities for EIS preparation under SEPA and NEPA.

Comment: *There is a major difference between the applicant's consultants supplying the agencies with information and data (such as species survey data, photographs, coordinates for turbine locations, etc.) and the applicant's consultants drafting analysis and conclusions to be inserted into the DEIS document. Unfortunately, the DEIS cover letter does not satisfactorily explain which scenario occurred, but the extremely biased nature of the DEIS in favor of the project strongly implies an active role by the Applicant's consultants in its preparation. [LTR 179, CMT 35]*

Response: Please see response to Comment LTR 179, CMT 30 above.

Comment: *Although the agencies claim to have "prepared" the content of the DEIS and independently reviewed and verified any information from the applicant, by all outward appearances this did not occur—at least with major sections of the DEIS. Rather, it appears that the Applicant's consultants were allowed to write major portions of the DEIS. If so, then the Applicant has been allowed to exert undue influence over the content of the DEIS. The predictable outcome is a DEIS that, in effect, serves as an extremely biased and result-oriented prospectus for the proposed project exactly as proposed by the Applicant, instead of the searching and balanced decision-making document required by NEPA and SEPA. NEPA case law and guidance are clear that an applicant, such as Whistling Ridge Energy, should not be allowed to influence the analytical content of an EIS. See, e.g., Sierra Club v. Sigler, 695 F.2d 957, 962 n.3 (5th Cir. 1983) (expressing serious concern over role of private firm in preparation of EIS). An EIS must be an entirely objective analysis intended to aid the decision maker and the public in understanding the consequences of an agency decision. Thus, it is standard practice for action agencies to ensure that applicants for federal action are insulated from all aspects of EIS preparation other than providing information. Any arrangement that allows the very same consultants who drafted the application to also draft analytical content for the DEIS is improper and cannot be allowed to continue. If in fact the agencies have been relying on the Applicant's consultants (rather than agency employees) to draft analytical content for the DEIS, then the agencies should immediately withdraw the DEIS, and should either retain new consultants unaffiliated with the applicants to prepare a revised DEIS or should ensure that a revised DEIS is drafted by disinterested agency employees. The Applicant and its consultants must not be allowed to continue to play a direct and significant role in the preparation of factual and legal conclusions in the EIS. Such a role is improper and invalidates the DEIS as the basis for further decision-making. The agencies also state that they have hired a third-party consultant who has been charged with independently verifying the content of the DEIS. However, it is ultimately the*

agencies' responsibility, and not that of any consultants, to independently verify the DEIS. [LTR 179, CMT 36]

Response: Please see response to Comment LTR 179, CMT 30 above.

Comment: *An attached May 28, 2010 email string further calls into question whether EFSEC and BPA staff actually wrote the content of the EIS, or allowed the applicant's consultants to write it. The emails show that a landscape architect with the U.S. Forest Service telephoned the EFSEC Site Manager "express[ing] concerns about the quality of the [visual resource] analysis." The Forest Service employee asked EFSEC "who did the analysis," "what their qualifications were," and "whether or not a Landscape Architect was consulted during development of this section." Apparently not knowing the answer to these questions, the EFSEC Site Manager appears to have referred the questions to the Project Manager with URS Corporation, the Applicant's lead consultants. As with the agencies' DEIS cover letter, this email string poses a number of questions. If EFSEC and BPA prepared the DEIS, why does it appear that EFSEC had to ask the Applicant's consultants who wrote it? If the agencies were directly responsible for the content of the EIS, why did they not know whether a landscape architect participated in its drafting? And as the Forest Service asked, who in fact "did the analysis," and what were their qualifications? On the face of the email and the DEIS itself, it certainly appears as if the same people who wrote the application (i.e., the Applicant's consultants) were also allowed to prepare the analysis reviewing the application. In fact, it appears that the entire scenic resources analysis section of the application, including all analysis, findings, and conclusions, was simply lifted from the application and inserted verbatim into the DEIS. [LTR 179, CMT 36]*

Response: The lead agencies believe that they have produced a reasonably thorough analysis of the proposed Project that adequately considers all points of view. BPA and EFSEC staff actively and extensively participated in the preparation of the EIS, as required by SEPA and NEPA. Both SEPA and NEPA allow for the use of environmental information, in whatever form, from the Applicant for use in the preparation of an EIS. In fact, SEPA allows for an applicant to prepare the EIS. Initial preparation of the DEIS was done by the Applicant's consultant, including the visual resource analysis. Nonetheless, where the lead agencies used information provided by the Applicant or its consultants, this information including the visual resource analysis was thoroughly reviewed and independently evaluated by the agencies to ensure its competency and accuracy. This approach is consistent with the intent of SEPA and NEPA that acceptable environment work not be redone, but that it instead simply be verified by the lead agency. Accordingly, the lead agencies appropriately took full responsibility for the scope and content of the EIS, and have fulfilled their respective responsibilities for EIS preparation under SEPA and NEPA. A list of preparers can be found in Chapter 6 of the EIS.

Comment: *The applicant here, Whistling Ridge Energy, desires to construct an additional 35 turbines on DNR lands immediately adjacent to the north of this project. This project, known as "Saddleback" or "Whistling Ridge Phase II," has been placed on hold by the DNR, but that hold*

could be removed at any time. The DEIS states that "use of these lands for project turbines was rejected from further consideration." DEIS at 1-14. However, recent public records requests have uncovered new evidence that the use of DNR lands is still contemplated by WRE. Specifically, the attached April 9, 2010, email shows that WRE was evaluating whether a temporary FAA moratorium on certain wind projects would prohibit expansion onto the DNR lands. The DEIS fails to sufficiently address the likelihood of Phase II of this project going forward, and fails to address the cumulative impacts of expanding the scope of this project onto the adjacent land. All phases and portions of a project must be evaluated at the outset during environmental review of the first phase. See Merkel v. Port of Brownsville, 8 Wn. App. 844, 850–51, 509 P. 2d 390, 395 (1973); Indian Trail Property Owner's Ass'n v. City of Spokane, 76 Wn. App. 430, 443, 886 P.2d 209 (Wn. App. 1994). [LTR 179, CMT 51]

Response: For the proposed action, the EIS evaluates what has been proposed to the lead agencies by the Applicant, as required by SEPA and NEPA. What has been proposed does not include development of any additional turbines on adjacent DNR land, nor does it include the interconnection of any additional power to the FCRTS. In addition, as discussed in Section 2.3.2 of the EIS, DNR is not interested in allowing development of wind turbines on the adjacent DNR land, regardless of any previously expressed wishes by the applicant. Given this situation, not only is wind development of DNR land not part of the proposed action, it is also not considered reasonably foreseeable for the purposes of the cumulative impact analysis in the EIS.

Comment: *I recommend that the DEIS for Whistling Ridge be withdrawn, and that a new one be prepared. [LTR 181, CMT 63]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *While we understand that the DEIS is being prepared by EFSEC and BPA, we have concerns as to the degree of input into the document that has been received from the applicant WRE. In the recent submission from WRE they indicate that they have participated in meetings with staff and Council consultants regarding the DEIS. [LTR 184, CMT 1]*

Response: Please see response to Comment LTR 179, CMT 30 above.

Comment: *Based on our review, we have assigned a rating of LO (Lack of Objections) to the DEIS. This rating and a summary of our comments will be published in the Federal Register. A copy of the rating system used in conducting our review is enclosed for your reference. [LTR 189, CMT 8]*

Response: Comment acknowledged.

Comment: *The DRAFT states on page 1-35 – Summary of Unavoidable Adverse Impacts – Table 1-1 – Visual Resources; "The project would cause some visual impact to surrounding areas where turbines were visible, including some areas inside the Columbia River Gorge National Scenic Area. The visual impact analysis showed that the anticipated level of visual impact would not be higher than low to moderate at any of the viewpoints examined." Greg Neely Comment 6-16-10: To state, "the visual impact would not be higher than low to moderate" is extremely subjective, given the proximity to the Columbia Gorge National Scenic Area. It's my opinion that the most crucial viewpoints are: Hood River, Columbia River Waterway (adjacent to Hood River), Columbia River Shoreline Recreation Sites (Adjacent to Hood River and Mosier), I-84 Freeway (From Hood River to Mosier in both directions) [LTR 194, CMT 1]*

Response: The criteria used for selecting viewpoints are discussed in Section 3.9.2.3 (DEIS page 3-164). Locations were chosen based upon their representation relative to the Project Area, those that were most accessible to the public, and locations with the largest number of viewers. Viewpoints from within Hood River (8, 17, and 18) and between Hood River and Mosier (11 and 12) are considered in the impacts analysis. Please refer to Figure 3.9-1, Locations of Simulation Viewpoints, to reference where the viewpoints used in this analysis are located relative to the Project Area.

Comment: *Specific Comments. 1. Independent Evaluation. In our scoping comments for this project, Seattle Audubon identified multiple issues in the application that needed thorough review to adequately evaluate the potential environmental impacts of this project. Unfortunately, the DEIS fails to address many of the issues we previously identified. In many instances, the DEIS simply repeats the information presented in the application with no new analysis or documentation. We urge your agencies to ensure that the Final Environmental Impact Statement (FEIS) fully addresses these inadequacies. [LTR 196, CMT 2]*

Response: Please see response to Comment LTR 119, CMT 2 above.

Comment: *Distribution of Project Power: One of the applicant's stated objectives for this project is "to provide an additional renewable resource for electrical utilities in Washington." (DEIS p. 1-7) We welcome that intent and request that any certification for this project include a provision that the power from project be sold to Washington utility(s) as opposed to being sold into the California market. Because the potential adverse impacts of this project would be experienced locally, it makes sense to keep the project benefits local as well. In addition, such a provision would also help relieve some of the current pressure on the California intertie that is causing challenges for BPA in integrating wind resources into its transmission system. [LTR 196, CMT 12]*

Response: Please see response to Comment LTR 178, CMT 39 above.

Comment: *Related Concerns: 1. A first Gorge Windmill project will set a precedent. Other proposals and very likely other windmill farms will follow. New companies (for example a conglomerate such as General Electric) will be much less concerned about the welfare of this area than our neighbors at SDS. [LTR 230, CMT 2]*

Response: Please see response to Comment LTR 119, CMT 11 above.

Comment: *Huge steel towers with massive concrete bases would be with us a very long time. The costs of removing an obsolete windmill would be substantial. But how long would a wind tower be useful? [LTR 230, CMT 4]*

Response: As discussed in Section 2.1.7 of the EIS, the proposed Project, including the wind turbines, is expected to have a useful life of at least 30 years. However, it is possible (and generally likely) that in the future, aging project components would be replaced as needed, which could extend the useful life of the Project for years or even decades beyond the current expected project lifespan.

Comment: *It is the Lead Agency's responsibility under the State Environmental Policy Act to fully consider the environmental impacts of the Proposed Action. As Lead Agencies, EFSEC and BPA need to weigh the proposal's limited environmental impacts against its relevant and consequential environmental benefits. Of the many EISs I've reviewed, I cannot think of a clearer example of where the significant positive regional and global environmental consequences outweigh the negligible, local adverse impacts. [LTR 231, CMT 6]*

Response: Comment acknowledged.

Comment: *Related Concerns: 1. A first Gorge Windmill project will set a precedent. Other proposals and very likely other windmill farms will follow. New companies (for example a conglomerate such as General Electric) will be much less concerned about the welfare of this area than our neighbors at SDS. [LTR 241, CMT 4]*

Response: Please see response to Comment LTR 119, CMT 11 above.

Comment: *Huge steel towers with massive concrete bases would be with us a very long time. The costs of removing an obsolete windmill would be substantial. But how long would a wind tower be useful? [LTR 241, CMT 6]*

Response: Please see response to Comment LTR 230, CMT 4 above.

Comment: *The project is inappropriate in that it addresses only the fiduciary interests of a local company and not overall needs of the County, it's residents or the Nation. In a time of rapidly decreasing forested areas in the world and climate change removing forest forever, i.e., 9 feet of concrete to support windmills, destroying watershed, creating lanes to move power with towers, destroying wildlife habitat, makes little sense. [LTR 245, CMT 2]*

Response: Please see response to Comment LTR 179, CMT 13 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. [LTR 266, CMT 6]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BP A need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the hue environmental impacts of the project. If another DEIS is issued the 50- turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 270, CMT 7]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *For the following reasons, as well as those that others have taken the time to bring to your attention, I strongly feel that a completely revised document must be created to stand as an accurate and unbiased presentation of information that Council members can use to make an informed decision regarding this proposal. [LTR 272, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *The existing document shows a lack of professionalism in many important areas that is inappropriate to both the SEPA NEPA requirements and the process, as well as to the scale and potential impact of the proposal upon the region and its varied resources. [LTR 272, CMT 1]*

Response: EFSEC and BPA believe that they have produced an EIS that fairly and adequately analyzes the proposed Project, and that fully complies with both SEPA and NEPA. No decision has been made regarding whether or not to approve the proposed Project. That decision will come after completion of the EIS process.

Comment: *[In reference to DEIS] Section 1.1.1, Pg 1, Para. 2, Interconnection, and Section 1.2.2, Pg 4, BPA Purpose and Need for Action, I do not believe that BPA has yet responded to the request for interconnection. The nearby BPA transmission lines are at carrying capacity with a backlog of other requests for interconnection. Although the location is referred to in Section3, the precise location for the proposed Whistling Ridge Project interconnection is presently unknown, since no new transmission line has yet been constructed, nor has firm commitment from BPA to existing lines been granted. This renders the cumulative impacts assessment incomplete. It is also incomplete with respect to several other facets of this proposal as well. The BPA new line access corridor construction and interconnection costs, design and placement of any collector substation and interconnection structure, as well as an evaluation of the resulting environmental impacts of their construction and operation would be legitimate, mandatory elements for inclusion in this document. Since BPA is partially responsible for the DEIS document, it should not be problematic for the agency to include an open and clearly understandable discussion of the agency's present interconnection problems as they relate to the current proposal, thus clarifying this aspect of the EIS. There is discussion of possibilities that were considered but rejected, however, the option finally chosen appears to be questionable, especially since BPA has offered no firm commitment. [LTR 272, CMT 2]*

Response: BPA's transmission studies for the proposed Project have shown there is sufficient available transmission capacity on existing BPA transmission system to provide transmission service for the proposed Project. In other words, no upgrades of the BPA transmission system (other than the proposed interconnection substation already considered in the EIS) would be required, and there would be no detrimental effect on this system. In addition, Columbia River hydrosystem generally has sufficient reserve capacity to provide for fluctuations in wind generation, although BPA is currently investigating potential options to ensure capacity. The potential for natural gas plants to be developed is discussed in other responses in this section. The potential for wind projects such as the proposed Project to result in cumulative impacts to Columbia River fish species due to the interplay of these operations with hydrosystem operations during certain conditions is discussed in Section 3.14.3.5 of the EIS and in other responses in this section.

Comment: *[In reference to DEIS] Section 1.2.3.2, Pg 6, "...it is critical to locate projects in areas where transmission lines currently exist. The applicant thus needs to locate near existing high-voltage transmission, such as the FCRTS." As noted above (in Section 1.2.2 notes), the currently existing BPA transmission line is running at capacity, with no possibility for the addition of large additional sources, such as this project's proposed output would comprise. The critical issue regarding wind facilities is indeed appropriate siting, but not for the reason of proximity to transmission lines. The applicant (I assume this is the author) misunderstands the basic premise and need for an environmental impact statement. The lack of transparency regarding this issue is disturbing, and should be clarified in the BPA discussion of the issue, rendering this claim invalid. It should be removed from the document; it appears repeatedly in all Sections. [LTR 272, CMT 2]*

Response: To clarify, the proposed Project would interconnect to an existing BPA transmission line that is not currently at capacity. In addition, transmission system

improvements currently being built by BPA, such as the under construction McNary-John Day 500-kV transmission line, will help further alleviate congestion on existing BPA lines in the area. The Applicant has closely coordinated with BPA staff to determine transmission capacity availability. As part of this coordination, BPA transmission planners have reviewed the proposed interconnection and found that it can be reliably interconnected, and that transmission service can be provided. The Applicant's objective of locating near the FCRTS thus is a legitimate consideration.

Comment: *[In reference to DEIS] Section 1.2.3.3, Pg 6, Business Needs of the Applicant, [a]n EIS is not a branch of any chamber of commerce nor is an EIS a forum for advertisement. The history of the applicant/company is already included in the Appendices. [LTR 272, CMT 2]*

Response: Please see response to Comment LTR 76, CMT 2 above.

Comment: *[In reference to DEIS] Section 1.3.2, Pg 1, "[t]he EIS will be used primarily to inform ...." As it stands, I do not feel this document yet contains the essential information needed for informed, responsible decision making, especially in the areas of wildlife impacts, soils/geology and cumulative impacts analysis. It must be improved significantly before it can serve its intended purpose. This may take more time, but it will certainly ensure that the final EIS is a more suitable document for unbiased decision-making, which at this point it is not. [LTR 272, CMT 3]*

Response: Please see response to Comment LTR 60, CMT 1 above.

Comment: *[In reference to DEIS] Section 1.2.3.3, Pg 6, Business Needs of the Applicant. An EIS is not a branch of any chamber of commerce nor is an EIS a forum for advertisement. The history of the applicant/company is already included in the Appendices. Other local background information is included in Section 3.10.2.1, Historic Background, and this is where it belongs. Every company has business needs but this is not the arena for such discussion. This heading and its text should be removed. [LTR 272, CMT 3]*

Response: Please see response to Comment LTR 76, CMT 2 above.

Comment: *[In reference to DEIS] Section 1.3.3 and 4, Pgs 8, 9, NEPA Section 102(2)(c) requires that alternatives to the proposed action be provided. There are no Action Alternatives offered in this document (the No Action Alternative is not considered a viable alternative.) Alternatives must be presented and discussed as real possibilities, not avoided by stating that alternatives were "considered but eliminated from detailed study" as is stated in Section 1.4.3. The Applicant cannot choose to avoid this requirement. Although it is stated several times that*

the document "... is intended to fulfill the format and content requirements" of a joint SEPA/NEPA EIS, it falls well short in many areas. [LTR 272, CMT 4]

Response: The lead agencies believe that the EIS considers a reasonable range of alternatives and adequately describes these alternatives, consistent with the requirements of both SEPA and NEPA. Issues raised in these comments specific to alternatives considered but eliminated from detailed study in the EIS are addressed in other response to comments in this section.

Comment: [DEIS] *Section 1.4.1.2 states that a trench, approximately 8.5 miles long and 5 feet wide would be required to place collector cables. Will the removed soil be compacted as it is returned to the trench? Will the soil returned to the trench be returned in the same order that it was removed? What will the compaction guidelines entail? Who ensures that it is done properly? [LTR 272, CMT 6]*

Response: As discussed in Section 1.4.1.3, excavated soils will be used to backfill the trenches. Additional information on earth disturbing activities was presented in Section 3.1.2.1. Proposed clearing and grading activity will be consistent applicable codes and standard engineering practices. As mentioned in Section 3.3.1.3, test pits were conducted to assess both the near-surface soil and rock characteristics ranging in depth from 7-16 feet in depth. No groundwater was encountered at that time. It was also noted that these observations were made based on a one-time sampling event and that the actual groundwater levels may fluctuate significantly in response to seasonal effects, regional rainfall, and other factors. The Applicant will be required to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), Erosion and Sedimentation Control Plan, and Environmental Protection Control Plan to lessen soil erosion and improve water quality of stormwater run-off through stabilization practices, structural practices, and stormwater management. These plans will be developed and approved by EFSEC prior to construction or modification of any roads or facilities. Additionally, EFSEC will require the Applicant to obtain coverage under Washington Department of Ecology's Construction Stormwater General Permit. The Stormwater General Permit (NPDES) will include BMPs to minimize erosion and runoff from the Project Area.

Comment: [DEIS] *Section 1.4.1.2 states that a trench, approximately 8.5 miles long and 5 feet wide would be required to place collector cables. The DEIS mentions reseeding with of grasses and native plants, but does not mention what species, nor whether trees or shrubs that were removed would be replaced in-kind. If the plantings are to minimize noxious weed colonization would the reseeding areas be watered to ensure germination in time to counteract opportunistic germination of undesirable species? If so, the amounts used should appear in the Section 3 water use list and a watering regime presented. [LTR 272, CMT 6]*

Response: Much of the trench area for the cables would be placed within the Project roadways as shown in Figure 2-1, Project Elements. Vegetation clearing and replanting is described in Section 3.4.2.1 of the Biological Resources Section. On DEIS page 3-72, it was noted that some areas would be permanently cleared for turbine foundations and roadways.

Except for permanently cleared areas, cleared areas would be replanted with trees within one year following construction. Areas where trees are permanently removed (such as turbine blade clearance) would be replanted with appropriate native grasses and low-growing shrubs. Implementation of a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, is included as a mitigation measure in Section 3.4.3. It is not anticipated that reseeding would require watering.

Comment: *[In reference to DEIS] Section 1.4.2, Pg 12, No Action Alternative, [t]o state that the No Action Alternative "would not help the state of Washington in achieving the renewable energy goals mandated by the state's Renewable Portfolio Standard" is misleading. Washington State wishes to encourage renewable energy, but not to the exclusion of all else. Site selection is probably the most important way that negative environmental consequences can be avoided, especially with respect to wildlife. Moreover, BPA does not segregate power sources. Once it is produced and fed into the collection system, it is dealt with as any business commodity, in this case by bids. Much of the power we create here is used elsewhere, historically, to California. To imply that a rejection would flout state goals and policies is simplistic and a little misleading. "(The No Action Alternative) would help to meet the region's need for additional power in the coming years." If by "region", "local" is meant, our regions need is not great. The Columbia River and other water-driven power-generating dams continue to supply more than 3/4 of our power needs. The current trend is to improve efficiency and to encourage both business and the private sector to conservation. It has been estimated (Draft Sixth NPP, 2009) that almost 80% of our locality's future energy demands can be met in this way. Existing and newly approved wind facilities in the region, with a focus in Klickitat County, are more than adequate to make up the difference. It would be not only misleading but inaccurate to state or imply that there is a "need" for additional wind power in this portion of the Northwest. [LTR 272, CMT 7]*

Response: The likelihood that regional power needs likely would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources under the No Action alternative was acknowledged in Section 2.2 of the EIS. The discussion of the likely implications of how the No Action alternative would relate to RPS and regional power needs identified by the Applicant is meant to provide a general description of this alternative's responsiveness to these needs. Simply put, not developing the Project would indeed not help achieve RPS goals, and also would not provide a source of additional power. To clarify information concerning the RPS, the discussion of this RPS in the No Action alternative has been revised to reflect that achievement of other states' RPS goals also would not be helped under this alternative.

Comment: *[In reference to DEIS] Section 1.4.3, Pg 13, Alternatives Considered but Eliminated from Detailed Study, [t]he applicant's response is in violation of the guidelines by virtue of not complying with the requirement to supply Alternatives. As mentioned above, an EIS requires that alternatives be provided and considered, with accompanying data and analysis to match all of the other Action Alternatives presented. [LTR 272, CMT 7]*

Response: The lead agencies believe that the EIS considers a reasonable range of alternatives and adequately describes these alternatives, consistent with the requirements of both SEPA and NEPA. Issues raised in these comments specific to alternatives considered but eliminated from detailed study in the EIS are addressed in other response to comments in this section.

Comment: *[In reference to DEIS] Section 1.4.3.1, Pg 13, Alternative Project Locations, [t]he contents of this portion are redundant. Again, it avoids the EIS requirement regarding Alternatives. The points made here have all been stated previously {Section 1, 4.1}, in the same bulleted form and with almost the same wording. [LTR 272, CMT 7]*

Response: Please see response to Comment LTR 22, CMT 2 above.

Comment: *[In Table 1-1 on DEIS page 1-22 under "Earth: Construction, Design and Mitigation Measures"] All of the Design and Mitigation Measures listed are "would be" statements. They "should be" already part of the EIS! If, for instance there was a critical subsurface condition, it needs to be known and factored into the decision process, not "discovered" after approval. Only in this way can accurate and responsible evaluation occur. Because of the difficult terrain, there would appear to be very little possibility for adjustment, should geologic constraints be revealed initially. This could easily endanger the viability of the project, which underscores the importance of having data collected from rigorous studies, and analysis conducted by respected sources. Even with the added benefit of such information, the impacts of such radical alterations to a fragile topography can only be guessed. Stringent geologic study of the proposed site must be performed now and the results reported in another, hopefully improved Draft document. This information will be essential for the Council's evaluation. Without it, the process will have no merit. [LTR 272, CMT 8]*

Response: Comment acknowledged.

Comment: *As mentioned above [in LTR 272, CMT 6], there is no doubt that the proposed excavated and refilled trench will impact and redirect existing subsoil water flows for 8.5 or more miles and may potentially influence an area far greater than the area of the trench. It is also possible that drainage may be improved in the trench after refill, but the possibility that it will not, must be at least considered. [LTR 272, CMT 9]*

Response: Comment acknowledged.

Comment: *In [Table 1-1 on DEIS page 1-22 under "Earth: Construction and Operation"], the considerable alterations to the terrain that are proposed for this project - 8.5 miles of three to four foot deep, five foot wide trenches for cable burial, 30-foot deep turbine pads that will*

require leveling with machinery and extensive blasting to excavate, the building of adequate access and delivery roadways on steep slopes - will certainly have more impacts, and ones that influence each other more closely, than those listed. The changes made to accommodate the towers will forever alter the ridge tops and they will not revert to their pre-construction profiles after the project is decommissioned. It is inaccurate as well as disingenuous to state that the project construction requirements would be "minor to moderate." [LTR 272, CMT 9]

Response: Section 3.1.2.1 describes the types of earth disturbing activities that would occur on the site, including tree harvesting in areas not already cleared; constructing roads and turbine crane pads; constructing foundations for turbine and meteorological towers; trenching for underground utilities; clearing and grading for the substation placement; and clearing and excavating for the foundation for the Operations and Maintenance facility. While these activities would affect approximately 108 acres (56 acres of permanent disturbance and 52 acres of temporary disturbance) the resulting change in the ground surface elevation would be minimal in comparison to the varied topography on the site. In addition, most areas affected by ground disturbing activities would not be visible from lower elevation areas surrounding the site.

Comment: *[In reference to Table 1-1 on DEIS page 1-22 under "Water: Construction and Operation], On-site development will certainly impact ground and surface water drainage patterns as indicated above. It is well- recognized that new roadbeds alter water flow significantly and are responsible for a good deal of continuing erosive runoff. The replacement of natural soil and rock drainage on the site with impervious concrete pads constitute large surface areas that will prohibit slow drainage. Water will be quickly released from these surfaces in large quantities at approximately the same time, limiting the remaining soil's ability to absorb and release it slowly. Some of the remaining soil may be additionally compacted from heavy construction machinery, limiting even more its ability to absorb rainfall and melting snow slowly. Section 3 down plays the impact these impervious surfaces may have upon soils, but this need to be seriously examined. Each of the 49 tower pads have a diameter of 60 feet, creating 2920 square feet of impervious surfaces at the top of steep ridges. , These conditions produce fast runoff accompanied by high erosion which, over time may lead to catastrophic geologic events, as well as degrade waterways used by fish, amphibians and invertebrates. Amend this inaccurate denial of the project's impacts to ground and surface waters. A discussion, or at the very least a mention of the runoff potential should be presented, as well as possible impacts to the larger streambeds below, with potential to impact fish, amphibians and invertebrates, upon which fish depend for food. Larger game and non-game animals may be impacted as well through water quality degradation and the possible inability to even reach water. The standard BMP guidelines will not be adequate for this anticipated situation. In recognition of this, an individual plan to accommodate the special runoff problems of the project could be developed as part of a mitigation plan, implemented and monitored by an agent other than the applicant/contractors, if the project is approved. The cumulative impacts discussion should deal with this possibility as well, but does not. [LTR 272, CMT 10]*

Response: As discussed in Section 3.1.3 and in other responses, EFSEC will require the Applicant to obtain coverage under Washington Department of Ecology's Construction

Stormwater General Permit. The Stormwater General Permit (NPDES) will include BMPs to minimize erosion and runoff from the Project Area.

Comment: *[In reference to DEIS] Section 1, Table 1 Pg [1-]24 Biological Resources: Construction Soil compaction is an undesirable and irreversible impact that should be acknowledged since it affects soil drainage, the ability of certain plants to grow well and limits the species of plants that will grow. In addition to "loss of suitable habitat," abandonment of adjacent suitable habitat due to construction activity should be considered a likely possibility. Some bird, mammal and invertebrate species are known to be more sensitive to intrusive activities, including noise, than others. Several of these species are listed as being present in the project area. Add "abandonment of suitable habitat due to construction activity" to the list on page [1-]24. [LTR 272, CMT 11]*

Response: The potential loss of suitable habitat and disturbance and displacement from construction activities was listed on Page 1-24 of the DEIS in the "Impact" column for "Biological Resources."

Comment: *[In reference to DEIS] Section 1, Table 1 Pg [1-]24 Biological Resources: Operation "There would be some mortality to birds and bats due to turbine collision and displacement, though not in sufficient numbers to affect population viability." I restrain myself when I say that this statement is offensively inaccurate. It also reveals the applicant's misunderstanding of the "cumulative impact" concept. As wind farms proliferate in our region, the cumulative mortalities become increasingly significant for individual populations, regardless of their population status. Just because there have been no studies addressing bird population declines in association with wind installations does not mean that one has a legitimate claim to deny that such a relationship may exist. The bat studies cited, employed equipment that was not capable of determining the bat species e present. How then, can an assessment of a particular population be made? Or, by extension, a statement regarding population viability? What authority provided the status information for each population? What is the source of data for western bat species population size? Eastern bat species are being threatened with mass extinctions from White Nose Syndrome, the etiology and causative organism of which is still unknown. The disease has not yet reached the western states; because of this, it is essential that ALL western bat populations be given added protection, regardless of their population status. The bat study data is inadequate in certain respects; the study plan assumptions were not adequately rigorous, there were discrepancies in data collection procedures from year to year, making comparisons and data merging ineffective; long-term sampling frequency was sparse. At the very least, a repeat survey should be conducted which would identify bat species. The Columbia River Flyway is a major East to West migration route that has likely been used longer than mankind has been here. Raptors are known to use mountain ridges for North/South travel as well as for hunting in this part of the Columbia River. People come from many places outside of this area specifically to see the variety of birds that congregate and fly through this river corridor, some stopping to feed for a few days or weeks before moving on. This site would be an unconscionable choice for a development of this kind, with this knowledge. "No impacts to*

listed species" - is this a wish, or a promise from an unknown deity? How can it possibly be known ahead of time that a listed species will not be impacted; especially when inadequate studies have failed to identify what species use the area and with what frequency? And when only a two year start-up mortality study is planned? This is not enough time to obtain meaningful data much less to make any conclusions from the data. The project location would be an especially difficult one for such monitoring due to the terrain and planned forestry understory management activities. A recent eastern U. S. mortality study is employing dogs to find bat carcasses, because they are so difficult to locate by eye, even in dry flat grassland. There is no body of information available documenting how wild animals might respond to the sound of wind turbine propellers. This should be at least briefly discussed and dealt with as a possible impact. [LTR 272, CMT 12]

Response: The Wildlife Society, in a landmark publication on wind energy and wildlife, concluded that fatalities of passerines from wind turbine strikes generally are not significant at the population level (Arnett et al. 2007). Also, the National Academy of Sciences (NAS 2008) recently reviewed wind energy impacts on birds, and came to the following conclusion: "At the current level of wind-energy development (approximately 11,600 MW of installed capacity in the United States at the end of 2006, including the older California turbines), the committee sees no evidence that fatalities caused by wind turbines result in measurable demographic changes to bird populations in the United States, with the possible exception of raptor fatalities in the Altamont Pass area." The available information suggests that the Project would be unlikely to have population impacts on birds. Additionally, the revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (WEST 2010) prepared for Klickitat County does not suggest the possibility of cumulative population impacts on birds. Operational adjustments such as increasing turbine cut-in speeds during low wind speed nights can be used to mitigate bat mortality if it is found to be warranted.

Comment: *[In reference to DEIS] Section 1, Table 1 Pg [1-]24 Biological Resources: Design and Mitigation Measures. "In order to avoid or minimize impacts to any raptors potentially nesting on or near the project site, a raptor nest survey would be conducted ..." Then what? A survey is not a mitigation measure. The composition of the proposed Technical Advisory Committee members is not well thought out. Entities or personages that have vested interests or have demonstrated no interest, cannot be relied upon to make responsible, nor to make informed mitigation recommendations. To include the developer on such a committee would be unwise as well as unfair to the resources. If this route is pursued, enforcement capabilities must be granted and there must be a preponderance of resource advocates as committee members. TAC groups are by reputation, generally ineffective when they have no powers. They are also rendered ineffective if members have conflicts in interest, as counties and developers often do. This would be a great opportunity to cast aside TACs, breaking out of the customary mold and devising a new and more effective way to resolve monitoring and mitigation issues associated with such a project. "For potential impacts to big game species (deer and elk) coordination with WDFW will occur if appropriate." Again, just to mention something does not comprise a mitigation measure. What about bears, and large cats? Who decides if a situation is "appropriate" warranting consultation? Under what circumstances would it be appropriate to coordinate?*

The project location is a designated wintering area for elk. What plant species are present that elk might use for winter forage? Will these species be replanted and therefore present in adequate quantities to continue to serve as winter forage during construction and operation of the proposed project? These considerations must be treated responsibly Somewhere in the document. The quoted statement is vague and obtuse. It leaves the reader with no information about how big game species' use of the area will be approached, nor does it correct nor solve any problems big game species may have because of the project. [LTR 272, CMT 13]

Response: Composition of the TAC will be based on the WDFW wind power guidelines. The TAC will develop appropriate mitigation measures as warranted.

Comment: *[In reference to DEIS] Section 1, Table 1[-1], "Energy and Natural Resource: Operation," [t]he "Minor quantities of lubricating oils ....." should be specifically quantified, if only as an estimate, to be consistent with the remaining listed items. [LTR 272, CMT 14]*

Response: Table 1-1 has been modified to include "less than 5 50-gallon drums" after this bulleted item to correspond with what is also listed in Section 3.6.2.1.

Comment: *[In reference to] Section 1, Table 1[-1], Pg 25, Environmental health: Construction, [t]he project is located at the southern end of a wide contiguous band of lands termed "Fire-prone Landscape Management Strategy Area" by a USFWS, 2008 Final Spotted Owl Recovery Plan map. This area runs from the Columbia River north to the Washington-Canada border. The increased risk of fire during the summer months must be seriously considered and aggressive prevention measures above the usual standards should be pursued and stipulated. Prohibitions on conducting potential spark and fire-generating activities during the driest fire danger periods of the year could be part of a plan keyed to this project and would demonstrate care and concern for nearby communities. A several month delay in certain construction activities and equipment use as a result of time-of-year prohibitions would be well justified and need not halt all building progress. There WILL be blasting activity in association with this project, if approved. Getting rid of the "may" and "could" in the bullet dealing with blasting would be a more honest way of stating the realities of the massive environmental reshaping that this project will engender. If "[b]lasting could also create a fire hazard during dry weather", then this activity should be curtailed during these periods. Likewise, an activities plan related to the regional weather patterns might suggest avoiding blasting during unusually wet times of the year to avoid problems similar to those encountered recently along Hwy 14. There is no doubt that the level of blasting activity alone has the potential to seriously destabilize this particular environment, which, as noted elsewhere, already has nearby unstable loci. Since there is no geologic assessment data provided, it is impossible to even guess what impacts such activity could produce. When the geologic assessment is conducted, it should address not only immediate impacts but the potential long term impacts of blasting, even although this would only be predictive. Road department records from Underwood and Hwy 14 should give the Council a good idea of the areas' historic instability. [LTR 272, CMT 15]*

Response: Fire prevention is discussed in Sections 3.6.1.2 and 3.6.2.1 of the DEIS. Additionally, as outlined in Section 3.6.3, a Fire Protection and Prevention Plan would be developed for EFSEC approval and would be implemented by the Skamania County Fire Marshall should to proposed Project be approved.

Comment: *[In Section 1-6, Table 1-1, under] "Environmental health: Construction" (Column 4), [t]he second, bulleted statement in column 4 implies that a fossil-fuel- powered facility might supply fill-in power when a wind facility is unproductive (and that it would carry a higher risk of fire.) There is a federal requirement mandating that alternative power source facilities must accompany any new wind facility, based upon the amount of power generated. The proposed wind project would generate above the MW threshold, requiring the construction of an alternative power-generating facility to balance a wind farm's unproductive periods of no wind or too high wind. The construction cost of this requirement building, inter-tie costs, should certainly be included in the cost analysis for this project, but it does not appear. Since the alternative power facility is a requirement, its location should be identified and the associated environmental impacts need to be included in the EIS, including the cumulative impacts portion. [LTR 272, CMT 16]*

Response: BPA has several procedures in place to operate with wind facilities interconnected to BPA's transmission grid. BPA allocates some balancing capacity to wind facilities under the BPA Balancing Authority. Wind Facility Developers pay for this capacity through BPA transmission rates. In addition to BPA transmission rates, generators are subject to Generation Imbalance which is also used to balance the wind output. BPA currently manages imbalances using the Federal Columbia River Power System (through the use of federally-managed dams on the Columbia River). For the long term, BPA is also evaluating other possible alternatives including self supply. More information regarding BPA's Customer Supplied Generation Imbalance, please visit *http://transmission.bpa.gov/wind/gen_imbalance/*. For more information regarding BPA's Wind Integration Team, please visit *http://www.bpa.gov/corporate/WindPower/WIT.cfm*. Lastly, for more information regarding BPA's Wind Power initiatives, please visit *http://www.bpa.gov/corporate/windpower/index.cfm*. Furthermore, a discussion of energy balancing can be found in Section 3.14.3.5.

Comment: *[In reference to] Section 1, Table 1[-1], " Environmental Health: Operation," [a]gain, with respect to fire potential, local ordinances and other regulations and standards are not directed to such a project, and are not adequate, because of the unusual situation. An individually tailored, aggressive fire prevention plan and response tactic needs to be developed for the construction and operation phases of this proposed project. Relying on existing regulations will not adequately address the specific potential hazards nor protect the nearby population and environment. "... none of the planned turbines are within 2,500 feet of existing residences." This is not correct; there is one residence. Mitigation measures should be included in the proper column. "EMF from the project ... would have no health and safety impacts." I do not see any information in the document to support this assertion. There is certainly study regarding the issue, but conclusions are not definitive at this time. Can a pronouncement be*

made if there is inadequate documentation? Unless this can be produced, this statement needs to be removed or qualified in some manner in order to be objective. [LTR 272, CMT 17]

Response: Fire mitigation measures are included in the proper column within Table 1-1; and Fire Protection and Prevention Plans are addressed several times in Section 3.6. Additionally, both "Fire and Explosion" and "Electromagnetic Fields" analysis during construction and operation of the proposed Project can be found in Section 3.6.2, Impacts, and the mitigation measures associated with both of these issues can be found in Section 3.6.3, Mitigation Measures, of the EIS.

Comment: *[In reference to] Section 1[.6], Table 1[-1], "Noise: Construction," [t]his section down plays construction noise, which will carry well into the valleys and bounce off of adjacent hillsides. Although construction is stated to occur during daylight hours, it will likely begin very early and continue through dusk. The added noise of myriad transportation trucks will certainly impact local residents on a daily basis and should be included in the list. The noise from blasting will certainly be noticeable and will last for awhile. In thoroughness, it should also be mentioned. Section 1, Table 1 Pg 27 Noise: Operation An in-depth submission regarding wind turbine noise impacts upon humans has been submitted. Please consider it as a counter to the data presented in the EIS and take appropriate action to modify the table. [LTR 272, CMT 18]*

Response: As described in Section 3.7.2.2, construction related noise between 7:00 a.m. and 10:00 p.m. is exempt from noise regulations per 173-60-050 WAC.

Comment: *[In Section 1-6, Table 1-1, under] "Socioeconomics: Operation," [t]here are several studies that identify undesirable affects of turbines upon humans {see K. Brown's testimony citations}. One would not unreasonably conclude that properties in close proximity to such turbine arrays might be less desirable for habitation, at least to a percentage of the population. Proponents of wind power have issued statements derived from studies indicating that property values are not adversely affected by nearby wind turbines. As such studies continue, depending on the analyses, certainly there is the possibility that property values may be affected one way or another, but for now either position can support and document its claims. [LTR 272, CMT 19]*

Response: Comment acknowledged.

Comment: *[In Table 1-2 on DEIS page 1-34, "Summary of Unavoidable Adverse Impacts: Earth"], the enormously disruptive activity that will be required to complete this project, located in a geologically fragile environment that has already been subjected to considerable alteration, is very likely to respond with undesirable events. In potentially susceptible areas, no amount of "careful design" can prevent, nor can "mitigation measures" restore, areas where mass wasting has occurred. It should be added to the list of potential adverse impacts, especially since*

evidence of such an event was documented during a previous survey. The severe re-contouring, blasting, large-scale trenching and creation of impervious surfaces all increase the likelihood of minor or major responses from the environment. The soil types in some areas are acknowledged to be susceptible to erosion and the proposed "A" array is located precisely along a Class II {High Landslide Hazard Area} ridgeline. To dismiss these and other known geologic concerns with the two brief dismissive statements presented is unacceptable. Until a reputable geologic assessment study is performed, there will remain a glaring gap in this arena. Without professional scientific data, any predictive statements can only be considered arbitrary and of dubious merit. [LTR 272, CMT 20]

Response: As discussed in Section 2.1.2, final siting of the wind turbines and associated facilities would be done following completion of the EFSEC Site Certificate. Prior to this final siting process, as a condition of the Site Certificate and as discussed in Section 3.1.3, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other Project facilities such as access roads (including improvements to West Pit Road), these facilities will be redesigned or relocated to avoid this risk. As discussed in Section 2.1.3.7, all road improvements required for the proposed Project would be designed and constructed under the direction of a licensed engineer, in accordance with the Skamania County Private Road Guidelines and Development Assistance Manual. All county roads requiring improvements would be designed and constructed in accordance with the WSDOT Design Manual.

Comment: *[In reference to Table 1-1 on DEIS page 1-22 of the under "Air Quality], [c]onstruction activity would involve many more pieces of diesel-fueled machinery than any logging operation. It is absurd to think that the residents of the town of Underwood will not notice, nor be affected by, a continuing stream of diesel trucks heading up and down the roads every day for months. Peak morning hour numbers of trucks are estimated to be 210/hr for 3-5 months. Further, all major construction equipment is to be diesel-powered (Section3 Table 6-5, Pg 109 Fire and Explosion Risk Mitigation.) It is disingenuous to claim that this would be comparable to "existing logging operations", and equally so to state that "the project would contribute to a beneficial impact on overall air quality." Climatological data presented in the EIS indicates that the area is prone to air stagnation at all times of the year, but especially during the summer when pollutants from downriver may collect forming considerable haze. Even if this statement refers to the completed project, it is a bit of a stretch to claim "beneficial impacts on overall air quality" when the requirement to build alternative fuel power plants are a direct result of building wind powered facilities. With this in mind, it might be fairer to consider that project would lead to a decline in overall air quality. [LTR 272, CMT 21]*

Response: The temporary effects on air quality from construction activities are described in Section 3.2.2.1. Mitigation measures to address those effects are described in Section 3.2.3.

Comment: *[In reference to DEIS] Section 1, 7 Pg [1-]34 Summary of Unavoidable Adverse Impacts: Biological Resources. See previous comments regarding bats and birds (Section 1,*

Table 1 Biological Resources: Operation.) The Summary statement simply reiterates the document text statements, almost word for word, imparting the same inappropriate lack […] [LTR 272, CMT 22]

Response: The summary table is intended to summarize information found elsewhere in the EIS. It does not provide new or additional information.

Comment: *Precedent. We feel that if Whistling Ridge is allowed to move forward, the Governor of WA would be setting a dangerous precedent here in the Columbia River Gorge. What will stop other wind farms from being allowed just outside the geographical boundaries but visually impacting the NSA? We have already sacrificed the natural beauty of the Columbia Hills east of the NSA to hundreds and perhaps even thousands of wind turbines on both sides of the Columbia in the interest of this green energy that must be subsidized to make ANY economic sense. How far should we go with this philosophy of creating green energy? At what cost? As common sense tells us, if it sounds too good to be true, it probably is, as evidenced by the ethanol political boondoggle. [LTR 273, CMT 1]*

Response: Please see response to Comment LTR 119, CMT 11 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS and issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 275, CMT 5]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *In reading this DEIS, one thing stands out. Rather than being a decision making document, which DEISs are supposed to be, this appears to be a justification document, providing support for a decision that is already in the mind of the preparers. The failure to analyze more than two alternatives - the applicants desired outcome and the required do-nothing alternative - strengthens that impression. [LTR 276, CMT 1]*

Response: EFSEC and BPA believe that they have produced an EIS that fairly and adequately analyzes the proposed Project, and that fully complies with both SEPA and NEPA. No decision has been made regarding whether or not to approve the proposed Project. That decision will come after completion of the EIS process.

Comment: *There should be a rationale, by the proponents, as to why they are proponing for this wind farm, and all the others in WA and OR and other areas. [LTR 279, CMT 11]*

Response: The reasons behind the Applicant's proposal for a wind generation project at the proposed site are provided in Section 1.2.3 of the EIS. The Applicant is not currently proposing any other wind projects in Oregon, Washington, or other states.

Comment: *They should also explain why this proposed wind farm is needed, or if it really is needed, in the energy grid. [LTR 279, CMT 20]*

Response: Please see response to Comment LTR 279, CMT 11 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 287, CMT 6]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Indeed, the EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 288, CMT 6]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 289, CMT 7]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. It is vital*

that we develop alternate and renewable-energy sources, but it is just as vital that we do not repeat the same kinds of mistakes we have committed with dirty energy; namely, destroying the natural world, its ecosystems, and beauty in order to develop more energy. This project has not been well analyzed in the DEIS. Another more critical look is required. [LTR 290, CMT 1]

Response: Please see response to Comment LTR 60, CMT 1 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the S0-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 290, CMT 7]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 291, CMT 8]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 292, CMT 7]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 293, CMT 6]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *Lastly, EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 294, CMT 7]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. [LTR 307, CMT 8]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. [LTR 308, CMT 8]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *EFSEC and BPA need to fix the flaws in the DEIS, issue a revised or supplemental DEIS, and make substantial revisions to the EIS to fully inform the public about the true environmental impacts of the project. If another DEIS is issued the 50-turbine layout should be rejected. [LTR 309, CMT 8]*

Response: Please see response to Comment LTR 66, CMT 4 above.

Comment: *The DEIS is fatally flawed and incomplete because of their lack of technical input about the cumulative impacts and effects of this project on our environment and ecosystems. [LTR 311, CMT 16]*

Response: Please see response to Comment LTR 60, CMT 1 above.

Comment: *BPA needs to be an active participant in this process and so far they have totally abrogated their regulatory obligations under NEPA. The Whistling Ridge wind farm DEIS is incomplete and should be redone with BPA's input. [LTR 311, CMT 16]*

Response: The lead agencies believe that they have produced a reasonably thorough analysis of the proposed Project that adequately considers all points of view. BPA and EFSEC staff actively and extensively participated in the preparation of the EIS, as required by SEPA and NEPA. Both SEPA and NEPA allow for the use of environmental information, in whatever form, from the Applicant for use in the preparation of an EIS. In fact, SEPA allows for an applicant to prepare the EIS. Nonetheless, where the lead agencies used information provided by the Applicant or its consultants, this information was thoroughly reviewed and independently evaluated by the agencies to ensure its competency and accuracy. This approach is consistent with the intent of SEPA and NEPA that acceptable environment work not be redone, but that it instead simply be verified by the lead agency. Accordingly, the lead agencies appropriately took full responsibility for the scope and content of the EIS, and have fulfilled their respective responsibilities for EIS preparation under SEPA and NEPA.

Comment: *I support this project. The EIS for Whistling Ridge has properly analyzed the environmental impacts; therefore, the project should be approved. [LTR 317, CMT 1]*

Response: Comment acknowledged.

Comment: *I support this project. The Draft EIS is comprehensive and complete and no further analysis is needed. [LTR 317, CMT 7]*

Response: Comment acknowledged.

Comment: *The DEIS needs to be revised to reflect that if the project isn't built our growing electricity needs will be met though conservation, efficiency, and new clean energy development. Whistling Ridge is not critical to meet the forecasted need for renewable energy resources. [LTR 318, CMT 27]*

Response: The likelihood that regional power needs likely would be addressed by some combination of energy efficiency and conservation measures, existing power generation sources, and/or the development of other new renewable and non-renewable generation sources under the No Action alternative was acknowledged in Section 2.2 of the EIS.

Comment: *The 14th amendment is the due process clause…requires that interested parties be given reasonable notice and a reasonable opportunity to be heard. It is completely*

unreasonable to expect the layman or even a trained professional to read a document of this magnitude and make informed comments in three weeks or even three months... I would like to formally object to these proceedings as we are denied reasonable notice and opportunity to be heard and are therefore being denied our constitutional rights. I would like an order extending the time for written comments for a minimum of 90 to 120 days from the currently deadline. *[LTR 317, CMT 31]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *The DEIS is so deficient…A year ago we all presented comments, I didn't see anything about the comments I presented in the DEIS. [LTR 317, CMT 32]*

Response: Please see response to Comment LTR 119, CMT 2 above.

Comment: *I commend the commissioning of an excellent document. It provides a rock solid foundation to perform your action. [LTR 317, CMT 42]*

Response: Comment acknowledged.

Comment: *We have not received adequate time to review the document. We need another chance to speak after we have had time to read the document. [LTR 317, CMT 44]*

Response: Please see response to Comment LTR 66, CMT 5 above.

Comment: *Why are other fed agencies not cooperating agencies? [LTR 317, CMT 84]*

Response: Please see response to Comment LTR 74, CMT 4 above.

Comment: *I feel the DEIS is very incomplete and poorly done. [LTR 317, CMT 86]*

Response: Comment acknowledged. Please see response to Comment LTR 60, CMT 1 above.

Comment: *The Yakama Nation would like a continuance of 30 days to review and comment on the project. The staff has not had a chance to meet on this important matter and would like to*

provide input. Harry Smiskin and Lavina Washine want a written response from you on this 30-day consultation process. [LTR 318, CMT 19]

Response: An extension was offered to The Confederated Tribes and Bands of the Yakama Nation in which comments from the Yakama Nation were expected by August 20, 2010. Additionally, please see response to Comment LTR 66, CMT 5 above.

Comment: *The Park Service concluded that under NEPA they are required to consult. You solicited the Forest Services' comments, you need to take them into consideration. [LTR 318, CMT 28]*

Response: The commenter is incorrect that the National Park Service has stated that the lead agencies must conduct some sort of consultation with the Park Service. The Park Service did submit a comment letter on the DEIS, which is addressed in the responses to comments. Similarly, comments received by the U.S. Forest Service have been addressed.

Comment: *Page 1-7 states that "No other Federal agencies have been identified as cooperating agencies for the EIS at this time." Is that because National Parks Service and the Forest Service have made concern negative comments about this proposal as it is now written? [LTR 318, CMT 34]*

Response: Please see response to Comment LTR 74, CMT 4 above.

Comment: *Why have the Yakama Nation not been involved in the DEIS when they as a sovereign nation have legitimate cultural resource concerns? [LTR 318, CMT 35]*

Response: As described in Section 1 and Section 3.10 of the EIS, the lead agencies, along with the Applicant, are in the process of coordinating with members of the Confederated Tribes and Bands of the Yakama Nation concerning the proposed Project, and the Yakama Nation has been afforded numerous opportunities to be involved in the process. Both the Yakama Nation Cultural Resources Department and two local resident tribal members have been contacted to assist with the identification of potential sensitive, traditional, and/or sacred resources. In addition, consultation is occurring through the Section 106 process.

Comment: *I do not feel this document is satisfactory in providing an objective document for public access to information and divide decision makers to their tasks as well. [LTR 318, CMT 38]*

Response: EFSEC and BPA believe that they have produced an EIS that fairly and adequately analyzes the proposed Project, and that fully complies with both SEPA and NEPA. No decision has been made regarding whether or not to approve the proposed Project. That decision will come after completion of the EIS process.

Comment: *I do not feel that the discussion of business needs in Section 1.2.33 is appropriate. The only information relevant was the portion that mentioned the amount of construction jobs. [LTR 318, CMT 39]*

Response: Please see response to Comment LTR 76, CMT 2 above.

Comment: *Please give us additional time to review the document. Three weeks is not enough. [LTR 318, CMT 49]*

Response: Please see response to Comment LTR 66, CMT 5 above.

G.2 PROPOSED ACTION AND ALTERNATIVES

Comment: *The Draft EIS is correct in its assessment of the Whistling Ridge Energy Project as an "'integrated whole,' as a single power plant, not pieces of a whole, where some turbines may be eliminated." The project, at 75 megawatts, is the smallest project proposed or operating in Washington State. No exception. The economic viability of the project hinges on SDS being able to complete the project as designed - at 75 megawatts. Those who suggest that they can support the project if "only" seven turbines are removed are, in effect, telling you that the project should not proceed. It reminds me of the used car dealer who claims that he's offering you a great deal while acknowledging that the auto lacks a small item: a transmission. In the interest of fair evaluation, the proposed project before you must be considered as an "integrated whole." Given the economies of scale and utility demand for renewable power, this project, if it is to proceed at all, cannot be downsized. [LTR 61, CMT 1]*

Response: As discussed in Section 2.3.2 of the EIS, the Applicant considers a 70-MW project as the minimum size required to make the proposed Project economically feasible. In addition, the Applicant believes this is the minimum size needed for utilities looking to fulfill RPS requirements, based on the Applicant's assessment of other wind projects that have successfully entered purchase agreements with utilities seeking to meet RPS requirements. The lead agencies believe these are reasonable requirements for the proposed Project.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), and other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 66, CMT 1]*

Response: The lead agencies believe that the EIS considers a reasonable range of alternatives and adequately describes these alternatives, consistent with the requirements of both SEPA and NEPA. Issues raised in these comments specific to alternatives considered but eliminated from detailed study in the EIS are addressed in other response to comments in this section.

Comment: *This DEIS is insufficient in that an appropriate EIS has a list of alternatives. This one only lists one action item and mentions throughout the document that it is one of the alternatives. How can the proposed action also be an alternative? The only alternative stated is the No Action Alternative. [LTR 74, CMT 2]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I have never seen an EIS, especially for a project of this scope that has no other action alternatives. Although they are mentioned in the text, they must be dealt with as real possibilities, regardless of the fact that the proponent does not wish to spend the additional funds it is claimed they would require. [LTR 76, CMT 11]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The Whistling Ridge draft EIS is basically well organized and readable. Nevertheless, it is insufficiently thorough and contains specific inaccuracies and subjective conclusions. Some shortcomings we noted are: 1.) An appropriate EIS should list a range of alternatives. However, the draft lists only one action alternative. More alternatives could be developed by such means as relocating or eliminating problematical turbine sites. [LTR 79, CMT 1]*

Response: The concerns over turbine corridor A1-A7 are noted. As discussed in the EIS, however, the Project has been proposed as an "integrated whole", meaning essentially as a single power plant, not as a dissectible project where some turbines may be eliminated. An alternative that would eliminate turbine corridor A1-A7 therefore was considered and eliminated from further study. Nonetheless, in determining whether to issue a site certificate and enter a site

certificate agreement for a proposed generation project, it is within authority of the State of Washington to condition approval of the proposed Project, consistent with RCW 80.50 and other applicable state statutes. In the draft certification agreement, EFSEC is empowered to include "conditions to protect state or local governmental or community interests affected by the construction or operation of the energy facility." See RCW 80.50.100. These conditions essentially serve to mitigate potential environmental or social impacts of the proposed Project. Accordingly, certain conditions, such as limiting the location of proposed turbine corridors, could be considered as a condition for project approval (i.e., as a form of mitigation related to the Project's potential impacts).

Comment: *Applicant SDS owns 70,000 acres of land; within this expanse, the draft claims that Whistling Ridge is best suited for a wind farm. But considering such large ownership, plus numerous valid concerns associated with Whistling Ridge, the draft should address in detail other potential wind power locations on SDS lands. [LTR 79, CMT 2]*

Response: The lead agencies believe that the DEIS presented a reasonably thorough discussion of the consideration of alternatives for the proposed action, including why alternative locations were not being further studied. The reasons that the Applicant proposed its wind project at this particular location is explained in Sections 1.4.1 and 2.3 of the EIS. As discussed in these sections, a variety of factors were considered in evaluating whether alternative locations might be feasible.

Comment: *We therefore request that EFSEC and BPA carefully study and analyze all possible adverse effects of the Project in its proposed location and evaluate whether other locations would be more appropriate for this type of project. [LTR 119, CMT 3]*

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *Location of the Project. It would appear that there are much better places to site a project of this magnitude. There are thousands of acres of farmland in Eastern Washington that can (and do) support this type of development. The land to the East is vast, it's close to transmission lines, it is many miles away from homes, has limited recreational value, limited wildlife (as compared to a forest), limited renewable resource (as compared to the timber resources here), there is limited damage to the ecosystem due to installation and it would not detract from views of a National Scenic area. We request that the EIS fully evaluate all of these considerations. [LTR 119, CMT 10]*

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *Thank you for the opportunity to comment on the DEIS for Whistling Ridge. After reading though this document, I realized that there is a workable solution that could satisfy common ground that could satisfy many of the residents of Skamania County, and people Columbia Gorge National Scenic Area. The workable solution I recommend is to approve of the Whistling project with the exception of the A1-A7 turbine group. [LTR 124, CMT 1]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *Eliminating the A1-A7 turbines would make this project much more acceptable to the local population because the impact to the National Scenic area would be much less. I request that you review these comments each as if you lived here, please remember, this project is in everyone's back yard, it is a National Scenic Area and one of the most traveled tourist destinations in the Northwest. [LTR 124, CMT 10]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *Regarding "future developments", the "Middle Mountain Wind Project" should be updated to indicate that the Hood River County Commissioners have determined the project to be not feasible due to local discontent. Please also consider adding the decision regarding the Seven Mile project; impacts to the local community and the scenic area also could not be justified. [LTR 124, CMT 10]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. [LTR 127, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The EFSEC and BPA must consider other alternatives to the siting of the Whistling Ridge wind turbines to avoid marring the viewscape of the Gorge NSA! [LTR 130, CMT 1]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *We feel it is imperative that the final EIS include alternatives such as adjusted placement or outright removal of the proposed A-array or however many wind turbines might be necessary to prevent any negative aesthetic impact to the nationally and globally recognized scenic area and its view points in the Columbia River Gorge. People come here to heal their souls and to escape from, not be impressed by, industrial complexes. [LTR 139, CMT 24]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *The DEIS fails to address the potential expansion of the Whistling Ridge project onto Washington Department of Natural Resources public lands in Klickitat County. The applicant has previously indicated plans to expand the project into Klickitat County, and applied for a lease from DNR to do so. These plans should be evaluated as part of this project, rather than piecemealed for later consideration. [LTR 161, CMT 4]*

Response: For the proposed action, the EIS evaluates what has been proposed to the lead agencies by the Applicant, as required by SEPA and NEPA. What has been proposed does not include development of any additional turbines on adjacent DNR land, nor does it include the interconnection of any additional power to the FCRTS. In addition, as discussed in Section 2.3.2 of the EIS, DNR is not interested in allowing development of wind turbines on the adjacent DNR land, regardless of any previously expressed wishes by the Applicant. Given this situation, not only is wind development of DNR land not part of the proposed action, it is also not considered reasonably foreseeable for the purposes of the cumulative impact analysis in the EIS.

Comment: *The DEIS failed to evaluate alternatives to the proposal. SEPA and NEPA require consideration of alternatives. The applicant owns tens of thousands of acres of land, including other sites that would be more appropriate for wind power development than Whistling Ridge. The DEIS must evaluate potential alternatives, including alternative sites as well as alternative turbine layout configurations. [LTR 161, CMT 13]*

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 163, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DE IS (the proposal and the no-action alternative). This is inadequate. [LTR 165, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 167, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 169, CMT 1]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *SOLAR ENERGY FACILITY. The DEIS discusses only the development of the site for wind energy facilities. The consideration of alternatives should be expanded to consider other alternate energy sources such as solar energy. Recently, a proposal for a 75 MW solar reserve has been made in Kittitas County (the Teamaway Solar Reserve, or "TSR"). The proposal will consist of approximately 145 acres for photovoltaic solar panels spread out over 900 acres. Such a proposal would reduce visual impacts and eliminate the noise impacts associated with wind turbine facilities, as well as eliminating the need for transportation of large towers and blades for wind turbines. This alternative should be fully considered in the DFEIS or FEIS. Thank you for this opportunity to comment on the DEIS. SOSA trusts that the FEIS will provide facts and analysis discussed herein. [LTR 175, CMT 7]*

Response: The Applicant has proposed a particular type of energy generation source - wind energy - for the proposed Project. More fundamentally for EIS purposes, the need for action by the lead agencies is to consider an application and request for siting and interconnecting a proposed wind project, not some other type of generation or just renewable energy in general. Consideration of the proposed Teanaway Solar Reserve Project, which is an entirely different project proposed by others, would not be responsive to this need, and therefore is not considered as an alternative in the EIS.

Comment: *Though this project has been under development for some time, the applicant has identified only a range of wind turbine generators which "would likely range in size from 1.2 to 2.5 MW." DEIS at 1-9. However, the larger capacity turbines have larger diameter rotors (up to 100 meters), so it is unknown what the size of the machines would actually be. [LTR 176, CMT 2]*

Response: Identification of a range of possible sizes of wind turbines is typical in a siting application for a proposed wind project, since the actual size to be used is not usually identified until the site certificate is issued. In addition, due to the high variability in potential turbine availability and pricing, it is currently unknown what turbines would be available when the Project is ready to be constructed (assuming it is approved), and the specific manufacturer and type of turbine that would be used thus cannot be determined at this stage in the Project review process. The specific manufacturer, type, and size of turbine will be identified at the time the site certificate is issued. However, as indicated in the EIS, it is reasonably expected that the turbines likely would range in size from 1.2- to 2.5-MW each, and would be up to approximately 426 feet from the ground to the turbine blade tip at its highest point. Thus, the EIS includes this turbine size range in its description of the proposed Project. If the 1.2-MW turbine were used, then up to 50 turbines would be installed, while if the 2.5-MW turbine were used, up to 30 would be installed. As discussed in Section 3.9.1.3 of the EIS, the visual impact analysis assumes use of the largest size turbine (2.5 MW) along with the maximum number of turbines (50) in order to assess the maximum envelope of potential visual impacts.

Comment: *A severe deficiency in the EIS is the failure to consider any alternative other than the applicant's minimum 70 MW proposal on its own property. Page 1-13 of the "Alternate*

Project Locations" includes only sites within the ownership of SDS. On page 1-14, the EIS states that the applicant considered a lesser number of turbines, but rejected such an alternative because it did not fit within SDS's concept of "economic feasibility." The failure to consider either alternate locations or alternate site configurations (with fewer wind turbines) is a fundamental and fatal defect in the DEIS, as was previously pointed out at the public hearing on the document. The responsible official must prepare a supplemental DEIS to address and thoroughly consider reasonable alternatives. This supplemental DEIS should be circulated for comment in the same manner as any DEIS under NEPA/SEPA rules and regulations. [LTR 176, CMT 3]

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *The starting point for analysis of the alternative requirement is SEPA itself. RCW 43.21 C.030(1)(c)(iii) makes clear that the "detailed statement" (which is now the environmental impact statement requirement) must consider "alternatives to the proposed action." Alternatives are so important under SEPA that each state agency, including EFSEC, has the responsibility to: Study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources. The details of consideration of alternatives in an EIS is found at WAC 197-11-440(5). Under NEPA Rules, the consideration of alternatives is considered the heart of the EIS: Sec. 1502.14 Alternatives including the proposed action. This section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (Sec. 1502.15) and the Environmental Consequences (Sec. 1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public. In this section agencies shall: (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated. (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits. (c) Include reasonable alternatives not within the jurisdiction of the lead agency. (d) Include the alternative of no action. (e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference. (f) Include appropriate mitigation measures not already included in the proposed action or alternatives. As noted above, based on the applicant's own opinion of financial feasibility, the DEIS has not considered other alternatives; a position which appears to be unquestioned by the drafters of the DEIS. However, the applicant has not provided any information on financial feasibility and cannot so stricture and limit its proposal to avoid alternatives. [LTR 176, CMT 5]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *It appears that the applicant asserts, and EFSEC and BPA concur, that the proposal is for a private project on private property. See 197-11-440(5)(d). This exemption*

does not apply if the project includes a rezone or: if other locations for the type of proposed use have not been included or considered in existing planning or zoning documents. The portion of the DEIS addressing land use regulation does not disclose that wind turbines were ever included or considered in planning documents adopted in Skamania County. See DEIS at pages 3-140 to 3-155. [LTR 176, CMT 5]

Response: A Private Project, as defined in the SEPA Rules WAC 197-11-780, means any proposal primarily initiated or sponsored by an individual or entity other than an agency. The proposed Whistling Ridge Project meets this definition and is being reviewed as a private project. EFSEC believes the Applicant adequately considered alternatives to the proposed action, including alternative project locations, larger or smaller generation facilities, alternative wind generation technologies, alternative project configurations, and alternative interconnections, in Section 2.3 of the DEIS.

Comment: *The failure of the DEIS to consider alternatives is a fatal flaw for several reasons. First, there are serious issues as to whether the proposal is consistent with local zoning. While the DEIS seems to claim that the project is consistent with Skamania County's comprehensive plan and zoning code, there are many reasons to believe it is not. On May 6, 2009 SOSA filed a lengthy letter directed to both Skamania County and EFSEC challenging the consistency of the proposal with local zoning. Among other matters, that letter pointed out that wind turbines or wind farms are not listed as permitted uses in the Skamania County Zoning Ordinance or in the 2007 Skamania County Comprehensive plan. The latter conclusion is confirmed by decision of the Skamania County Hearing Examiner made in February 2009 in a SEPA challenge to a determination of non-significance for adoption of a new zoning ordinance for Skamania County, which ordinance proposed regulating wind turbine development. Questions arose during the course of that hearing regarding whether the 2007 Skamania County Comprehensive Plan actually permitted or considered wind energy facilities. In her decision, the Hearing Examiner found as follows: The 2007 Comprehensive Plan does not contemplate the type of energy facilities described in the Planning Commission Recommended Draft. See Findings and Decision, Finding 18 at page 8. The Hearing Examiner went on to rule that Skamania County was required to prepare an environmental impact statement prior to the adoption of its new zoning ordinance. Skamania County has never prepared the environmental impact statement ordered by the Examiner and the proposed zoning ordinance was not adopted. Since Skamania County has adopted a zoning ordinance that does not provide for wind energy facilities, and its comprehensive plan does not contemplate such facilities, the exception in the SEPA Rules does not apply. Either WRE must apply for a rezone (which it has not) or EFSEC must preempt local zoning. The preemption decision by EFSEC would be the functional equivalent of a rezone because it provides approval for a previously unpermitted use. In fact, EFSEC must make a determination of land use consistency and held a hearing on that subject on May 6, 2010. However, EFSEC did not make a decision on land use consistency at that time and has deferred such decision to be made in the course of the adjudicative hearings. The consistency of the proposed project with local zoning has yet to be determined. The responsible official under SEPA, the EFSEC manager, accordingly cannot determine whether the WRE project is consistent with local zoning. If it is not, the Council may preempt local zoning, which would be*

the functional equivalent of a rezone for the project. Alternatives must accordingly be fully considered. [LTR 176, CMT 6]

Response: Please see response to Comment LTR 176, CMT 5 above.

Comment: *Second, the proposal is not a private project within the meaning of the SEPA Rules. This issue was previously considered in a Washington Supreme Court decision: Under the present statutes and administrative code, the question now before the court as to whether the EIS is adequate turns on whether the proposed project is a "public project" or a "private project." It is unnecessary in this case to determine whether the "public"/ "private" distinction drawn in the administrative code accords with SEPA policy. We recognize that one commentator has suggested that in certain cases, the distinction may be unsound. See Richard L. Settle, The Washington State Environmental Policy Act: A Legal and Policy Analysis § 14(b)(ii) (4th ed. 1993). WAC 197-11-440(5)(d) provides in relevant part: When a proposal is for a private project on a specific site, the lead agency shall be required to evaluate only the no action alternative plus other reasonable alternatives for achieving the proposal's objective on the same site… A "private project" is defined in WAC 197-11-780: "'Private project' means any proposal primarily initiated or sponsored by an individual or entity other than an agency." Weyerhaeuser v. Pierce County, 124 Wn. 2d 26, 38-39, 873 P.2d 498, 505 (1994). The project in Weyerhaeuser was a land fill proposed by a private applicant on private property. However, the court concluded it was a public project because of the close relationship between the county actions and the supposedly private project. The court went on to hold: We agree with the Weyerhaeusers that, as a matter of law, the proposed landfill is a public project, and the EIS must contain a sufficient discussion of offsite alternative proposals. Because it does not do so, it is inadequate as a matter of law. The WRE project is similarly public for several reasons. First, the DEIS contains extensive discussion as to need for electric power to meet public needs for the region. See DEIS pages 1-4 to 1-7. This is clear in the DEIS at page 1-4: "The Applicant's purpose in proposing the Whistling Ridge Energy Project is to help meet the future need for energy resources." SDS also seeks to provide an additional renewable resource for electric utilities in Washington. Second, this project has been referenced by its proponents as a "semi-public" facility under the Skamania County zoning ordinance. See DEIS at page 3-147 to 149. The WRE proposal is not exempt from alternatives analysis under SEPA or NEPA as it must be classified as a public facility. [LTR 176, CMT 7]*

Response: Please see response to Comment LTR 176, CMT 5 above.

Comment: *Seventh, in examining alternatives, the draft needs to compare the impacts of developing the proposed project with other alternate sources of wind energy being developed within the jurisdiction of EFSEC. There are serious impacts related to the WRE proposal based largely on its location. The Underwood location will have serious visual and aesthetic impacts to extremely valuable and unique scenic resources found in the Columbia River Gorge, where because of its elevation the project will be seen by many persons over a broad area. Further, this forested location increases substantially the risks of bird and bat collisions with the turbine*

blades. Other environmental impacts are of concern because of the location of the turbines on steep ridgelines, which may restrict options for micrositing and increase impacts due to road building. This location should be compared with other possible sites, especially in southeast Washington where wind turbines are located away from populated areas and have lesser risk for bird or bat collisions. [LTR 176, CMT 14]

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *Eighth, the section on alternatives in SEPA explicitly calls for an analysis of the alternative of future development of the proposal under WAC 197-11-440(5)(c) where the alternatives section of the EIS includes obligation to: (vii) Discuss the benefits and disadvantages of reserving for some future time the implementation of the proposal, as compared with possible approval at this time. The agency perspective should be that each generation is, in effect, a trustee of the environment for succeeding generations. Particular attention should be given to the possibility of foreclosing future options by implementing the proposal. For the present application, the DE IS must discuss the alternative of delaying the implementation of the WR proposal. In light of visual impacts, bird and bat kills and other serious impacts of the WR proposal, the DEIS should discuss the option of reserving the WRE project until such time as projects with lesser impacts have been permitted and constructed. The DE IS should accordingly discuss potential wind turbine sites, including those permitted, those under application, and those in areas where new applications are likely, for example, where land commitments in the form of leases are made by property owners to wind turbine developers. [LTR 176, CMT 15]*

Response: Neither SEPA nor NEPA require that the option of merely delaying implementation of a proposed project be treated as an entirely separate and distinct alternative in an EIS. As noted in the comments, SEPA does require consideration of the benefits and disadvantages of delaying a proposed project in an EIS. Accordingly, this consideration has been included in Section 2.4 of the EIS. The lead agencies believe that this section provides a fair discussion of the benefits and disadvantages of delaying this proposed Project. Nonetheless, Section 2.4 of the EIS has been revised to better reflect that some of the identified disadvantages would be a delayed rather than entirely prevented.

Comment: *Ninth, the proposed project requires an interconnection with the BPA transmission line together with the construction of a substation. That is clearly a public project, not a private project, and thus alternatives must be fully considered. As related to the substation it is understood that the BPA substation must be built with capacity to receive additional electric energy for interconnection with the FCRTS. Thus, the EIS must consider whether the BPA substation will act as an attraction for other energy projects to locate nearby. In this regard, SOSA notes that a natural gas pipeline traverses the north portion of the project area. See DEIS, Figure 2-3. In the recent past, the land owner SDS has promoted plans for a gas turbine for electrical generation in this area. The EIS must consider the possibility of a gas turbine project in the area, especially one that may have enhanced financial feasibility because of the*

proximity to both a fuel source (the gas pipeline) and a substation to connect that energy to the FCRTS. Given the need for balancing resources for VERs like WR, location of such a facility nearby appears more likely. Accordingly, the EIS must consider the impacts of such a gas turbine facility, including air emissions, noise, wildlife impacts and other impacts common to these facilities. [LTR 176, CMT 16]

Response: Please see response to Comment LTR 176, CMT 5 above.

Comment: *Tenth, while SEPA contains the public v. private distinction, NEPA and the NEPA Guidelines contain no such exception. Since this DEIS is to meet NEPA requirements, there must be a full exploration of available alternatives under the terms of both NEPA and SEPA rules. As cited above, the NEPA Guidelines require consideration of alternatives even though they may not be within the agency's jurisdiction. Given the importance of alternatives analysis under both NEPA and SEPA, the failure of EFSEC and BPA to do this analysis now may mean that upcoming processes will have to be repeated should a court determine that the procedure adopted is illegal, resulting in a huge waste of time and resources of all involved. [LTR 176, CMT 18]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *In summary, the failure of the DEIS to discuss reasonable alternatives is a fatal flaw in that document. EFSEC and BPA should immediately withdraw the noncompliant DEIS and prepare a supplemental DEIS that considers all reasonable alternatives, not just those identified in this letter. The supplemental DEIS should be circulated for comment as required for any DEIS and no work on the final EIS should begin until all comments are in for the supplement. [LTR 176, CMT 19]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The FEIS should also be expanded to consider the Middle Mountain Project, which is only 12 miles from the proposed project site, as an alternative wind generation site. [LTR 177, CMT 9]*

Response: The EIS addresses the need for the lead agencies to respond to an application and request by the applicant for a proposed wind project to be developed by the Applicant. Consideration of the Middle Mountain Wind Project, which is an entirely different project that has been proposed by Hood River County, Oregon would not be responsive to this need, and therefore is not considered as an alternative in the EIS. While the Middle Mountain Wind Project was included in the DEIS cumulative impact analysis, Section 1.8.1.2 in the FEIS has been revised to explain that the Hood River County Commission decided to cease efforts to pursue the Middle Mountain project (around 10 MW) at its meeting on May 17, 2010.

Comment: *[In reference to DEIS Section] 2.0, Proposed Action and Alternatives, [Section] 2.1, PROPOSED ACTION, [Section] 2.1.2, Project Overview, Table 2-1: [p]ermanent disturbance areas should include the permanent parking areas adjacent to each turbine that will be necessary to conduct turbine repairs and maintenance. Also there appears to be some inconsistency in the road width used to determine the impact area outside the project. [In Section] 2.1.3.7, Access Roads, [n]either the Application nor the DEIS include a description of parking areas that will have to be maintained adjacent to each turbine for construction and maintenance purposes. The space consumed by these parking areas should also be included in the calculations for permanently disturbed environment. [LTR 177, CMT 17]*

Response: The areas of disturbance for maintenance vehicle parking and turnarounds is included in the temporary and permanent disturbance acreage for Turbine String Corridor listed in Table 2-1 on page 2-4 of the DEIS. Regarding the width of access roads outside the Project Area, page 2-8 and page 3-215 of the DEIS both state the existing width of West Pit Road is 20 to 26 feet. Portions of approximately 2.5 miles of West Pit Road would be widened to create a drivable surface of 25 feet with 5 feet of additional clearing on each side.

Comment: *[In reference to DEIS Section] 2.3.6, Alternative Access Roads, [please refer to earlier] comments in response to Section 1.4.3.6, Alternative Access Roads. [LTR 177, CMT 17]*

Response: Use of CG 2930 was evaluated in the original Application for Site Certification as "Route 2." This route would have connected the site to Cook-Underwood Road via Kollock-Knapp Road, Scoggins Road and CG2930. CG2930 is a private logging road that crosses property owned by the Applicant and is currently used for commercial timber production and harvest. As described in Section 2.3.6 on DEIS page 2-23, use of Route 2 would require minor roadway improvements that would not directly impact any non-Project landowners. However, these roadway improvements would require construction within the National Scenic Area. Therefore, Route 2 was eliminated as a construction roadway access alternative purpose and need for proposed action, or clearly greater environmental impacts.

Comment: *[In reference to DEIS Section] 2.1.4.1, Construction, [t]he size and location of proposed laydown areas should be disclosed and evaluated in the FEIS. The size and location of permanent parking lots next to each turbine should be included and evaluated in the FEIS. This section should include a discussion regarding how concrete will be transported to the construction site. If a concrete batch plant is going to be used, its size and location should be disclosed in the FEIS. If concrete is going to be transported to the site, information regarding the trucking route and potential environmental impacts (air pollution, traffic, etc.) should be disclosed and evaluated in the FEIS. [In reference to Section] 2.1.6, Forest Harvest, [d]uring Project Construction and Operation Mitigation measures for construction of the project should include off-site mitigation for permanently disturbed or cleared areas that would constitute "forest conversions." This would include turbine parking areas and any permanent laydown area at the site. [LTR 177, CMT 18]*

Response: The areas of disturbance for temporary laydown areas and maintenance vehicle parking and turnarounds was included in the temporary and permanent disturbance acreage for "Turbine String Corridor" listed in Table 2-1 on page 2-4 of the DEIS. These Project features would be located within the 650-foot wide micrositing corridor. As stated in Section 3.8.5 (DEIS, Page 3-155) the 1,152-acre Project Area would continue to be predominantly used for commercial forestry operations. A maximum of approximately 56 acres of forestry land (under 5 percent of the Project Area) would be converted to energy facility use for the life of the Project. This conversion would not constitute a substantial change to area land use patterns given the area of the Project retained for active forestry operations, and given the acreage surrounding the Project in both private and state ownership that will be maintained in commercial forestry operations. As described in Section 2.14.3 of the Application for Site Certification, the use of on-site batch plants are under consideration. However, if concrete needs to be transported to the site, concrete trucks would use the same haul routes used to transport the large turbine components. See Section 1.4.1.6 of the EIS for a description of the proposed haul route

---

Comment: *[In reference to DEIS Section] 2.1.7, Project Decommissioning, [t]he Applicant has indicated that the life of the project is expected to be 30 years, at which time the project will either be upgraded ("re-powered") or decommissioned. If the current project receives EFSEC approval, any proposal to "re-power" the project or extend operation of the project beyond its anticipated life span should be reviewed by EFSEC as an amendment to the Site Certification Agreement. Such review should require an updated evaluation and assessment of the environmental impacts posed by the upgrade or extended life of the project. [LTR 177, CMT 19]*

Response: Section 2.1.7 of the EIS includes information concerning potential future decommissioning and site restoration that is reasonably foreseeable at this time. Given that these activities would occur 30 or more years into the future, it is not currently known what types of technologies or techniques would be available at that time to best accomplish decommissioning and site restoration. Any specific plan developed at this time thus would be not only speculative, but also could be viewed as limiting these activities to only currently available technologies and techniques. As discussed further in Section 2.1.7, any future decommissioning and site restoration would be conducted in accordance with applicable state laws, which would include an assessment of potential impacts from these activities. To the extent that EFSEC has authority over possible actions taken to "re-power" the Project in the future, these actions also would be subject to appropriate environmental review.

Comment: *[In reference to DEIS Section] 2.4, BENEFITS AND DISADVANTAGES OF DELAYING PROJECT IMPLEMENTATION. This section summarizes the benefits and disadvantages that will result from delaying the project. It is drafted, however, in a way that minimizes the benefits and over-exaggerates the disadvantages of delay. For example, statements to the effect that a delay will prevent the creation of new construction jobs are simply not accurate. A delay in constructing the project will result in a delay in the creation of new construction jobs, just as a delay in constructing the project will delay visual impacts from the project. [LTR 177, CMT 22]*

Response: Please see response to Comment LTR 176, CMT 15 above.

Comment: *[In reference to Section] 2.5, COMPARISON OF ALTERNATIVES. Government action or inaction is not the only possible reason that the project will not be built. For the reasons discussed earlier, assertions that the No Action Alternative will only arise if EFSEC or BPA deny approval of the project should be redacted. [LTR 177, CMT 23]*

Response: Comment noted. It is acknowledged that many factors could result in the Project not being built, and nothing in the EIS is intended to indicate that project disapproval by the lead agencies - EFSEC and BPA - would be the only reason the Project may not be built. Nonetheless, for the purposes of defining the No Action alternative in the EIS, the key consideration is what the result would be if the either or both of the lead agencies decide not to approve the proposed project. Thus, the EIS references the No Action alternative in this manner

---

Comment: *As discussed above, the DEIS should be expanded to include off site and on site alternatives. Without these additional alternatives, the comparison of the limited alternatives set forth in Table 2-5 is of questionable value for purposes of conducting meaningful environmental impact analysis under NEPA and SEPA. [This expansion of off-site and on-site alternatives should be expanded to Section] 3.0, Affected Environment, Impacts and Mitigation, [where g]enerally, discussions in this section should be expanded to include off site and on site alternatives. [LTR 177, CMT 23]*

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *Applicant-owned land that contained high ridges on which to place wind turbines with little impact to the continued underlying use of the land for commercial forestry. Applicant states in DEIS that commercial forestry would cease for the life of the Project. Plus, why are high ridges mutually exclusive for wind, this is not true for most all Projects in Eastern WA and OR. Note: this citation is one of 3 KEY criteria for establishing a site. It is flawed in logic, and will bias the conclusion that only the proposed site is feasible. Remedy - The Alternatives analysis must be redone with the criteria removing the requirement of placement on a high ridge, as this artificially excludes viable lands. Remove the limitation of placement only in areas used for commercial forestry. [LTR 178, CMT 40]*

Response: The requirement for high ridges for the Project is a product of the topography in the Project Area and surrounding area. This topography generally consists of relatively sharp ridges and valleys, as compared to the more rolling hills and landscape of eastern Washington and Oregon. In general, wind blows more frequently and strongly at the top of the ridges in the Project vicinity, rather than in the valleys. Thus, in order to be able to utilize this wind resource, turbines would need to be location generally on the ridges. The discussion concerning

commercial forestry is intended to reflect the desire not to unduly interfere with land that is currently in that use.

Comment: *[In reference to] Section 2.3, [t]he project must be located in an area with a steady supply of robust wind power, and on a site on which construction can reasonably occur (no significant geotechnical constraints). Both terms "steady" and "robust" have not been substantiated with independent data, or data from the Applicant. (i.e. met tower data in velocity, durations, 3-Dimensional directions). The DEIS does not even demonstrate that the "preferred" alternative meets these criteria. Remedy - 1) Quantify the terms "steady" and "robust." 2) Support the "preferred" alternative with data compared to item 1 above. 3) Evaluate other alternatives against the standards established in item 1 above. [LTR 178, CMT 63]*

Response: The purpose of the EIS that has been prepared is to evaluate the potential environmental impacts that could occur from the lead agencies' actions concerning the proposed Project, not to require financial or resource justification for the proposed Project itself. In other words, neither SEPA nor NEPA require that an EIS prove or validate the applicant's business case for its proposal.

Comment: *[In reference to] Section 2.3, [t]he project must be located in an area with a steady supply of robust wind power, and on a site on which construction can reasonably occur (no significant geotechnical constraints). The micrositing corridor for proposed Turbines A1-7 averages ONLY 170 feet wide, before entering into Landslide Hazard Area (LHA) Class II. The URS report (DEIS at Appendix B) states no Turbines will be sited on LHA Class II (or I, implied) soils. With a Foundation diameter of 60 feet (typ.) there is very limited ability to site these machines. The Applicant's "preferred" alternative does not even qualify for consideration, according to their own standards. Remedy - Since no other alternatives have been offered, other than the No Action alternative, one or two other Alternatives must be added to compare the reasonableness of construction from a geotechnical perspective. [LTR 178, CMT 65]*

Response: The Applicant believes, and the lead agencies agree, that based on available geotechnical information, the Project as proposed can be sited to avoid significant geological hazards. Additional alternatives related to geotechnical constraints thus are not necessary.

Comment: *[In reference to] Section 2.3, [t]o reduce startup costs, the project must be located on land the Applicant owns and controls, and land that can serve a dual purpose of commercial forestry and power production. Generally speaking, most Land Lease agreements are based more on output, than on fixed rates, and they may or may not include up front costs. These are an insignificantly low percentage of the construction costs (read "startup costs") that this argument can only speak to the marginal economic viability of this project. As for land that can serve a dual purpose of revenue generation over the life of the project, similar to wheat farming, this has NOTHING to do with STARTUP COSTS. These are self serving, self-imposed*

constraints, designed to artificially restrict consideration of any other alternative. Remedy - Disclose financial justification of how these particular startup costs materially effects project viability, or remove that as a "constraint" in evaluating Alternatives. [LTR 187, CMT 66]

Response: The purpose of the EIS that has been prepared is to evaluate the potential environmental impacts that could occur from the lead agencies' actions concerning the proposed Project, not to require financial or resource justification for the proposed Project itself. In other words, neither SEPA nor NEPA require that an EIS prove or validate the applicant's business case for its proposal.

Comment: *[In reference to] Section 2.3, [in order t]o enable the power to reach urban markets and eliminate the cost and time required to construct new transmission lines, the project must be located in proximity to existing high-voltage transmission lines. Proximity to existing high-voltage transmission lines is PURELY a matter of economics, and has nothing to do with power reaching urban markets. Remedy - Restate the "constraint" to incorporate the additional costs, due to this factor, into the potential viability of other alternatives. Such that the economic viability of WRE has a certain savings over Alternative B, C, and D, for example. [LTR 178, CMT 67]*

Response: For further discussion of the Project's purpose and need and alternatives, see Section 1.2.3.

Comment: *General Comment on DEIS. BPA yard size of 4+ acres invites and encourages future growth, which must be evaluated now. Remedy - BPA must, or the DEIS must, identify the minimum size of land needed to house a 75 Megawatt Substation, and only permit, purchase, and develop such a BPA Facility, if the proposed WRE project is approved. Any larger size of land or power capacity would trigger additional review requirements for WRE Application in the BPA NEPA process. [LTR 178, CMT 133]*

Response: The proposed BPA substation to interconnect the proposed Project is sized to accommodate only the interconnection of this Project. Interconnection of other generation projects at this substation is not envisioned or planned at this time. Nonetheless, if any proposal materializes at some future time for a potential generation interconnection at this substation, and if such a proposal appears feasible from a technical and operational standpoint, BPA would consider such a proposal and would conduct appropriate NEPA review of the proposal at that time.

Comment: *As in the National Parks & Conservation Association case, the private economic interests of the Applicant are the driving force behind the purpose and need statement, and thus behind the entire DEIS. The narrowly drawn statement unreasonably constrains the possible range of alternatives, because it excludes alternatives that fail to meet the Applicant's specific private objectives, which are to build a wind energy project. The result of such a narrowly*

driven statement led to only two alternatives to be considered: the proposed action (authorizing construction and operation of the proposed Whistling Ridge Entergy Project and associated components) and the No Action Alternative (not authorizing construction and operation of the proposed project). This extremely narrow range of alternatives is unreasonable, and thus, violates NEPA. [LTR 179, CMT 18]

Response: EFSEC and BPA have identified their respective need for action in a manner entirely consistent with SEPA and NEPA. As discussed in Section 1.2.1 of the EIS, EFSEC's need for action is to respond to an application by WRE for a site certificate. As discussed in Section 1.2.2 of the EIS, BPA's need for action is to respond to WRE's request for an interconnection of its proposed Project to the Federal Columbia River Transmission System (FCRTS). Each agency also has separate purposes (i.e., objectives) that it will bear in mind and attempt to meet in reviewing and making a decision on the Project. Given the agencies' need for action in this case (i.e., to approve or deny an application and request), the range of alternatives considered in detail in the EIS is not unreasonable. In addition, the agencies considered a number of other alternatives but eliminated those alternatives from detailed study in the EIS, as discussed in Section 2.3.

Comment: *The Range of Alternatives Considered is Inadequate. The DEIS discusses only the Proposed Action Alternative (the proposed project) and the No Action Alternative. Such a truncated alternatives analysis violates the agencies' duties under NEPA and SEPA to fully review all reasonable alternatives. "The purpose of NEPA is to require disclosure of relevant environmental considerations that were given a 'hard look' by the agency, and thereby to permit informed public comment on proposed action and any choices or alternatives that might be pursued with less environmental harm." Te-Moak Tribe of Western Shoshone of Nevada v. United States Dep't of the Interior, ---F.3d ---, 2010 WL 2431001 (9th Cir. 2010) (quoting Lands Council v. Powell, 395 F.3d 1019, 1027 (9th Cir.2005)); see also 42 U.S.C. § 4332(E) (requiring agencies to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources"). Agencies are required to consider alternatives in an EIS and must give full and meaningful consideration to all reasonable alternatives. Id.; see also 40 C.F.R. § 1508.9(b). "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." Id. (citing Idaho Conservation League v. Mumma, 956 F.2d 1508, 1519 (9th Cir.1992) (quoting Citizens for a Better Henderson v. Hodel, 768 F.2d 1051, 1057 (9th Cir.1985)). SEPA also requires an EIS to evaluate alternatives. RCW 43.21C.030(2)(c)(i). The applicable guidelines are found at WAC 197-11-440(5). An alternative considered for purposes of an EIS need not be certain or uncontested, it must only be reasonable. King County v. Central Puget Sound Growth Management Hearings Bd. 138 Wn.2d 161, 184-85, 979 P.2d 374, 385 (1999). A reasonable alternative is one that could feasibly attain or approximate a proposal's objectives at a lower cost to the environment. Id.; see also WAC 197-11-440(5)(b). According to the applicable federal regulations, an EIS "shall inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. CEQ clarified the meaning of this requirement in its "Forty Most Asked Questions" policy guidance by defining "reasonable alternatives" as including "those that are practical or feasible from the*

technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant." Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026 (Mar. 23, 1981) (emphasis in original). When selecting alternatives, an agency may consider an applicant's desires, but is not by any means bound or limited by them. It is not appropriate for an agency to rely on the "self serving statements of the project applicants." Southern Utah Wilderness Alliance v. Norton, 237 F. Supp. 2d 48, 53 (D.D.C. 2002). Instead, the action agency must "to the fullest extent possible ... study, develop and describe appropriate alternatives to recommended courses of action in any proposal which includes unresolved conflicts concerning alternative uses of available resources." Id. at 54 (citing 42 U.S.C. § 4332(2)(E)). Moreover, "[o]ther factors [other than the applicant's desires] to be developed during the scoping process - comments received from the public, other government agencies and institutions, and development of the agency's own environmental data - should certainly be incorporated into the decision of which alternatives to seriously evaluate in the EIS." CEQ, Guidance Regarding NEPA Regulations, 48 Fed. Reg. 34,263, 34,267 (July 28, 1983). [LTR 179, CMT 20]

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *Again, the DEIS analyzes the impacts of only two alternatives: 1) the proposed project, and 2) the no action alternative. These options advance the Applicant's goals, rather than the agencies' goals, to the exclusion of other reasonable alternatives. The DEIS is fatally flawed in its failure to consider an adequate range of reasonable alternatives. See Muckleshoot Indian Tribe v. USFS, 177 F.3d 800, 913 (9th Cir. 1999) (agency failed to consider an adequate range of alternatives when an EIS considered only a no action alternative along with two "virtually identical" action alternatives). [LTR 179, CMT 21]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *Various other alternatives should have been considered. First, at page 1-13 of the DEIS, the BPA did not consider any alternate locations for the wind turbine project other than those owned by the Applicant. Likewise, alternatives for interconnecting the wind project with transmission lines off of the project site were eliminated. Indeed, under NEPA, the EIS may even have to look at alternatives over which the applicant has no control. NRDC v. Morton, 458 F.2d 827, 835 (D.C. Cir. 1972); NWF v. NMFS, 235 F. Supp.2d 1143 (W.D. Wash. 2002). Further, it is irrelevant whether an applicant already owns alternative sites for the purposes of NEPA review: "The fact that this applicant does not now own an alternative site is only marginally relevant (if it is relevant at all) to whether feasible alternatives exist to the applicant's proposal." Van Abbema v. Fornell, 807 F.2d 633, 638 (7th Cir. 1986). As stated in the Van Abbema case, other alternatives for a project cannot be eliminated as non-feasible simply because the Applicant does not now own the site where an alternative location may exist. Here, SDS and Broughton Lumber own tens of thousands of acres of land in Oregon and Washington that could potentially be available for energy production purposes. The EIS fails to consider those lands, and fails to consider the possibility of applicant purchasing lands in other*

locations, such as east of the National Scenic Area, for an energy facility. Similarly, SEPA also requires a discussion of alternate development sites for a proposed project in order to have an adequate discussion of reasonable alternatives. See Barrie v. Kitsap County, 93 Wn.2d 843, 855, 613 P.2d 11481155 (1980) (EIS was inadequate because it looked only at the use of the applicant's private property for siting a shopping center, and failed to discuss alternative development sites). Here, alternate locations could provide comparable energy output. This approach would be consistent with the BPA stated goals of acting consistently with its environmental and social responsibilities and providing for cost and administrative efficiency. Surely other sites with far less impacts could easily be located. Not far to the east of this project site, thousands of wind turbines have been constructed recently, the vast majority of which pose far less resource impacts than the Whistling Ridge site. [LTR 179, CMT 22]

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *Another potential site is immediately north of the proposed project site, on DNR lands. In fact, this property has been designated by WRE as "Phase 2" of the Whistling Ridge project. Although DNR has indefinitely placed on hold consideration of WRE's request for a wind power lease of this property, that does not mean use of the property is forever out of the question. In fact, recent emails by WRE representatives, obtained by Skamania County residents Keith Brown and Teresa Robbins in response to a public records request, indicate that WRE still wishes to use the DNR property for wind energy. The DEIS fails to analyze the possibility of siting wind turbines on this property rather than on the SDS and Broughton Lumber land. Second, the BPA did not consider alternate configurations (with fewer wind turbines and/or in different locations) for the project. [LTR 179, CMT 23]*

Response: Please see response to Comment LTR 161, CMT 4 above.

Comment: *On page 1-14, the DEIS states that "the project must be capable of producing a minimum of 70 MW" and that the project size "was selected to optimize . . . economic feasibility" (emphasis added). There are no financial data or projections provided to support this claim. Moreover, the agencies eliminated any alternatives that would have considered a smaller generation facility, for instance in order to address potential environmental impacts, solely in an effort to "optimize"2 [Footnote 2: The Webster's Dictionary definition of "optimize" is "to make as effective, perfect, or useful as possible."] the applicant's economic wishes. Nor did the agency consider alternative locations for individual turbines that would reduce their impacts. This approach is unlawful and violates the agencies' legal mandates. [LTR 179, CMT 24]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *Fourth, no conservation alternatives were considered to eliminate the stated "need" for this 70 MW of installed capacity. Conservation alternatives, such as demand response technologies, also should have been included in order to meet the agencies' goals of promoting their environmental and social responsibilities. [LTR 179, CMT 26]*

Response: Please see response to Comment LTR 33, CMT 6 above.

Comment: *Fifth, another reasonable alternative is one that analyzes and considers the future development of the proposal. WAC 197-11-440(5)(c) states that the EIS shall: (vii) Discuss the benefits and disadvantages of reserving for some future time the implementation of the proposal, as compared with possible approval at this time. The agency perspective should be that each generation is, in effect, a trustee of the environment for succeeding generations. Particular attention should be given to the possibility of foreclosing future options by implementing the proposal. The DEIS fails to comply with this requirement, because it fails to consider the possibility of delaying the development of wind energy until a later date, perhaps at a time when the energy grid will be more equipped to handle the addition of new wind energy sources. [LTR 179, CMT 27]*

Response: Please see response to Comment LTR 176, CMT 15 above.

Comment: *The above alternatives were either eliminated from the study, or not considered at all, because the Applicant's economic needs, rather than the stated goals of the agencies, dictated the results of this DEIS. In effect, the agencies are violating their duties to consider all reasonable alternatives. [LTR 179, CMT 28]*

Response: Please see response to Comment LTR 179, CMT 18 above.

Comment: *Third, what turbines will be used and how large will they be? The scale of commercial turbines continues to increase year by year. Taller turbines than the ones depicted would be even more visible and higher contrast. [LTR 180, CMT 27]*

Response: Please see response to Comment LTR 176, CMT 2 above.

Comment: *We respectfully request that the DEIS and the Final EIS include consideration of the following alternatives which are absent or rejected in the DEIS: 1. Resiting of the seven most southerly "A Towers" (A1-A7) to a location within the proposed site that mitigates negative impacts; 2. Use of towers across the project with greater megawatt per tower ratings that will allow for the elimination of Towers A1-A7 with minimal impact on the proponents total megawatt output target of 75 MW; 3. Use of low profile towers across the project, and in*

particular at tower locations A1-7 to minimize negative impacts; 4. Elimination of towers A1-A7 through micro-siting across the project as a whole; 5. Elimination of towers A1-A7 to mitigate negative impacts. Such alternatives should be considered in the DEIS and the Final EIS to mitigate negative impacts based on the following five facts: 1. That tourism is the life blood of Skamania County and all communities throughout the Columbia River Gorge; 2. That Agri-Tourism is the present day driver of tourism in the famous Hood River Valley and that Underwood is well on its way to duplicating that economic success in Eastern Skamania County; 3. That Underwood's historic transformation from pear orchards to Agri-Tourism and to one of the premier wine producing regions in the world has enormous present-day socio-economic value; 4. That the very real present-day economic value of Underwood Agri-Tourism, as well as its future potential, would be severely impacted by the seven "A Towers" as currently sited; and finally 5. That this Council has the authority and responsibility to put the reins on this project by requiring the responsible re-siting or elimination of the seven "A Towers"; towers that will otherwise dominate the skyline and become Underwood's new "calling card." As we detail in our written comments, failure to re-site the seven "A Towers" would improperly force the blossoming Underwood Agri-Tourism industry to bear a disproportionate share of the negative environmental and socioeconomic impacts of this project in violation of WAC 463-60-085. Such a result is prohibited by WAC 463-47-110 which states that "[t]he overriding policy of the council is to avoid or mitigate adverse environmental impacts which may result from the council's decisions." [LTR 186, CMT 3]

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *For the reasons set forth above, we respectfully request that the DEIS and the Final EIS include consideration of the following alternatives which are absent or rejected in the DEIS: 1. Resiting of the seven most southerly "A Towers" (A1-A7) to a location within the proposed site that mitigates negative impacts; 2. Use of towers across the project with greater megawatt per tower ratings that will allow for the elimination of Towers A1-A7 with minimal impact on the proponents total megawatt output target of 75 MW; 3. Use of low profile towers across the project, and in particular at tower locations A1-7 to minimize negative impacts; 4. Elimination of towers A1-A7 through micro-siting across the project as a whole; and 5. Elimination of towers A1-A7 to mitigate negative impacts. [LTR 186, CMT 18]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *The Meteorological Towers should neither be a basic design nor a lattice design. The Meteorological Towers should utitilize a Tubular towers; pursuant to the same justification for turbine towers. Construction of a Tubular Meteorological Tower may require a Custom design, in that the top of the tower would have to be adapted to support the equipment it supports. [LTR 193, CMT 3]*

Response: We believe that the commenter is assuming that there might be some avian issues associated with lattice met towers as there were associated with lattice turbines towers in the

past. This is not the case. First, the permanent lattice met towers are smaller in diameter than the lattice towers that historically were used for wind turbines. Second, these permanent lattice met towers in the vicinity of the Project would provide no greater perching potential for birds than existing trees in the vicinity of the Project. Industry standard practice is to use lattice met towers because they do not require multiple guy wires for support. Tubular towers are available for use, but they would require nine or more guy wires to support them from blowing down and require frequent tightening and maintenance. In the case of the forested Whistling Ridge site, if tubular towers were used with guy wires it will increase the amount of cleared area that would be required for the Project because trees cannot be allowed to grow in a large radius around the met tower. The cleared area is necessary to prevent tree interference with the guy wires. Lastly, permanent lattice met towers would be located in the Project vicinity but not immediately adjacent to the wind turbines or in a location where they can cause interference or cause an elevated risk of avian strikes.

Comment: *Please reconsider other SDS properties to post wind towers. The ridges east of White Salmon are preferable, but frankly, all towers should be east of Lyle. Thank you for your time and consideration. [LTR 210, CMT 3]*

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *However, I do feel that if the project managers can make some minor modifications to number or exact location of the towers to accommodate specific complaints of the local residents, they should do their best. [LTR 212, CMT 4]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *If you allow these towers on the rim of the Gorge, you are setting a precedent in the Gorge. On what grounds could you deny any others near the Gorge? This will lead to all the rims of the Gorge, at least on the WA side, being lines with towers, since the wind is good everywhere. In turn, that may break down the objections to towers on the OR side. [LTR 262, CMT 1]*

Response: It is unclear at this time whether approval of the proposed Project would set a precedent for siting other wind projects in the area. Since all projects are evaluated on a case-by-case basis, approval of this Project does not dictate that any other Project that may be proposed in the future would also be approved. In addition, most developers are aware of the challenges of attempting to site wind projects in this general area. For the Applicant, proposing a wind project in this area may make sense, but other wind project developers may have differing opinions. Nonetheless, because there are no current proposals for other wind projects in the area; such future development is considered too speculative at this time.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 266, CMT 2]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 267, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I would add that coordination with the general public seems deficient, and this critical purpose of NEPA has thereby fallen short. Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 267, CMT 3]*

Response: BPA and EFSEC initially allowed a 45-day public review and comment period for the Draft EIS, which is consistent with NEPA and SEPA regulations for allowing adequate time for DEIS review and comment. In order to further facilitate public involvement however, the lead agencies agreed to extend the end of the original comment period (July 19, 2010) for an additional 39 days (to August 27, 2010), thereby allowing a total of 91 days for public review and comment on the DEIS. The lead agencies provided timely and broad distribution of the DEIS, wide noticing, web postings, and periodic updates to ensure sufficient public awareness of the DEIS and comment period. The lead agencies also posted the DEIS on the agencies' websites and held public meetings on the DEIS to ensure that the public was provided with opportunities for involvement.

Comment: *This proposed project does not appear to have been adequately coordinated with the Yakima Indian tribes, and thereby places Native cultural resources at risk. [LTR 267, CMT 3]*

Response: As described in both Section 1.0 and Section 3.10 of the EIS, the lead agencies along with the Applicant have coordinated with the Confederated Tribes and Bands of the

Yakama Nation (including the Yakama Nation Cultural Resources Department) concerning the proposed Project. The Applicant also coordinated with two local resident tribal members to assist with the identification of potential sensitive, traditional, and/or sacred resources. In addition, BPA undertook consultation with the Yakama Nation through the NHPA Section 106 process to address effects of BPA's interconnection activities. While no resources of significance to the Tribe were identified within the APE of proposed interconnection, the Tribe provided information indicating that the Chemawa Hill area was culturally sensitive. Although the available information about the area was somewhat conflicting, the Applicant agreed to limit the number of turbines in that area in part to address the Tribe's concerns. In addition, the Applicant committed to continue to work with the Tribe to address siting of towers and other construction disturbances to address tribal cultural resource concerns where practicable to do so while maintaining the viability of the project.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. The DEIS has other flaws. [LTR 270, CMT 2]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a fair and balanced alternative analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. The DEIS has other flaws. [LTR 274, CMT 2]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The alternatives considered (briefly?) but eliminated from detailed study were given short shrift. [LTR 276, CMT 1]*

Response: Consistent with both SEPA and NEPA requirements, alternatives considered but eliminated from detailed study in the EIS are briefly discussed, and this discussion identifies the reasons why these alternatives were eliminated from further study. The lead agencies believe that these alternatives thus were sufficiently addressed. As discussed in other responses to

comments, additional information has been provided concerning alternative locations to further clarify this information.

Comment: *The design of the proposed facility is fatally flawed for lack of statutorily required alternatives and insufficient mitigation analysis. [LTR 283, CMT 13]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *Is the proponent's staunch resistance to alternative designs related to a minimum output required for just such a sale? [LTR 283, CMT 18]*

Response: Please see response to Comment LTR 61, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 287, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am also concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 288, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. The DEIS has other flaws. [LTR 289, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DE IS (the proposal and the no-action alternative). This is inadequate. The DEIS has other flaws. [LTR 290, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. The DEIS has other flaws. [LTR 291, CMT 4]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. The DEIS has other flaws. [LTR 292, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other ,sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. A holistic energy assessment should the first thing on the review*

program for any proposed development - not just first cost and/or specific company investment return profit figures. The DEIS has other flaws. [LTR 293, CMT 3]

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *I am concerned that the DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. The DEIS has other flaws. [LTR 294, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The proposal fails to provide a credible alternatives analysis. Additional time is required for proper review. The EFSEC and BPA need to consider other alternatives, as well as other sites for wind energy. Additional planning is required for other configurations, deleting turbines to reduce impacts. [LTR 297, CMT 4]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 307, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 308, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The DEIS is fundamentally flawed because it fails to provide a credible alternatives analysis. EFSEC and BPA need to consider other alternatives, including other means of providing electricity (including increasing efficiency and reducing consumption), other sites for wind energy, other configurations, deleting turbines to reduce impacts, alternative routes for hauling turbines to avoid traffic impacts to the National Scenic Area, etc. Only two alternatives are meaningfully considered in the DEIS (the proposal and the no-action alternative). This is inadequate. [LTR 309, CMT 3]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *Please define counterpoise and staging areas. [LTR 311, CMT 6]*

Response: Staging areas are temporary areas used assist in the installation of Project components during Project construction. These areas are used to prepare and store Project components and equipment as needed. Previously disturbed areas are used where possible, and any additional disturbance is restored and re-vegetated after construction. Counterpoise is wire connected to Project components that is installed underground to help dissipate any lightning strikes. Counterpoise typically consists of 3/8-inch diameter wire buried about 12 to 18 inches underground. Small trenches are dug for installation, with the disturbed area restored and re-vegetated after installation.

Comment: *Why aren't all these "components" addressed by BPA in the Whistling Ridge DEIS? Towers, Conductors, Counterpoise, Fiber Optic Cable, Right-of-Way Clearing, Access Roads, Staging Areas, Gates, Substation Facilities. [LTR 311, CMT 7]*

Response: To the extent any of these components are proposed as part of the proposed Project, they are included and addressed in the EIS.

Comment: *So, why doesn't the Whistling Ridge DEIS have a BPA analysis about the impacts of not building any new transmission lines, or using the old transmission line, or substations? Further, the I-5 EIS goes on to say that it "…will evaluate direct, indirect and cumulative impacts to: Land Use, Cultural Resources, Aesthetics, Sensitive Plants and Animals and their Habitats, Fish and Water Resources, Erosion and Soils, Socioeconomics and Public Services, Electric and Magnetic Fields, Noise, Public Health and Safety, Air Quality, Recreation, Environmental Justice." From the Whistling Ridge DEIS, it is very apparent that BPA did not address any of these issues as they pertain to transmission lines and substations, technology that BPA should know something about! [LTR 311, CMT 9]*

Response: The EIS for the proposed Project addresses both the direct and indirect impacts of the proposed Project itself, as well as the cumulative effect of the proposed Project in combination with other past, present, and reasonably foreseeable future projects. Since the scope of the proposed action is the wind Project and its proposed interconnection to the FCRTS, that is the focus of the analysis of direct and indirect impacts in the EIS. Other existing and proposed BPA transmission lines and other facilities in the general vicinity of the proposed Project were considered in the cumulative impact analysis (Section 3.14) of the EIS. This section has been revised to more clearly reflect that these facilities were considered in this analysis.

Comment: *Why isn't the "No Action Alternative" addressed more fully and thoughtfully in the DEIS? [LTR 311, CMT 9]*

Response: In preparing the EIS, the lead agencies gave substantial treatment to the No Action alternative, commensurate with its potential level of impacts. Since the No Action alternative would involve the Project being denied by EFSEC and/or BPA (and thus not being built), inherently there is less to describe and analyze about this alternative. Nonetheless, this alternative is fully described in Chapter 2 of the EIS, and fully analyzed in Chapter 3 of the EIS.

Comment: *One of the requirements of these environmental impact statements is that alternatives are presented. And while I didn't see much in alternatives, SDS, Whistling Ridge owns about 80,000 acres in the state of Washington, and they choose these few acres. Why can't they locate the project elsewhere so it won't impact the National Scenic Area, peoples backyards and tourism? [LTR 317, CMT 33]*

Response: Please see response to Comment LTR 79, CMT 2 above.

Comment: *The applicant insists on 70-MW, why? What are the alternatives? If there are no alternatives we need to know why. [LTR 317, CMT 34]*

Response: Please see response to Comment LTR 61, CMT 1 above.

Comment: *Whistling Ridge Energy Project will need to proceed as an integrated whole. You cannot remove pieces of the project and hope for its success. [LTR 317, CMT 39]*

Response: Please see response to Comment LTR 61, CMT 1 above.

Comment: *We strongly recommend removing Turbine Corridors A-1 though A-7 from further project consideration. Visual impacts will seriously degrade core scenic and historic landscape values. [LTR 317, CMT 59]*

Response: Please see response to Comment LTR 79, CMT 1 above.

Comment: *Consider reasonable alternatives and look at the language from these federal agencies who are mandated to protect this area. [LTR 317, CMT 63]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The only alternative discussed is no action, so technically they are no alternative. [LTR 317, CMT 85]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The alternatives addressed are insufficient. It is said we need 70-MW or we cannot do the project, and there is no place else to do it and we have absolute every array that we've proposed. This is disingenuous to the process of SEPA to allow that to stand. I think there needs to be a hard look at the 70,000+ acres owned to come up with some viable alternatives to compare this to. [LTR 318, CMT 15]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *The EIS does not have an appropriate list of alternatives. It states only one action item and mentions throughout the document that it is one of the alternatives. How can the proposed action also be* an alternative? *The only alternative stated is the no-action alternative. [LTR 318, CMT 33]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *NEPA and SEPA require two major points with respect to alternatives. 1) there be a reasonable range of alternatives considered and 2) each reasonable alternative be rigorously explored and objectively evaluated. In this project we have two alternative: the project and no action. This is not in accordance with NEPA/SEPA requirements. [LTR 318, CMT 45]*

Response: Please see response to Comment LTR 66, CMT 1 above.

Comment: *Please consider Hood River in your impact analysis. [LTR 318, CMT 51]*

Response: The community of Hood River was considered in the analysis of several environmental impact topics including land use, transportation, socioeconomic, and visual impacts.

Comment: *The authors of the EIS should consider the reconfiguration of the project that was rejected. [LTR 318, CMT 58]*

Response: Please see response to Comment LTR 79, CMT 1 above.

G.3 AFFECTED ENVIRONMENT, IMPACTS AND MITIGATION

G.3.1 EARTH

Comment: *The project would require substantial soil relocation. Spoils sites should therefore be approved by a qualified specialist and their locations identified in the EIS draft. [LTR 79, CMT 10]*

Response: As discussed in Section 3.1.3, a Stormwater Pollution Prevention Plan (SWPPP), an Erosion and Sedimentation Control Plan, and an Environmental Protection Control Plan will be submitted to EFSEC for approval. These plans will include BMPs to minimize erosion and runoff from areas such as spoils piles. EFSEC may require the Applicant to obtain coverage under Ecology's Construction Stormwater General Permit since it would disturb more than 1 acre of land. Placement of all spoils piles would be regulated by the conditions of this permit. At this time, the location of the spoils piles is not known because the final location of the wind turbines has not been completed.

Comment: *[In reference to* soil contamination*] - The discussion regarding soils does not address possible presence of contaminants along the access road right of way or at the project site. The FEIS should include the results of a Phase I Environmental Site Assessment to determine if and where contaminated soils may exist. [LTR 177, CMT 26]*

Response: There are no past land use activities that would lead the Applicant to believe hazardous materials or contaminants are present along the access roads or within the Project Area. Additionally, no contaminants were found during recent access road improvements within the Project Area. Therefore, the Applicant will not conduct a Phase I Environmental Site Assessment. However, the construction management plan would include provisions to ensure worker safety as discussed in Section 4.2 and required by state and federal laws.

Comment: *[In reference to DEIS Section 3.1.2.1] Landslide evaluation….without danger….to surrounding environment. No obvious recent mass wasting features were observed in the aerial photos or during sight reconnaissance. Class III LHAs were delineated adjacent to proposed wind turbines along the southern Tower Line A and along Tower Line C. Fails to show detailed topography, detailed topographical changes, and how it affects landslide danger. Attempts to depict turbines outside of slide area, but common knowledge dictates the pad and activities will be in the unstable slopes. [LTR 178, CMT 75]*

Response: As discussed in Section 2.1.2 and in other responses, final siting of the wind turbines and associated facilities would be done following completion of the EFSEC Site Certificate and a detailed geotechnical investigation. As part of the final siting process, grading/excavation plans would be developed.

Comment: *[In reference to DEIS Section 3.1.2.1], the changes to topography would be minor to moderate depending on location "Changes in topography" denotes significant earth moving. Need detailed maps and grading/excavating plans to able to assess the extent of the topographical changes. Remedy - The extent of topographical changes should be identified in the DEIS test, as well as the photomontages. [LTR 178, CMT 74]*

Response: Please see response to Comment LTR 178, CMT 75 above.

Comment: *[In reference to] Section 3.1.2.1, [the] entire section, [n]o information is given as to how cite decommissioning will occur so impacts cannot be assessed. [LTR 178, CMT 79]*

Response: Section 2.1.7 of the EIS includes information concerning potential future decommissioning and site restoration that is reasonably foreseeable at this time. Given that these activities would occur 30 or more years into the future, it is not currently known what types of technologies or techniques would be available at that time to best accomplish decommissioning and site restoration. Any specific plan developed at this time thus would be not only speculative, but also could be viewed as limiting these activities to only currently available technologies and techniques. As discussed further in Section 2.1.7, any future decommissioning and site restoration would be conducted in accordance with applicable state laws, which would include an assessment of potential impacts from these activities. To the extent that EFSEC has authority

over possible actions taken to "re-power" the Project in the future, these actions also would be subject to appropriate environmental review.

Comment: *[In reference to DEIS Section 3.1.2.1], the primary impacts during construction would be potential for erosion, landslides, soil compaction and changes to topography Where these impacts will occur needs to be disclosed fully, particularly where changes to topography will occur. Remedy - Provide a supplemental DEIS that fully discloses where the topographical changes will occur and provide before and after contour maps for all locations. [LTR 178, CMT 131]*

Response: Please see response to Comment LTR 178, CMT 75 above.

Comment: *[The Volcanic Activity] section should discuss how ash from a volcanic eruption may impact the operation of wind turbines, transmission lines, and other elements of the project. [LTR 177, CMT 27]*

Response: The potential for ash fall was discussed in DEIS Section 3.1.2.1. Ash fall would be a potential unavoidable impact resulting from a volcanic eruption and there are currently no mitigation options available for this type of geological event.

Comment: *Why is volcanic ash deposition of such concern that it is mentioned here? Granted, several of the soils present do contain a volcanic ash component, but it is not clear to me why this appears, since there is no control over the possible event and, depending on the severity of an ash fall, no mitigation measures would be possible. Large amounts of ash could be physically removed, but would that be mitigation? [LTR 272, CMT 9]*

Response: Volcanic ash deposition is discussed as a possible geologic hazard within the Project Area. The commenter is correct in stating that there would be no mitigation measures that could be implemented to reduce ash deposition.

Comment: *Does the statement regarding mass wasting "no obvious recent mass wasting features" imply that there is evidence of the phenomena having occurred on the site in the not-so-recent past? If so, then this is another reason why a more thorough geologic assessment be conducted, before the project is evaluated by the Council. Although the soil type present on part of the project site has low liquefaction potential, massive excavation and refill, as in the 8.5 mile trench, may disturb soil structure enough to render the possibility greater than in the undisturbed state. Although liquefaction of soils is generally associated with earthquake activity, a similar phenomenon may result when soils become oversaturated. [LTR 272, CMT 9]*

Response: As discussed in Section 2.1.2 and in other responses, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other Project facilities such as access roads, these facilities will be redesigned or relocated to avoid this risk.

Comment: *The [DEIS] shows that the soils on the proposed Whistling Ridge wind farm site, 1152 acres located in Sections 5, 6, 7, 8, and 18 of T3N, R10E, and on Section 13 of T3N, R9E, are unstable and should not be disturbed through the building of this project, a project that would involve thousands of tons of ground movement and disturbance, with the addition of thousands of tons of concrete and wind turbines on top of this unstable soil. [LTR 281, CMT 1]*

Response: As discussed in Section 3.1.2.1, the landslide evaluation concluded that the Project could be constructed without danger to human life or the surrounding environment due to landslide hazard. Further subsurface investigation in support of final tower foundation design would help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock underlying the ridgelines.

Comment: *Geologic and soils information is troubling for anyone the proposed project site which is pretty steep, and this project proposes to disturb a great deal of that. Blasting would disturb fragile habitats. The soil types present are unstable. [LTR 318, CMT 41]*

Response: Please see response to Comment LTR 281, CMT 1 above.

Comment: *In reading the DEIS, it also came to my attention that the soil descriptions used by the proponent were not as complete and not as informative as the soil descriptions in the Soil Survey of Skamania County, Washington, done by the U.S. Department of Agriculture, Soil Conservation Service, dated October 1990. It is as if certain, very pertinent information was left out of the DEIS. I have attempted to put this information in this memo. [LTR 281, CMT 2]*

Response: Information regarding soil series relevant to the proposed Project was included in Section 3.1.1.3.

Comment: *The soils on the proposed wind farm site can be found in the U.S. Department of Agriculture's Soil Conservation Service's Soil Survey of Skamania County Area, Washington, October 1990. The DEIS descriptions are in ITALICS; other descriptions and information for each soil type is from the Soil Survey book (I have copied freely!). The soil types are numbered, as follows: #66, McElroy Series (included in this unit are small areas of Chemawa, Timberhead, Underwood, and Undusk soils) gravelly loam, 5 – 15 percent slopes. "The McElroy series*

consists of very deep soils (up to 5 feet) formed in colluvium and residuum from basalt with a mantle of volcanic ash that influences soils in the top 9 to 13 inches. The soils exist on the footslopes and backslopes of mountains on slopes from 5 to 90 percent at elevations from 400 to 2,600 feet in eastern Skamania County and western Klickitat County. McElroy Soils are well drained with medium to rapid runoff and moderate permeability. The series was established in 1981 following the introduction of volcanic ash from the eruption of Mt. St. Helens." The average annual precipitation is 55 inches, average air temperature is about 46 degrees Fahrenheit (F), and the average frost-free period is 105 – 125 days. Hazard of water erosion is moderate. This unit is used for woodland, hayland, pastureland, homesites, wildlife habitat, and recreation. Douglas fir, ponderosa pine, and grand fir are the main woodland species. Oregon white oak and bigleaf maple are trees of limited extent in this soil unit. Main limitation for harvesting timber is seasonal soil wetness…wheeled and tracked equipment produces ruts, compacts the soil, and damages the roots of trees…Unsurfaced roads and skid trails are soft and slippery and can be impassable when wet…Occasional snowpack hinders the use of equipment and limits access in winter. This unit is well suited to use as hayland and pastureland. The main limitation of this unit for use as homesites is the steepness of slop. Erosion is a hazard in the steeper areas. Capability sub-class IIIe. [LTR 281, CMT 7]

Response: Please see response to Comment LTR 281, CMT 2 above.

Comment: *#67, McElroy Series (included in this unit are small areas of Chemawa, Timberhead, Underwood, and Undusk soils), gravelly loam, 15 to 30 percent slopes. It formed in colluvium derived dominantly from basalt with a mantle of volcanic ash. The native vegetation is mixed conifers and shrubs. Elevation is from 400 to 2300 feet. [Note: the DEIS states that the McElroy Series is from 400 to 2600.] The average annual precipitation is 55 inches, average air temperature is about 46 degrees F, and the average frost-free period is 105 – 125 days. Runoff is medium and the hazard of water erosion is moderate. Most areas of this unit are used for woodland, pastureland, hayland, wildlife habitat, recreation, and watershed. A few areas are used as homesites. Douglas fir, ponderosa pine, and grand fir are the main woodland species on this unit. Limited extent trees are Oregon white oak and bigleaf maple. Main limitation for harvesting timber is seasonal soil wetness…wheeled and tracked equipment produces ruts, compacts the soil, and damages the roots of trees…Unsurfaced roads and skid trails are soft and slippery and can be impassable when wet… Occasional snowpack hinders the use of equipment and limits access in winter. This unit is well suited to use as hayland and pastureland. The main limitations are steepness of slope and the hazard of erosion. Main limitation for use as homesites is the steepness of slope and erosion. Restricted permeability and steepness of slope increase the possibility of failure of septic tank absorption fields. Access roads should be designed to provide adequate cut-slope grade, and drains are needed to control surface runoff and keep soil losses to a minimum. Capability subclass IVe. [LTR 281, CMT 8]*

Response: Please see response to Comment LTR 281, CMT 2 above.

Comment: *#68, McElroy Series (included in this unit are small areas of Chemawa, Timberhead, Underwood, and Undusk soils), gravelly loam, 30 – 65 percent slopes. Very deep, well-drained soil is on the back slopes of mountains. It formed in colluvium derived dominantly from basalt with a mantle of volcanic ash. The native vegetation is mainly mixed conifers and shrubs. Elevation is 400 to 2300 feet. The average annual precipitation is 55 inches, average air temperature is about 46 degrees F, and the average frost-free period is 105 – 125 days. Runoff is rapid, and the hazard of water erosion is severe. This unit is used for woodland, wildlife habitat, recreation, and watershed. Douglas fir, ponderosa pine, and grand fir are the main woodland species on this unit. Oregon white oak and bigleaf maple are limited extent trees on the unit. Steep slopes restrict the use of wheeled and tracked equipment in skidding. Use of wheeled and tracked equipment when the soil is moist produces ruts, compacts the soil, and damages the roots of trees. Logging roads require suitable surfacing for year-round use. Occasional snowpack hinders the use of equipment and limits access in winter. Steep yarding paths, skid trails, and firebreaks are subject to rilling and gullying unless plant cover is maintained or adequate water bars are provided. Capability sub-class VIe. [LTR 281, CMT 10]*

Response: Please see response to Comment LTR 281, CMT 2 above.

Comment: *#135, Timberhead Series, gravelly loam, 5 to 30 percent slopes. The Timberhead series consists of very deep soils (up to 5 feet) formed in residuum and colluvium from basalt mixed with volcanic ash. The soils exist on mountain ridges between 5 and 30 percent at elevations from 2,000 to 3,600 feet in Skamania County and western Klickitat County. Timberhead Series soils are well drained with medium to rapid runoff and moderately high to high permeability. [Note: The Soil Survey book states that this unit is at 2000 to 2800 feet elevation.] Average annual precipitation is about 60 inches, the average annual air temp is 44 degrees F, and the average frost-free period is 95 to 115 days. Included in this unit are small areas of McElroy, Underwood, and Undusk soils. Runoff is medium, and the hazard of water erosion is moderate. Most areas of this unit are used for woodland, recreation, wildlife habitat, and watershed. A few areas are used as grazeable woodland. Douglas fir, grand fir, and western hemlock are the main woodland species on this unit. [Would there be bats here, just like at the canopy crane, because of the hemlock?] Among the trees of limited extent is western redcedar. Areas on ridge tops that are subject to strong, persistent winds [how strong and how persistent?] are less productive than other areas of this unit. The main limitation of harvesting timber is seasonal soil wetness. Use of wheeled and tracked equipment when the soil is moist produces ruts, compacts the soil, and damages the roots of trees. Unsurfaced roads and skid trails are soft and slippery and can be impassable when wet. Occasional snowpack hinder the use of equipment and limits access in winter. This map unit is in capability subclass IVe. [LTR 281, CMT 11]*

Response: Please see response to Comment LTR 281, CMT 2 above.

Comment: *#136, Timberhead Series, gravelly loam, 30 to 65 percent slopes. The Timberhead series consists of very deep soils (up to 5 feet) formed in residuum and colluvium*

from basalt mixed with volcanic ash. The soils exist on mountain ridges between 5 and 30 percent at elevations from 2,000 to 3,600 feet in Skamania County and western Klickitat County. Timberhead Series soils are well drained with medium to rapid runoff and moderately high to high permeability. [Note: the Soil Survey book states that this soil unit is in the 2000 to 2800 foot elevation range.] Average annual precipitation is about 60 inches, the average annual air temp is 44 degrees F, and the average frost-free period is 95 to 115 days. Included in this unit are small areas of McElroy, Underwood, and Undusk soils. Also included are small areas of Rock outcrop and moderately deep soils over basalt. Available water capacity is moderately high. The hazard of water erosion is severe. Most areas of this unit are used for woodland, recreation, wildlife habitat, and watershed. Douglas fir, grand fir, and western hemlock are the main woodland species on this unit. Western redcedar is a tree of limited extent. The main limitation for harvesting timber is steepness of slope, which restricts the use of wheeled and tracked equipment. Use of wheeled and tracked equipment when the soil is moist produces ruts, compacts the soil, and damages the roots of trees. Occasional snowpack hinders the use of equipment and limits access in winter. Steep yarding paths, skid trails, and firebreaks, are subject to rilling and gullying unless plant cover is maintained or adequate water bars are provided. Capability subclass VIIe. [LTR 281, CMT 12]

Response: Please see response to Comment LTR 281, CMT 2 above.

Comment: *#144, Underwood loam, 2 to 15 percent slopes. The Underwood series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 2 and 50 percent at elevations between 500 and 2,700 feet in southeast Skamania County and west Klickitat County. Underwood Series soils are well drained with slow to medium runoff and moderately high permeability. [Note: The Soil Survey book states that this unit is at 500 to 2000 feet elevation.] The native vegetation is mainly mixed conifers and shrubs. The average annual precipitation is about 50 inches, the average annual air temperature is about 46 degrees F, and the average frost-free period is 100 to 150 days. Included in this unit are small areas of Chemawa and McElroy soils on terraces and foot slopes and Timberhead and Undusk soils on ridgetops. Also included are small areas of soils that are more than 35 percent clay. Included areas make up about 10 percent of the total acreage. Permeability of this Underwood soil is moderately slow. Available water capacity is high. Runoff is medium, and the hazard of water erosion is moderate. This unit is used for woodland, hayland, pastureland, orchards, homesites, wildlife habitat, and recreation. Douglas fir, ponderosa pine, and grand fir are the main woodland species on this unit. Among the trees of limited extent are Oregon white oak and bigleaf maple. The main limitation for harvesting timber is seasonal soil wetness. Use of wheeled and tracked equipment when the soil is moist produces ruts, compacts the soil, and damages the roots of trees. Unsurfaced roads and skid trails are soft and can be impassable when wet. Logging roads require suitable surfacing for year-round use. Occasional snowpack hinders the use of equipment and limits access in winter. The main limitations of this unit for use as homesites are steepness of slope, shrink-swell potential, moderately slow permeability, and the hazard of erosion in the steeper areas. Use of sandy backfill for the trench and long absorption lines helps to compensate for the moderately slow permeability of the soil. During the rainy season, effluent from onsite sewage disposal*

systems may seep at points downslope. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite disposal systems. The effects of shrinking and swelling can be minimized by using proper engineering designs. Buildings and roads should be designed to offset the limited ability of the soil in this unit to support a load. This map unit is in capability subclass Ille. [LTR 281, CMT 13]

Response: Please see response to Comment LTR 281, CMT 2 above.

Comment: *#147, Undusk gravelly loam, 5 to 30 percent slopes. The Undusk series consists of very deep soils (5 feet or more) formed in residuum and colluvium from basalt and andesite with a thin mantle of volcanic ash. The soils exist on benches, backslopes, and footslopes of mountains with slopes between 5 and 65 percent at elevations between 2,000 and 2,800 feet in southeast Skamania County and west Klickitat County. Undusk Series soils are well drained with slow to medium runoff and moderately high permeability. Based on the current test pits and field observations, the site soil is best represented as Soil Site Class D (stiff soils). Rock with varying strength and weathering characteristics was encountered at depths ranging from 3 to 12 feet bgs. The average annual precipitation is about 55 inches, the average annual air temperature is about 44 degrees F, and the average frost-free period is 90 to 120 days. The subsoil to a depth of 60 inches or more is dark brown very gravelly loam and extremely gravelly loam. Included in this unit are small areas of Chemawa, McElroy, Timberhead, and Underwood soils on ridges and back slopes and St. Martin soils on landslides. Also included are small areas of soils that are less than 35 percent rock fragments and soils that are shallow to bedrock. Included areas make up about 12 percent of the total acreage. Permeability of this Undusk soil is moderate. Available water capacity is moderately high. Runoff is medium, and the hazard of water erosion is moderate. This unit is used for woodland, wildlife habitat, recreation, and watershed. Douglas fir, grand fir, and western hemlock are the main woodland species on this unit. Among the trees of limited extent are red alder and western red cedar. Areas on ridge tops that are subject to strong, persistent winds are less productive than other areas of this unit. The main limitation for harvesting timber is seasonal soil wetness. Use of wheeled and tracked equipment when the soil is moist produces ruts, compacts the soil, and damages the roots of trees. Unsurfaced roads and skid trails are soft and can be impassable when wet. Logging roads require suitable surfacing for year-round use. Occasional snowpack hinders the use of equipment and limits access in winter. Logging activities can readily displace the surface layer. This map unit is in capability subclass IVe. [LTR 281, CMT 14]*

Response: Please see response to Comment LTR 281, CMT 2 above.

Comment: *#177, Undefined Soil Unit located west of wind turbine string C1-C4? These units sit next to the turbine strings? [LTR 281, CMT 15]*

Response: All soil series found within the Project Area are shown on Figure 3.1-3, including those located west of the "C" turbine string.

Comment: *Turbines are heavy, unwieldy machines. In my research, I came across the following information, several articles—one from Wind Watch, one from aweo.org, and one on transporting wind turbines--which provide insight on just how big and weighty wind turbines actually are, and I believe this information is very pertinent to the evaluation of weight effects on the soils located in the proposed area of the Whistling Ridge wind farm. [LTR 281, CMT 16]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.1.2.1 Proposed Action; PDF pg. 11], [t]he initial site restoration plan and the decommissioning plan SHOULD be part of the DEIS and SHOULD also be included in the FEIS. We should all be able to evaluate all of SDS's and the BPA's plans for this proposal, NOW not later, especially if "the initial site restoration plan will…identify, evaluate, and resolve all major environmental and public health and safety issues…including potential changes to soils, topography, or erosion…impacts to earth…mitigation measure…". All of these issues should be addressed in the DEIS and these plans should be available for public comment and input NOW. [LTR 286, CMT 8]*

Response: Section 2.1.7 of the EIS includes information concerning potential future decommissioning and site restoration that is reasonably foreseeable at this time. Given that these activities would occur 30 or more years into the future, it is not currently known what types of technologies or techniques would be available at that time to best accomplish decommissioning and site restoration. Any specific plan developed at this time thus would be not only speculative, but also could be viewed as limiting these activities to only currently available technologies and techniques. As discussed in Section 2.1.7, any future decommissioning and site restoration would be conducted in accordance with applicable state laws, which would include an assessment of potential impacts from these activities. To the extent that EFSEC has authority over possible actions taken to "re-power" the Project in the future, these actions also would be subject to appropriate environmental review.

Comment: *Regarding soil stability - Skamania County has failed to comply with the critical areas ordinance that has been mandated by the state upon this county, and it delayed that process. Therefore it is possible that particular areas of concern are not mentioned because they have not been legislatively acted on at a local basis. [LTR 318, CMT 13]*

Response: As discussed in Section 4.10, EFSEC will specify the conditions of construction and operation of the proposed project. This provision operates to supersede all state and local land use permitting related to energy facility sites that are under EFSEC's jurisdiction. However, a determination of consistency with local land use regulation is required. Skamania County has provided EFSEC with a letter and Resolution 2009-54 stating that proposed Project would comply with the land use policies and zoning regulations for the vicinity of the proposed Project. Furthermore, EFSEC believes that Section 3.1.1.4 in the DEIS, and the referenced geotechnical report (URS 2009), adequately analyzed the issue of soil stability in and near the Project Area. As discussed in Section 2.1.2 and in other responses, a detailed geotechnical

investigation of the specific locations of all wind project elements would be conducted prior to construction. If this investigation indicates the potential for slope instability at turbine sites or other Project facilities such as access roads, these facilities will be redesigned or relocated to avoid this risk.

Comment: *There is a DNR FPA application that indicates the A-7 though 7 portion of the eastern slope is - unstable slopes, high erosion potential, and a high mass wasting potential, and there is a portion of the slope that is intentionally not logged due to concerns about stability. [LTR 318, CMT 14]*

Response: For a discussion of unstable slopes and mass wasting potential, please refer to Section 3.1.3, Mitigation Measures. The following mitigation measures were identified to avoid, minimize, and compensate for potential impacts of the proposed Project related to geology, soils, topography, and geologic hazards.

Comment: *[In Section 3.1.1.4, Geologic Hazards], this section should be expanded to address geologic hazard issues related to the proposed access road (West Pit Road). That this road traverses lands identified as Class II Landslide Hazards is of particular concern. See Table 3.1-4.8 [Footnote 8: Table 3.1-4 should be revised so that the locations of the proposed access road, as well as other access road alternatives, are easily discernable.] The DEIS should also be revised to include a discussion regarding the extent to which Skamania County has assessed whether the project site or the area traversed by the proposed access road contains Class I landslide hazards (Severe).9 [Footnote 9: To qualify as a Class I landslide hazard, the location must be designated as such by the local legislative body, in this case Skamania County. See DEIS at § 3.1.1.4 Landslides.] If such an assessment has not been done, the discussion regarding landslide hazards should be expanded to determine whether there are affected areas that would otherwise meet the criteria for a Class I landslide hazards, even though they have not been formally designated as such by the County. [LTR 177, CMT 24]*

Response: As discussed in Section 2.1.2, final siting of the wind turbines and associated facilities would be done following completion of the EFSEC Site Certificate. Prior to this final siting process, as a condition of the Site Certificate and as discussed in Section 3.1.3, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other project facilities such as access roads (including improvements to West Pit Road), these facilities will be redesigned or relocated to avoid this risk. As discussed in Section 2.1.3.7, all road improvements required for the proposed Project would be designed and constructed under the direction of a licensed engineer, in accordance with the Skamania County Private Road Guidelines and Development Assistance Manual. All county roads requiring improvements would be designed and constructed in accordance with the WSDOT Design Manual.

Comment: *[In DEIS Section 3.1.2.1, Proposed Actions - Access Road], this section should be expanded to include a discussion of geologic hazards and their impact on the access road during both the construction and operation of the proposed project, including the environmental impacts that may arise from locating the access road in a Class II landslide area. [LTR 177, CMT 25]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *[DEIS Section 3.1.1.2, Regional Geology, of the DEIS] states "Regional geologic maps indicate the presence of Quaternary-age mass wasting landslide deposits located north of Underwood Mountain (Figure 3.1-2). These deposits are mapped as a large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long. However, based on field work conducted in 2007, there is no obvious evidence to suggest the presence of a landslide as mapped on the 1:100,000 scale geologic map. If landslide deposits are present, they have been exposed long enough that most or all of the geomorphic evidence has been removed by erosion." (p. 3-3) This is not an acceptable analysis. See Reference A, at the end of this document [see letter 177 in Appendix H] for more information on mass wasting but, briefly, "Mass wasting, the downhill movement of soil and rock under the influence of gravity, encompasses a variety of physical processes by which mountain ranges are eroded. These processes include: Creep - slow, nearly continuous downslope movement that is induced by either freeze/thaw cycles or wet/dry cycles. Slides - sudden downhill movement of masses of rock or sediment. Debris flows- dense, fluid mixtures of rock, sand, mud, and water. There are other categories of mass wasting processes such as slumps, rock flows, rockfalls, block glides (etc...) that can be grouped together or separately with creep, slides, and debris flows depending on which characteristics that share in common. All of these processes share one thing in common, namely, that they are caused by the incessant downward pull of gravity, which moves loose slope material downwards." [LTR 281, CMT 3]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *"These deposits are mapped as a large landslide, estimated to be approximately 1/3 square mile in area and almost a mile long. However, based on field work conducted in 2007, there is no obvious evidence to suggest the presence of a landslide as mapped on the 1:100,000 scale geologic map. If landslide deposits are present, they have been exposed long enough that most or all of the geomorphic evidence has been removed by erosion." "No obvious evidence…If landslide deposits are present…they have been exposed long enough that most or all of the geomorphic evidence has been removed…"!!! These are astonishing statements, made without any type of real, geological evidence, i.e., a sub-surface hazard survey, drill holes, etc., in the DEIS. An in-depth geological study should be made of the entire proposed site—before the project is approved, not after. Geomorphic evidence of landslides does not just disappear—a near-surface hazard survey is a tool to find out just what is going on under the exposed, eroded surface. This has not, apparently, been done for this DEIS, and it should be. This proposed*

wind farm would be situated on top of a unstable ridge line, subject to mass wasting. [LTR 281, CMT 4]

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *[DEIS Section 3.1.1.4, Geologic Hazards, Earthquakes states that] earthquakes are the result of sudden releases of built-up stress within the tectonic plates that make up the earth's surface. Stress accumulates where movement between plates or on faults produces friction. No faults are mapped within the footprint of the proposed project area. However, faults are mapped approximately 1.5 miles to the southwest and northeast. (Pezzopane 1993 and Geomatrix 1995) Many of these faults are inferred, and shown as dotted lines buried by younger surficial deposits. While the activity of the area faults is unknown, a review of aerial photography showed no indication of recent movement along the trace of the inferred faults. There have been no surface-rupture earthquakes on any fault within northwestern Oregon or southwestern Washington in historic times, and investigations of the regional faults have been limited. According to the updated National Seismic Hazard Maps published by the US Geological Survey (USGS) in 2008 (Petersen et al. 2008 and USGS 2009), the peak ground acceleration estimated for the area of the Whistling Ridge site is 0.18g for a 475-year return period earthquake (i.e., ground motion with a 10 percent chance of being exceeded in 50 years) and 0.40g for a 2,475year return period earthquake (i.e., ground motion with a 2 percent chance of being exceeded in 50 years). Large earthquakes at more distant faults could cause prolonged ground movement at the project site. Information on historic large earthquakes can be found in the Application for Site Certification Section 3.1 (Appendix A). [LTR 281, CMT 5]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *[Additionally, DEIS Section 3.1.1.4, Geologic Hazards, Landslides states that] the landslide evaluation conducted for the Application for Site Certification concluded that the project could be constructed and operated without danger to human life or the surrounding environment due to landslide hazards. Although none of the proposed turbines are located within Class II LHAs, several of the towers along the western side of the project site (Tower Lines A and B) are located along ridgelines with descending slopes that are locally greater than 35 degrees (70 percent). Based on studies conducted for the Application for Site Certification, it appears that the primary concern for towers located adjacent to the Class II LHAs is the potential for headward erosion of the steep drainages by debris or earth flow processes. Erosion rates of these drainages are unknown, but no obvious recent mass wasting features were observed in the aerial photos or during the site reconnaissance. Further subsurface investigation in support of final tower foundation design would help determine if there are weak rock or soil layers that could contribute to more deep-seated failure of the ridges and provide information on the quality of the rock underlying the ridgelines. [LTR 281, CMT 6]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *An in-depth geological study should be made of the entire proposed site—before the project is approved, not after. A near-surface seismic hazard survey and deep coring should be required before this project is approved. [LTR 281, CMT 17]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *The impacts of the turbines' weights on the mountain ridges in the DEIS has not been fully addressed. Could mass wasting result from ridges being flattened, heavy machinery being installed, deep anchors disturbing the soils, etc? [LTR 281, CMT 19]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *There are a lot of questions about the geology of the proposal area that have not been adequately answered in the DEIS. We need complete data in order to properly evaluate the DEIS. [LTR 281, CMT 24]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *[In reference to DEIS Section 3.1.1.2, Regional Geography] - Just because there is "no obvious evidence to suggest the presence of landslides" does not mean that the landslide does not exist or that mass wasting is not a definite possibility. What is mass wasting? A Wisconsin geology class syllabus defines mass wasting as follows: "Mass-wasting processes: Mass-wasting processes such as creep, landslides, and debris flows are distinguished from each other in part by whether they occur rapidly or slowly. Landslides are capable of transporting massive amounts of rock and soil downslope or miles in very short periods (e.g. minutes). Creep can also transport much material, but at rates of only millimeters per year. Both are important erosional processes. Rapid mass wasting events such as massive landslides or debris flows are typically triggered by events that destabilize material that resides on steep slopes. Such events include earthquakes volcanic eruptions, rain or melting snow, and poorly planned landscape alterations by humans (e.g. road cuts or developments that require the removal of material at the bases of slopes)." [Source: http://www.geology. wisc.edu!courseslgl12If1lass_wasting.html] Hmm, "landscape alterations"? I'm thinking that putting hundreds of tons of whirling propellers on top of impermeable surfaces in a steep-sloped area subject to wind and water erosion is probably not a well-thought out proposal. [LTR 286, CMT 1]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *[In reference to DEIS Section 3.1.1.4, Geologic Hazards, Earthquakes] - "A review of aerial photography' is NOT doing geology! This is a totally inadequate geologic*

analysis. "Inferred" faults shown as dotted lines does not mean that there are NOT buried, sub-surface, wide-ranging faults. Ridges have fault lines. I will comment further on the soils issue in a separate memo. [LTR 286, CMT 2]

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *[In reference to DEIS Section 3.1.2, Proposed Action] - So, are we to gather from the above statement that "further subsurface investigation: has NOT been done, there is NOT a "final tower foundation design that would help determine if there are weak rock or soil layers that could contribute to deep-seated failure of the ridge"?!? And, that this LACK of a final tower foundation design could "provide information on the quality of rock underlying the ridgelines"? Well, I'm confused. Isn't this DEIS supposed to provide all this information so that a thoughtful, science-based decision can be made by EFSEC and the involved public as to whether this project should even go on? This LACK of information is critical and should be provided in the DEIS. [LTR 286, CMT 3]*

Response: Please see response to Comment LTR 177, CMT 24 above.

Comment: *[In reference to Section 3.1.1.2] - Above the basalts are a variety of younger volcanic rocks and sedimentary materials that range from… These are materials that contribute to instability on slopes. Need clear topo[graphic] maps that show where turbines are to be placed so the interaction between loose layers and steep slope can be identified. [LTR 178, CMT 78]*

Response: Site topography is shown in Figure 3.1-1. Additionally, site topography and geology are shown with the micrositing corridors in Figure 3.1-2.

Comment: *[In reference to Section 3.1.2.1] "The steel tower is anchored in a platform of more than a thousand tons of concrete and steel rebar, 30 to 50 feet across and anywhere from 6 to 30 feet deep. Shafts are sometimes driven down farther to help anchor it. Mountain tops must be blasted to accommodate it. The platform is critical to stabilizing the immense weight of the turbine assembly." This statement is from the National Windwatch article. I really don't want to see mountain tops "blasted," and residents near the wind farm proposal probably don't want to see it, either! The proposed wind farm has 50 some turbines proposed. That is 50 x 1000 tons of concrete and steel rebar = to 50,000 tons of concrete and steel rebar weighing down on soils that are susceptible to erosion; one ton equals 2000 pounds, 2000 pounds x 50,000 tons = 50,000,000 pounds. What are the cumulative impacts of putting 50,000,000 pounds of stress on mountain ridges in Skamania County, and what are the cumulative effects of all the other wind farms' weights on all the lands and soils in BPA's area of interest? What does all this weight do to water tables? Any other effects? This issue of weight should be addressed more fully in the DEIS and its lack makes the DEIS inadequate and incomplete. [LTR 281, CMT 20]*

Response: As discussed in Section 3.14.3.1, the cumulative impacts of the proposed Project in combination with past, present, and reasonably foreseeable future actions have been analyzed. Reasonably foreseeable future projects do not include other wind facility projects located within Skamania County. The Applicant has no other information on additional reasonably foreseeable future actions in the Project Area. Therefore it is not possible to identify impacts to mountain ridges in Skamania County from possible future wind generation projects that are not reasonably foreseeable. Additionally, as discussed in Section 3.3.2.1, operation of the proposed Project would have minimal or no impacts to groundwater. As discussed above in another response, prior to the final siting process and as a condition of the Site Certificate, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted.

Comment: *[In reference to DEIS Section 3.1.1.4, Geologic Hazards, Earthquakes] - What does "large earthquakes at more distant faults could cause prolonged ground movement at the project site" actually mean? Does that mean that there will be earth movement downhill? Mass wasting? Does this mean that people and wildlife will be affected? How will they be affected? Does this mean that people would have to leave their homes? Are there evacuation routes? Would there be loss of life and property involved in "prolonged ground movement"? These questions are not answered in the DEIS. [LTR 286, CMT 3]*

Response: The impact of earthquakes on the proposed Project is discussed in Section 3.1.2.1. Field investigations concluded that the potential for liquefaction is very low at this site and settlement and lateral spread induced by a seismic event would be minimal. Additionally, the potential for surface rupture within the proposed Project Area is small given that there are no mapped faults crossing the site. As discussed above in another response, prior to the final siting process and as a condition of the Site Certificate, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted.

Comment: *Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants. Proper disposal of construction debris must be on land in such a manner that debris cannot enter buffers and waters of the state or cause water quality degradation of state waters. During construction, all releases of oils, hydraulic fluids, fuels, other petroleum products, paints, solvents, and other deleterious materials must be contained and removed in a manner that will prevent their discharge to waters and soils of the state. The cleanup of spills should take precedence over other work on the site. Clearing limits and/or any easements or required buffers should be identified and marked in the field, prior to the start of any clearing, grading, or construction. Some suggested methods are staking and flagging or high visibility fencing. A permanent vegetative cover should be established on denuded areas at final grade if they are not otherwise permanently stabilized. All temporary erosion control systems should be designed to contain the runoff from the developed two year, 24-hour design storm without eroding. Coverage under the National Pollution Discharge Elimination System (NPDES) and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activities is required for construction sites which disturb an area of one acre or more and which*

have or will have a discharge of stormwater to surface water or a storm sewer. [LTR 171, CMT 5]

Response: As discussed in Section 3.1.3 and in other responses a Stormwater Pollution Prevention Plan (SWPPP), an Erosion and Sedimentation Control Plan, and an Environmental Protection Control Plan would be submitted to EFSEC for approval. These plans would include BMPs to minimize erosion and runoff from the Project Area. EFSEC may require the Applicant to obtain coverage under Ecology's Construction Stormwater General Permit since it would disturb more than 1 acre of land.

Comment: *[Within T3N-R9E-S13], there are potential unstable slopes indicated. Applicable [Forest Practice] (FP) rules that may be relevant to the project. Most of these would come into play if there is logging or road building near any waters. 222-16-030, Water typing systems; 222-16-050, Classes of Forest Practices; 222-20-010, Applications and Notifications; 222-24-030, Road construction; 222-24-040, Water crossing structures; 222-24-052, Road maintenance; 222-30-020, Harvest unit planning and designs (wetland management zones); 222-30-022, Eastern Washington RMZs; 222-30-050, Felling and Bucking; 222-30-070, Ground based logging systems. [LTR 172, CMT 12]*

Response: Comment acknowledged.

Comment: *Mass wasting is a real concern in the proposal area and it has not been adequately addressed in the DEIS. There are real consequences to area residents from erosion and mass wasting events. [LTR 281, CMT 22]*

Response: As discussed in Section 2.1.2, final siting of the wind turbines and associated facilities would be done following completion of the EFSEC Site Certificate. Prior to this final siting process, as a condition of the Site Certificate and as discussed in Section 3.1.3, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other project facilities such as access roads (including improvements to West Pit Road), these facilities will be redesigned or relocated to avoid this risk. As discussed in Section 2.1.3.7, all road improvements required for the proposed Project would be designed and constructed under the direction of a licensed engineer, in accordance with the Skamania County Private Road Guidelines and Development Assistance Manual. All county roads requiring improvements would be designed and constructed in accordance with the WSDOT Design Manual.

Comment: *[In reference to Section 3.1.2.1], "[t]he primary impacts during construction would be potential for erosion, landslides, soil compaction and changes to topography." IS THAT ALL?!? As the WA State Department of Transportation learned during its rock removal along Highway 14 during the summer of 2010, in Skamania County, when they started an*

unintended landslide, there is always the very high potential that once you start moving earth, earth does what it wants to and moves where it wills! [LTR 286, CMT 5]

Response: Please see response to Comment LTR 281, CMT 22 above.

G.3.2 AIR QUALITY

Comment: *Once the wind turbine is built, the energy it produces does not cause green house gases or other pollutants. [LTR 1, CMT 4]*

Response: Comment acknowledged.

Comment: *Because all coal-fired power plants and some natural-gas-fired power plants produce greater emissions when they act as backup systems for wind power, thanks to inefficiencies associated with cycling on and off, the benefits of wind power in reducing carbon emissions are reduced. Contrary to what the DEIS states, there is no evidence that the Whistling Ridge project will have a beneficial impact on air quality in the Columbia Gorge vicinity. No fossil fuel-fired projects will be taken offline as a result. In fact, backup power from fossil-fuel fired projects may be required for those times when the wind is not blowing. Thank you for the opportunity to comment on this project. [LTR 36, CMT 11]*

Response: Wind powered generation is dependent on the variable and temporal nature of wind. Therefore, back-up power is indeed required to balance generation variability. BPA, however, has the luxury of an extensive hydro-electric resource which is currently 100% sufficient for balancing the variability of wind-generated power that enters onto BPA transmission lines. In short, 100% of wind power generation has back-up provided by the vast hydro-electric system located in the Pacific Northwest. BPA requires all generators to acquire an amount of reserves (i.e. hydro-electric power). This means that generators must have some potential generation on line that is not generating at that time but can be called upon in an emergency. Currently, BPA supplies that to the wind facilities with the hydro-electric system. Long term, when wind generation exceeds load and energy cannot be stored then alternative solutions are being explored such as hydro pump storage. Pump storage is where water is pumped into a reservoir while generation exceeds load and then power is generated from the stored water when load exceeds generation. Moreover, BPA has hourly schedules (estimates) for how much wind will be generated as well as how much load will be required. So, as load (power consumption) and generation of wind and other sources change, BPA alters the generation at the hydro electric dams. See the BPA fact sheet included at the end of this Response to Comment Section for additional information on this topic.

Comment: *[DEIS Section 3.2.2 states that] there would be no emissions from the operation of the turbines. True, but backup would release emissions therefore the operation of the farm would result to increase net emissions in the region. Remedy - Include impacts due to firm power backup, and idling gas plants during wind power operations. [LTR 178, CMT 77]*

Response: Please see response to Comment LTR 36, CMT 11 above.

Comment: *Gas is a hydrocarbon. Hydrocarbon use produces greenhouse gasses. Greenhouse gasses are known to cause global climate changes. Using "gas-fired reciprocating engines" will produce greenhouse gasses. What is the carbon footprint of these gas-fired reciprocating engines? How many of them would be needed to balance out the unpredictability of wind power generation? What is their cumulative impact on air and water quality? [LTR 279, CMT 17]*

Response: Please see response to Comment LTR 36, CMT 11 above.

Comment: *[In reference to DEIS Section 3.2.1] - Although this proposed wind farm project itself does not, allegedly, have any "permanent sources of regulated air emission, and no backup generation," it goes not mean that there are no cumulative impacts on air emissions, because this project is included in BPA's energy production grid and BPA's energy production DOES have CUMULATIVE IMPACTS on REGIONAL AIR QUALITY. It is widely known that X amount of wind energy production requires Y amount of gas plant back-up capability because wind energy is notoriously unreliable and BPA cannot have unreliable sources of energy in the grid. It creates havoc among users and I'm pretty sure it negatively affects BPA's machinery. The effects of wind power on the grid and on the actual BPA hard infrastructure is not addressed in the DEIS and it should be. The public should be aware if there are any dangers associated with the influx of large amounts of energy from wind farms in the energy grid and if the grid and reliably balance this energy influx without hardware meltdowns. BPA should have addressed these issues in the DEIS and their failure to do so is just another fatal flaw in this fatally flawed DEIS. [LTR 286, CMT 11]*

Response: Please see response to Comment LTR 36, CMT 11 above.

Comment: *[In reference to DEIS Section 3.2.1] - The statement "production of electricity from wind produces no direct emissions of greenhouse gasses or other air pollutant" is specious. The DEIS does not provide any details on what huge propeller-like blades do to the air and what if any, gasses are produced by the machinery that is used to run the wind towers. The DEIS does not provide any details on how many gas plants are used by BPA to manage the flexibility and balance of the influx of unreliable wind power generated by all the wind farms producing energy and trying to get it onto our energy grid. If the capability of the hydro system to incorporate wind power will be fully utilized in a couple of years, as the NW Energy Council has stated, then*

the option to use existing gas-fired power plants, unidentified in the DEIS, would be used to integrate wind more fully into the energy grid. Where are these plants located? How much CO2 do they produce? What is their carbon footprint? What is global climate change negatively affects the winds that are not powering some of these wind farms, will more and more gas-fired plants have to be brought online, thus eliminating any benefits that may accrue to wind power? Where is BPA's Wind Integration documentation? If, as the NW Energy Council states, we can achieve 85% of load growth can be met, through the use of technologically proven efficiencies in our homes, commercial spaces, lighting, etc., then why do we need so many wind farms and gas plants that degrade our environment and our quality of life? These questions need to be answered in the DEIS. The NW Energy Council sees conservation and "improved efficiency of electric use" as the best choice for the region. See the Sixth NW Electric Power and Conservation Plan Overview, put out by the NW Energy Council. [LTR 286, CMT 13]

Response: Please see response to Comment LTR 36, CMT 11 above. No emissions result from wind powered turbines and 100% of wind generation has back-up provided by the vast hydro-electric system within the Pacific Northwest. Therefore, no coal, gas, or any other new generation facility would be required as a result of the proposed Whistling Ridge Project. Although a significant percentage of future load growth may be achieved via various efficiencies, wind generation is a piece of the puzzle that collectively will meet electric load growth within the Pacific Northwest. Please refer to Section 1.4.2 for a discussion of the No Action Alternative.

Comment: *[In reference to the Whistling Ridge Energy Project] - It also decreases the carbon footprint that a coal fired plant would use to produce 75 MW of power which our growing population state needs. [LTR 37, CMT 5]*

Response: Comment acknowledged.

Comment: *We have a short time in to impact our dire global situation, and we must replace other harmful polluting means of producing energy. [LTR 40, CMT 7]*

Response: Comment acknowledged.

Comment: *The DEIS [misrepresents] the climate change and air quality impacts of the project and of the no-action alternative. The DEIS repeatedly asserts that if the Whistling Ridge Energy Project is not built, then adverse impacts to climate change and air quality would necessarily result. For example, the DEIS states that "[i]f the No Action Alternative is selected, the growing electricity needs of the region would continue to be met through a combination of other renewable development and a combination of additional fossil fuels." DEIS [on pages] 3-21 [through] 3-22. This completely false dilemma, in various forms, is repeated throughout the DEIS without any factual support. In fact, the regional energy system will reduce greenhouse*

gas emissions and air pollutants regardless of whether this individual project is built, and primarily through conservation measures. The Northwest Power Planning Council's Sixth Power Plan, which will dictate the portfolio of energy production sources for the foreseeable future, has planned to meet 85% of new demand with conservation and efficiency measures over the next 20 years. Sixth Northwest Power Plan Overview at 1. The remaining 15% of new demand would be met with renewables. Notably, this would be achieved even while the Boardman coal-fired power plant is taken offline by 2020. The Bright Future Report also provides some broader context for the supply and demand aspects of the regional energy grid. Bright Future Report, NW Energy Coalitions, Original Edition, March 2009 – Update 1, July 2009. The Bright Future Report analyzes how the region will meet its energy needs through 2050, factoring in the loss of the Boardman coal-fired power plant, the removal or reduced use of hydropower projects on the lower Snake River, and picking up that lost energy supply through conservation, efficiency, and clean new sources of energy. The Report's bottom line conclusions are that "[t]he region has enough renewable potential to more than meet all current and future power needs" and that the potential for affordable clean energy "[d]warfs" the need. Bright Future Update at 14, 15. Thus, foregoing the 21 average MW of production capacity that would result if the Whistling Ridge project is not constructed would be essentially irrelevant to the overall supply of alternative energy. Furthermore, there is absolutely no evidence in the record showing that the alternative to this particular wind project is continued use of fossil-fuel generation sources or new fossil-fuel generation sources. The real choice is between this particular wind facility and siting other wind facilities in alternative locations with fewer environmental impacts. Thus, it is inappropriate for the DEIS to compare the likely impacts of a wind energy development to the impacts of fossil-fuel generation sources. The region's climate change goals and air quality goals will be achieved regardless of whether the Whistling Ridge project is constructed. Every statement asserting the false dichotomy between constructing the project and a future with higher carbon emissions and air quality problems must be removed from the DEIS. [LTR 179, CMT 81]

Response: Please refer to Section 1.2 for a discussion of the purpose and need of the Project. Indeed the number 1 option described by The Northwest Power Planning Council's Sixth Power Plan is for cost-effective efficiencies. The number 2 option, however, is the development of renewable resources, namely wind power. Although, the integration of wind generation poses load management challenges, BPA has developed a diverse strategy to overcome such challenges and continues to support the transmission of clean, inexpensive power. Additionally, in order to accommodate increased demand for clean, renewable energy, BPA has instigated lofty efforts to bring over 6,000-MWs of wind power generation online by 2013. See the BPA fact sheet included at the end of this Response to Comment Section for additional information on this topic.

Comment: *[In reference to Section 3.2, Air Quality] - Qing Chen, (360) 407-6809, [is available to address concerns related to] Best Management Practice for minimization of track out and windblown dust should be required in applicable permitting. [Whereas, Connie Groven, (360) 407-625, is available to discuss any toxics cleanup. Otherwise], there are no new comments submitted at this time. [LTR 187, CMT 1]*

Response: Section 3.2.3 identifies several mitigation measures to avoid, minimize, and compensate for potential construction-related air emissions and dust impacts.

Comment: *[Regarding] climate change - we recognize the significant threat climate change poses to birds and bird habitat, including threatened and endangered bird species. That is why we support well-designed, appropriately sited renewable energy projects as a critical step in reducing carbon emissions. Seattle Audubon is greatly encouraged by the potential for this project to avoid the emissions from combustion of an estimated 114,000 barrels of crude oil or 654 million cubic feet of natural gas, leading to the displacement of over 131,000 tons of carbon dioxide annually. (DEIS at 3-20) The beneficial biological impact of such a displacement to birds and other wildlife in the region appears significant. It is also important to evaluate how the project's contribution to reducing carbon emissions would in turn impact at-risk species in the region such as the northern spotted owl. For example, climate change models predict that as a result of global warming, the Pacific Northwest will experience warmer and drier summers, thereby reducing the food supply for owls, as well as colder and wetter springs, resulting in a reduction in the survival chances of owl fledglings during nesting season (for more details, see http://ir.library.oregonstate.edu/jspui/bitstream/1957/11326/1/EGlennDisseration2009.pdf). While hard to quantify precisely, the FEIS should better evaluate the trade-off between potential benefits from the project to birds from avoided emissions (through reduced carbon output and the resulting effects on forest habitat and food supply) and the potential harm from the project to birds (through loss of existing habitat, habitat fragmentation and potential collision mortality). Your two agencies, together with the project proponent, are well positioned to facilitate a Northwest-specific study comparing the annual bird fatalities caused by wind farms versus those caused by fossil-fueled power stations, similar to the Sovacool study. (DEIS p. 3-276) [LTR 196, CMT 3]*

Response: While the proposed Project has the potential to offset emissions from combustion of an estimated 114,000 barrels of crude oil or 654 million cubic feet of natural gas, leading to the displacement of over 131,000 tons of carbon dioxide annually, it is beyond the scope of this EIS to evaluate how the Project's contribution to reducing carbon emissions would in turn impact at-risk species in the region such as the northern spotted owl. It could be concluded that the displacement of 131,000 tons of carbon dioxide annually would have a beneficial biological impact on at-risk species to the degree that changes to existing bird and wildlife habitat from global climate change are moderated. It would be overly speculative to estimate the trade-off between potential benefits from the Project to birds from avoided emissions (through reduced carbon output and the resulting effects on forest habitat and food supply) and the potential harm from the Project to birds (through loss of existing habitat, habitat fragmentation and potential collision mortality). The most that could be concluded would be that the benefits to at risk bird and wildlife species from carbon displacement would potentially offset potential harm from the Project to birds (through loss of existing habitat, habitat fragmentation and potential collision mortality).

Comment: *About this time these objections are usually dismissed with the argument that we must save the world from green house gasses. The problem is that wind power will not accomplish that. Because wind power only produces energy when the wind Is blowing - and even then it produces variable energy - it must have 100% back-up by conventional or nuclear energy sources. In this way, wind power is in fact driving the need for gas (preferred source) electrical plants that produce a lot of green house gasses. [LTR 256, CMT 6]*

Response: It is true that wind generation requires back-up energy sources, however BPA currently supplies balancing generation from hydro power. Wind generation in the northwest may require additional backing sources in the future, but at this time are not 'driving the need for gas (preferred source) electrical plants within BPA's balancing authorities.

Comment: *So, now we have come to the crux of the wind generation matter—wind is not a reliable source of energy and needs backup from "natural gas-fired generators; storage resources such as pumped-storage hydro plants; and utility demand response programs…natural gas-fired turbines and reciprocating engines appear to be good options." What is the carbon footprint of these backup systems? [LTR 279, CMT 14]*

Response: While these are excellent questions, they are speculative in nature and fall beyond the scope of this EIS. If BPA receives a request to interconnect new generation to the transmission system, back-up or otherwise, each request will be reviewed on a case by case basis and subject to review under NEPA. Furthermore, 100% of wind generation has back-up provided by the vast hydro-electric system within the Pacific Northwest. Therefore, no coal, gas, or any other new generation facility would be required as a result of the proposed Whistling Ridge Project.

Comment: *[In reference to Section 3.2.1] - Just because the DEIS states that "Skamania County does not have any nonattainment areas for air quality" does not mean that the air quality in the Columbia River Gorge is good. The OR department of Environmental Quality and the SW Clean Air Agency have been working for many years on the issue of increasing haze and air quality in the Gorge and the surrounding environments. Most people who reside in the area or swim in the Columbia River will tell you that they have noticed a degradation of the air and water quality. These issues have not been adequately addressed by any government agency, to date. Which does not mean that air (or water) quality of the Gorge is good or bad, from a science viewpoint. It means that it needs to be thoroughly investigated and analyzed. The DEIS fails to do any adequate air [or water] cumulative impacts analyses. [LTR 286, CMT 10]*

Response: Please refer to the Background Air Quality section within Section 3.2.1. Air quality in the Project Area is influenced by a variety of sources including power plant emissions, woodstoves, motor vehicles, ships, trucks, agriculture, and other industrial activities. The well-documented haze problem within the Columbia Gorge is largely caused by winter stagnations that trap pollutants and fog, and by westerly winds transporting emissions from the Portland metropolitan area. No air emissions result from wind turbine operation as no fuel is being

burned. Air emissions would occur during construction activities, but these emissions would be temporary in nature and minor relative to other industrial activities (e.g., logging, manufacturing) and therefore would not have a notable effect on long-term air quality.

Comment: *[In reference to DEIS Section 3.2.1] – "Half of all emissions from energy-related activities come from large stationary sources such as power plants" is not a reassuring statement. Half means 50 percent, that is 50%. This is not a small amount. The DEIS does not state, as far as I was able to ascertain, how much BPA contributes to greenhouse gases through its entire energy production process. How many power plants back up BPA's hydro-energy production when there is not enough water, or fish protections prohibit BPA from dumping water over the dam? What is BPA's calculated carbon footprint? Why didn't BPA calculate its total carbon footprint for the DEIS? This is another fatal flaw in this document. The statement that hydropower "produces less carbon dioxide per MW-hour than any other region in the United States" is NOT a conclusive statement about BPA's or the wind farms' total cumulative contribution to greenhouse gases! LESS does not mean that BPA and Whistling Ridge and all the other energy production facilities in the region do not contribute C02 to the total footprint. BPA needs to calculate its cumulative carbon footprint from ALL its energy production facilities and processes. Then we call start to talk about carbon footprints. [LTR 286, CMT 12]*

Response: It is important to note that BPA provides transmission services to electrical generation facilities, but does not own or operate any generation facilities. Additionally, the scope of this EIS relates specifically to the Whistling Ridge Wind Energy Project and is not intended to document impacts from other sources. Nevertheless, BPA has made it a priority to quantify GHG emissions associated with all of the agencies activities. As discussed on page 3-17 and 3-18 of the DEIS, BPA has already prepared a climate change roadmap and plans to release annual GHG inventory reports beginning in 2010.

Comment: *[In reference to DEIS Section 3.2.1] - The state initiative to lower greenhouse gases by 2020 through the use of renewable energy sources, while admirable, is perhaps not the only and best way to achieve reduction of greenhouse gases. Going green is not a concept carved in cement. Our ideas can evolve and we can change our minds if a better and safer ideas and technology comes along. [LTR 286, CMT 15]*

Response: Comment acknowledged.

Comment: *[In reference to DEIS Section 3.2.1] - Where is this document in the DEIS? I was not able to find it. This should be part of the DEIS and if it isn't then the DEIS is not adequate and should not have been rushed out for public comment. This is a critical report on BPA's carbon footprint. One rationale for all of these regional wind farms is that they produce less C02 than other types of energy production facilities and therefore have less of a carbon footprint. Well, we don't really know that, do we? There is nothing in the DEIS that would lead to this*

conclusion, at least nothing based on facts and figures. All of BPA's greenhouse gas-cal/sing activities SHOULD be in the DEIS, so that a comparison can be made based on facts and figures. [LTR 286, CMT 16]

Response: As stated on DEIS page 3-17, "This document" refers to BPA's climate change road map which can be located at: *http://www.bpa.gov/corporate/pubs/Climate_Change_2008_Initial_Roadmap_final.pdf*. Please also see the response to Comment LTR 286, CMT 12 above. Wind powered turbines do not produce any CO_2 as they are solely powered by wind. Therefore, they have a smaller carbon footprint than any combustion generation facility.

Comment: *[In reference to DEIS Section 3.2.2] – So, nitrogen oxides, hydrocarbons, carbon dioxide, particulate matter, and sulfur dioxide would be the primary air pollutants, plus more particulate matter produced by the rock crusher and batch plants! What quantity of each of these would be produced? How much particulate matter would go into our air and affect air quality? Where is the data (and some hard numbers so that we can see what quality of these "primary air pollutants" will be produced! Where are the cumulative impacts analyses on our regional air' and water quality to see how much air and water pollution this project would contribute to our region? There is nothing here to compare, assess, and analyze. This is a DEIS deficiency. [LTR 286, CMT 17]*

Response: As discussed in Section 3.2.2, the primary air pollutants from diesel-powered equipment would be nitrogen oxides, hydrocarbons, carbon dioxide, particulate matter (PM) and sulfur dioxide. In addition to these, the rock crusher and batch plant(s) would produce additional PM. These emissions would be similar in nature to those produced by any construction project that involves heavy equipment and transportation of materials to the Project Area. These construction emissions would be temporary and would be limited to the areas adjacent to the construction site. They would not affect a substantial number of persons or persist for an extended period of time and would not result in exceedance of any air quality standards.

Comment: *[In reference to DEIS Section 3.2.2] – So what does "wind energy's carbon dioxide emissions are on the order of 1 percent of coal or 2 percent of natural gas per unit of electricity generated" actually mean? This statement doesn't mean anything without data to compare. Where are the comparison charts for wind, gas, and coal CO2 emissions? I could not find them in the DEIS. [LTR 286, CMT 19]*

Response: The sentence, "The American Wind Energy Association estimates that including generation from all sources, wind energy's carbon dioxide emissions are on the order of 1 percent of coal or 2 percent of natural gas per unit of electricity generated (AWEA 2009)," on page 3-21 has been removed from the EIS.

Comment: *[In reference to DEIS Section 3.9.2.2] - It is now accepted (OSU and other universities, scientific studies, etc.) that old growth trees sequester more CO2 than younger trees. The age when young trees begin to become part of the sequestration cycle of CO2 is fifteen years. So, the harvesting of the older trees and the replanting with seedlings would actually put MORE CO2 into the atmosphere. This must be computed into the total carbon footprint of this project; it must also be considered when calculating BPA's carbon footprint. [LTR 286, CMT 59]*

Response: Discussing the theoretical sequestering of carbon dioxide from old-growth trees versus that of seedlings in addition to forestry practices are out of the scope of this EIS.

Comment: *Wind farm proponents talk about turbines as if they are do not change air quality, but propellers whirling around do change the chemical composition of air. Where is the analysis to look at this air quality issue? Wind turbines can change the flow of wind in the area where they are located. How do wind turbines changing local wind patterns affect the local area? How does it affect crops? Rainfall? [LTR 314, CMT 7]*

Response: Wind turbine operation, including propeller rotation, does not emit any air pollutant nor is there any scientific basis suggesting that it modifies the chemical composition of air. In addition, research suggesting wind facilities influence weather patterns is preliminary and is not considered viable at this time. If future research concludes the contrary, then localized and global meteorological studies would be considered.

B O N N E V I L L E P O W E R A D M I N I S T R A T I O N



Fact Sheet

March 2010

BPA's wind power efforts surge forward

As the nation seeks new sources of clean electricity, wind has emerged as the most mature and promising new resource. It is free of CO_2 emissions, relatively cost effective compared to other new generating resources and is, thus far, the most viable non-hydro renewable resource available on a large scale. Its assimilation into the U.S. and Pacific Northwest generation resource base is advancing rapidly, thanks to concerted efforts to meet and overcome challenges to dealing with wind's variability.

Others, primarily independent companies, are developing wind resources. The Bonneville Power Administration's major role is to provide the reliable transmission that delivers electricity from wind farms, often located in remote areas, to the region's communities. Bringing a variable and difficult to predict energy resource, such as wind, onto the power grid in large amounts is one of the great engineering and economic challenges in the power industry today. BPA is maintaining a remarkable pace of connecting wind power onto its transmission system and has among the highest levels of wind power in its transmission system compared to load of any grid balancing authority in the country.

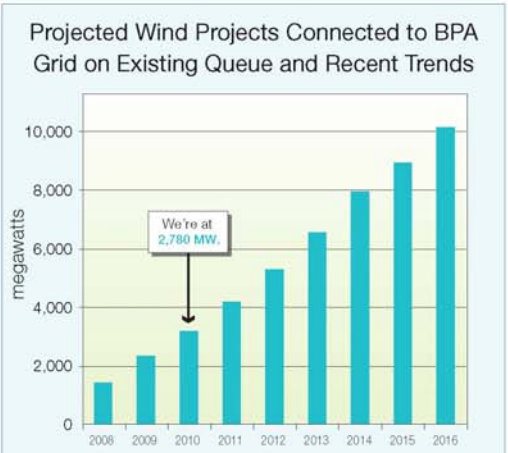
Growth rate fuels progress

All but one of the states in BPA's service territory have enacted renewable electric generation standards for their retail utilities. These requirements, coupled with those of other Western states, have set off a "gold rush" of wind developers to the region.

The growth rate of wind interconnections is astounding. In 2009 alone, the amount of wind power integrated into BPA's transmission system went from 1,500 megawatts to more than 2,500 megawatts. It is now above 2,700 megawatts. In the next two years, BPA expects a near doubling of wind on its system. By 2013, BPA may have more than 6,000 MW of wind power on its system.

As wind power continues to grow, the energy industry faces dramatic change. This is an exciting time for the industry, and BPA is helping lead the nation into a new age of renewable power.

BPA and the region's wind community have been working aggressively to adapt to wind power's rapid growth. In 2009, the agency released an accelerated



Northwest wind power is growing fast.

18-month work plan for wind integration activities. BPA's Wind Integration Team is tackling five projects to better manage large amounts of wind power in BPA's balancing authority area. All of these projects, summarized below, are on or ahead of schedule.

Making it work

Given the challenges, how can 6,000 megawatts of wind, and perhaps more ultimately, successfully operate in a balancing area with just under 11,000 megawatts of peak load? BPA is focusing its efforts in four areas to make it work.

- Building transmission to support wind integration.
- Using existing transmission capacity in new ways.
- Exploring new sources of generation capacity reserves.
- Developing partnerships with other utilities and the wind power community.

Building transmission to support wind integration

The region needs new transmission to meet growing demand for energy, particularly renewable energy. Because BPA owns and operates three-quarters of the region's high-voltage transmission, the agency plays a vital role in facilitating the development of renewable energy. Simply put, wind and other resources will not be developed unless transmission is available to get those resources to market. This is particularly challenging because, on average, wind projects in the BPA service territory only operate at about 30 percent of their capacity.

To determine transmission needed to support additional wind generation, as well as to shore up reliability, BPA initiated a new process called Network Open Season in 2008 to better manage the queue of customers seeking BPA's transmission services. Previously, many potential developers had sought to reserve transmission for plants still in the planning stage or plants that might never be built. The result was a long and unmanageable queue. Under Network Open Season, BPA offers firm network transmission service to customers who request it, but the customers must make a financial commitment for that service. This winnows out the speculative requests for transmission.

In 2009, BPA confirmed financial commitments for 6,410 megawatts of transmission service requests. Three-quarters of the requested service capacity were for wind generation.

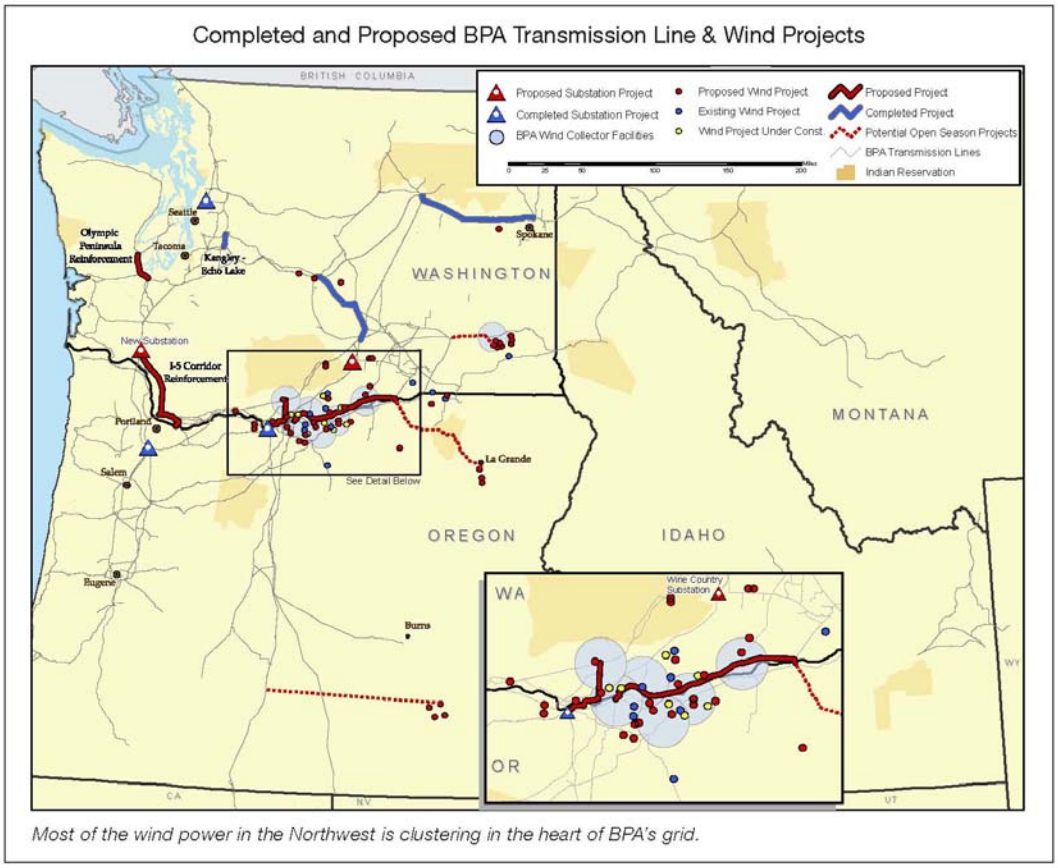
BPA was able to accommodate more than 20 percent of the requests with existing capacity. It was also able to offer a new "conditional firm service" to provide still more transmission service from existing capacity of the system. Conditional firm allows some curtailment of service under certain conditions. This allowed BPA to make the most efficient use of its existing system before proposing new construction.

Network Open Season did show, however, that BPA needs to move forward with four new transmission projects. Together, these projects would bring 1,800 megawatts of new wind generation to the region. BPA is ahead of schedule on the construction of the first project and is conducting environmental work on the others. The feasibility of these projects was enhanced by access to increased borrowing authority granted BPA under the American Recovery and Reinvestment Act. BPA will pay this money back with interest to U.S. taxpayers, but the expanded borrowing authority provides increased capital for critical projects. BPA is completing its second Network Open Season and plans to conduct the process annually.

> BPA wind initiatives are stretching the capability of the existing system.

Changing grid management for wind power integration

BPA's Wind Integration Team is developing new processes and systems to wring as much efficiency as possible out of existing transmission and generating reserve assets. Basically, BPA is stretching the capability of the existing system through efficiencies from operational improvements. If these initiatives succeed and are implemented over the long term,



Most of the wind power in the Northwest is clustering in the heart of BPA's grid.

they could make a significant dent in the amount of balancing reserves needed to support a tripling of the wind generation interconnected to BPA's system.

New protocols manage extreme wind ramps

BPA has seen unscheduled wind generation swings of more than 1,000 megawatts in less than an hour on its system. New operating protocols introduced in 2009 help manage sudden fluctuations in wind generation. When wind picks up and unscheduled generation threatens to deplete BPA's balancing reserves, BPA dispatch now automatically sends an electronic signal to wind plants to reduce their generation to scheduled levels. So far, BPA dispatchers have applied the protocols several times a month. Likewise, when large decreases in scheduled wind generation deplete BPA's ability to provide balancing energy, BPA revises the wind schedules downward, and receiving utilities must make up the difference with their own resources.

Shorter scheduling intervals

Historically, utilities schedule power deliveries by the hour. As a pilot project, BPA is allowing within-hour changes to power schedules for wind projects that are exceeding their hourly schedule. Intra-hour scheduling can help wind generators avoid curtailment of excess generation and could make it possible for them to sell excess power that otherwise might be limited. This has the potential to help reduce reserve requirements and generation imbalance charges. BPA is evaluating possible expansion of this project.

3

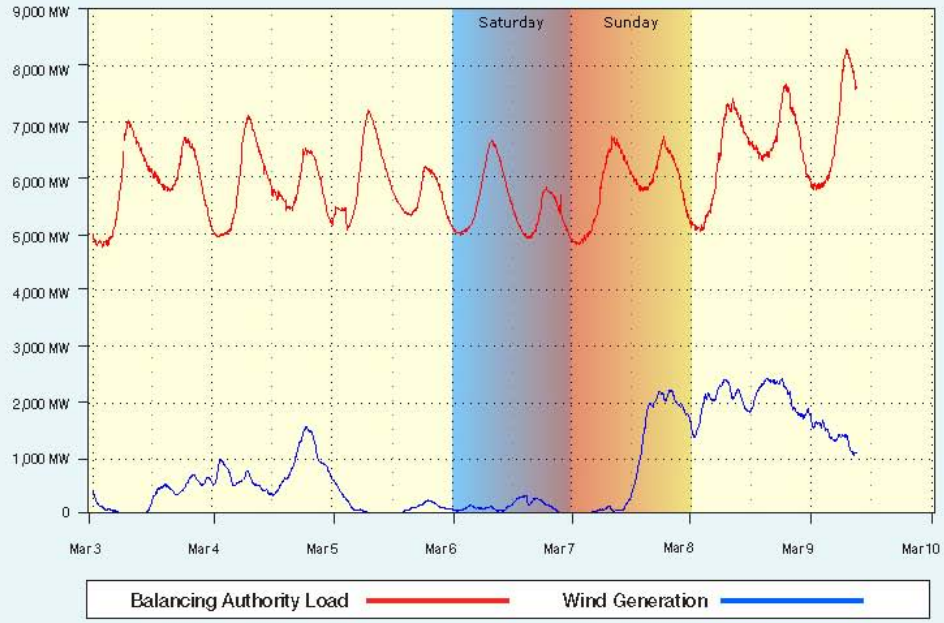
The challenge

Wind is a variable power resource that is hard to predict. That's a challenge because, unless generation matches demand second by second, the transmission system will destabilize. If the system becomes unbalanced, blackouts can result. Think of it in terms of a computer. We use surge protectors to prevent a sudden increase in electricity. Some sensitive electronic equipment also incorporates voltage sag protectors. Without these protections, equipment can suffer the equivalent of a "black out."

To maintain system balance in the high-voltage grid, utilities use balancing reserves, or generation held available to manage fluctuations between power load and power generation. In the Northwest, the hydro system has historically provided all the balancing reserves we need, because hydro generation can be increased or decreased quickly. But the hydro system has limits. To support continued large-scale wind power growth, we are learning to operate the existing system in new ways.

As with most coastal climates, Northwest winds are not steady. They tend to ramp up or down quickly and often unexpectedly. System operators are inventing new techniques to maintain the constant balance needed between power loads and generation levels. Some solutions already have been put in practice; others are on the way.

BPA Balancing Authority Load & Total Wind Generation
March 3–10, 2010



BPA now operates the hydro system to respond to and balance both variations in power loads and unexpected changes — up and down — in wind power output.

4

New wind forecasting applications

Wind output is difficult to predict, making it hard to schedule accurately. This uncertainty increases the amount of reserves BPA must hold to keep loads and generation in balance. BPA has installed 14 anemometers throughout the region to better predict wind availability and is using the data to develop a more accurate wind power forecast system for the Columbia Basin.

Dynamic transfer

Dynamic transfer is one of the most important techniques to reliably and cost-effectively integrate large amounts of variable renewable generation resources. This technique would allow a dispatcher in one balancing authority to control and take responsibility for supplying balancing reserves for a generator located in another balancing authority. A study identifying available dynamic transfer capacity on 11 key transmission paths completed in February 2010 found moderate amounts of available dynamic transfer capability. BPA is making this capability available to its customers on a pilot basis.

Managing large wind fleets is proving most efficient when handled across large geographic areas.

Customer-supplied imbalance reserves

Also known as self-supply, this project would allow wind generators in the BPA balancing authority area to supply their own imbalance reserves rather than relying on BPA for such services. BPA plans to launch this project on a pilot basis in October 2010, once the necessary technical adjustments are in place on both BPA and participating wind project systems. Wind project owners likely will use the Joint Initiative's Dynamic Scheduling System to facilitate supplying their reserves.

There are more than 30 discrete balancing authorities in the Western Electricity Coordinating Council (see box, page 6.). The result is numerous system operators, each of whom has individual requirements to maintain a constant balance between load and generation. This fragmentation is a challenge for the development of wind power in the Northwest, because wind generated in one balancing authority often serves consumers in another balancing authority that may be located across several intervening balancing authorities.

Exploring generation capacity reserves

Wind project operators in BPA's balancing authority pay for integration services for their projects, so that the consumers who pay to purchase wind power both receive the benefits of wind power and pay the costs of the resource. For 2010–2011, the rate reflects the costs of generation imbalance reserves provided from federal hydropower resources.

As the wind resource grows, even with efficiencies, new resources likely will be needed to provide balancing services for variable renewable resources. In preparation, BPA has begun to explore options for adding flexibility capacity.

Key terms

Balancing Authority: A balancing authority is an entity that is responsible for maintaining a constant balance between power load and power generation in a geographic area. It is usually a utility or other transmission provider such as a regional transmission organization. There are 14 balancing authorities in the Pacific Northwest. BPA's balancing authority area includes primarily rural portions of Oregon and Washington, plus small portions of northern Idaho and northwest Montana.

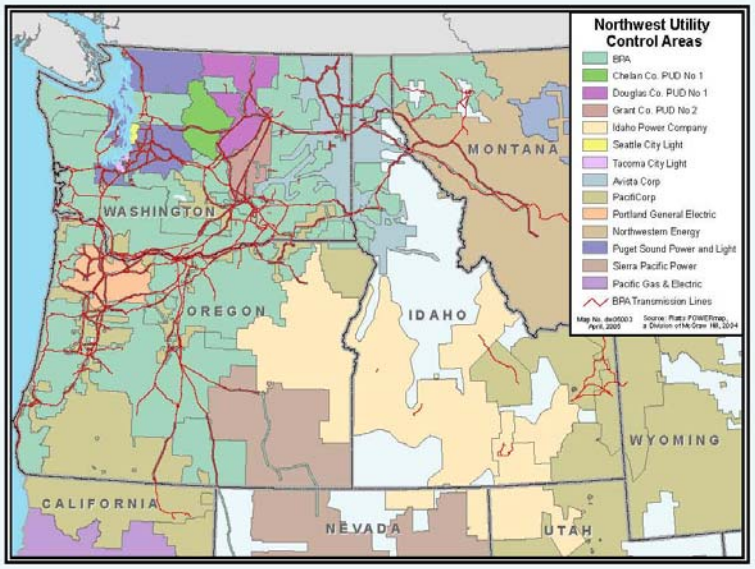
Balancing Reserves: Generation held available to be ready to use if needed to maintain the balance between power load and power generation as loads fluctuate and/or as real-time generation differs from scheduled generation.

Part of a much larger picture

Most of the Northwest's wind generation is in rural portions of eastern Oregon and Washington, while most consumers of wind power are in larger metropolitan areas in balancing authorities managed by other utilities. Worldwide, managing large wind fleets is proving most efficient when handled in unified systems that cover large geographic areas with millions of people and many, diverse power sources, such as in Spain and Texas.

Utilities in the Northwest are working together to realize similar benefits across their smaller balancing authorities. BPA is among many Western utilities participating in a Joint Initiative of ColumbiaGrid, WestConnect and the Northern Tier Transmission Group — entities managing and coordinating some transmission issues among utilities — to develop common approaches to wind integration. For example, the Joint Initiative is creating a common system for dynamically scheduling control of a wind generator from a resident balancing authority to another balancing authority where the wind power is being consumed.

On a still larger scale, utilities throughout the Western Interconnection — the interconnected power system of the Western United States, British Columbia, Alberta and small parts of Mexico — are working to redesign transmission and power resource planning and adapt the way the grid works to help meet state and national renewable power objectives. The Western Electricity Coordinating Council, the reliability organization for the Western Interconnection, is leading this effort.



BPA is the balancing authority responsible for maintaining a constant balance between the power load and power generation in the area shown in teal. (A balancing authority is also known as a control area.) Most of the wind power on line and planned for the Pacific Northwest is clustered in BPA's balancing authority at the eastern end of the Columbia River Gorge. However, 80 percent of the wind power in BPA's balancing authority area serves loads in other utilities' balancing authorities.

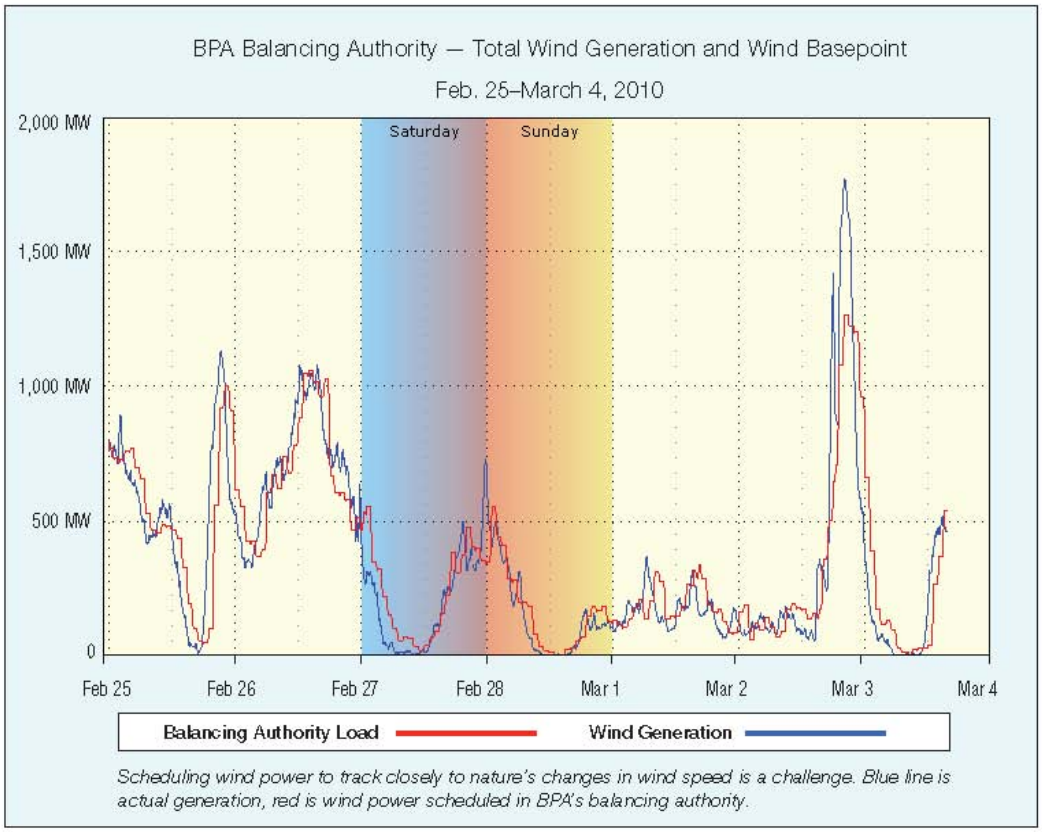
Energy storage technologies could be a valuable source of such flexibility to the degree they can absorb excess wind energy when it is not needed and return it to the grid during periods of greater demand. For example, BPA is working with the Pacific Northwest National Laboratory on its study of various options including pumped storage, compressed air storage, batteries and flywheels. PNNL is also examining residential applications such as hot water heaters as potential sources of energy storage for the grid.

BPA is working with the U.S. Army Corps of Engineers and the Bureau of Reclamation on the potential for pumped hydro storage in the Northwest. This represents a new application of an existing but evolving technology that could help fill the need for more frequent uses of ramping generation to respond to wind variability.

BPA has begun to explore options for adding flexibility capacity.

Follow our progress

To follow BPA's wind integration work or participate in its efforts, go to *www.bpa.gov/go/wind,* contact Eric King at *evking@bpa.gov* or call BPA at 1-800-622-4519.



Scheduling wind power to track closely to nature's changes in wind speed is a challenge. Blue line is actual generation, red is wind power scheduled in BPA's balancing authority.

BONNEVILLE POWER ADMINISTRATION
DOE/BP-4146 • MARCH 2010

G.3.3 WATER RESOURCES

Comment: *[In reference to DEIS Section 3.3.1.1] – There is no mention of the unnamed stream west (and down slope) of the A1-A7 turbine group. This stream initiates as a spring and flows year round, and eventually empties into the Columbia River. In addition, it flows through World Stewardship Nature Preserve land (soon to be purchased by Columbia land Trust). Please add this consideration to your study. [LTR 60, CMT 2]*

Response: All known and field verified surface water resources in and near the Project Area (including those west and down slope of the A1-A7 turbine string) are shown in Figure 3.3-1. Most of these drainages are small perennials streams or seasonal streams with short periods of spring or storm runoff. The construction and operation of the wind turbines, access roads, and other project features are not anticipated to impact surface or ground water resources in or near the Project Area.

Comment: *[In reference to DEIS Section 3.3.1.3], the same unnamed stream mentioned above has been overlooked since it does originate at groundwater. Please add this to your study. [LTR 60, CMT 3]*

Response: Please see response to Comment LTR 60, CMT 2 above.

Comment: *The geologic and soils information is troubling even when one has seen the steep hillsides that this project proposes to disturb. Construction will require blasting, which can destabilize fragile habitats, and unpredictable effects may result over large periods of time. The soil types present at or immediately adjacent to the construction sites are not stable and the planned mitigation measures which aim to control erosion and slides may be difficult, if not impossible to achieve, as can be already seen at numerous locations in this portion of the country. Although downplayed in the EIS, significant erosion events will surely degrade water quality and adversely affect downstream functions as well as local aquatic invertebrate populations. [LTR 76, CMT 6]*

Response: Please see response to Comment LTR 60, CMT 2 above.

Comment: *[In reference to DEIS Section 3.3.1.1] -There is no mention of the unnamed stream east (and down slope) of the A1-A7 turbine group. This stream initiates as a spring and flows year round, and eventually empties into the Columbia River. In addition, it flows through World Stewardship Nature Preserve Land (soon to be purchased by Columbia Land Trust). Please add this consideration to your study. [In reference to DEIS Section 3.3.1.3], the same*

unnamed stream mentioned above has been overlooked since it does originate at groundwater. Eliminating the A1-A7 turbine would eliminate any effects on the following factors would eliminate the impact to these important water resources. [LTR 124, CMT 2]

Response: Please see response to Comment LTR 60, CMT 2 above.

Comment: *There is no mention of the unmapped stream west and down slope of the A-1 through A-7 turbine group. This stream initiates as a spring and flows year around and eventually into the Columbia. In addition, it flows though World Stewardship Nature Preserve Land which will soon be purchased by Columbia Land Trust. Please add this consideration to your study. [LTR 317, CMT 23]*

Response: Please see response to Comment LTR 60, CMT 2 above.

Comment: *On ground water the same unmapped stream mentioned above has been overlooked since it doesn't originate as ground water and springs. Please add that to your study. [LTR 317, CMT 24]*

Response: Please see response to Comment LTR 60, CMT 2 above.

Comment: *We are also concerned about whether there will be effects to groundwater and surface water. We request that the EIS carefully evaluate what effects the Project would have on wildlife and the ecosystem. [LTR 119, CMT 7]*

Response: The Water Resources section addresses surface water (Section 3.3.1.1, DEIS page 3-24) and groundwater issues (Section 3.3.1.3, DEIS page 3-26). The impacts to surface waters and groundwater are listed in Section 3.3.2.1 and state that "Temporary roadways would be built to provide additional access for heavy machinery during construction. Of these improvements, only the planned improvement to West Pit Road may directly affect water resources."

Comment: *[In reference to DEIS Section 3.3.1.3, this section] lacks sufficient information on the existing groundwater environment to support the finding of little or no impact. Suggest the section more fully address the depth to groundwater, flow direction, and transmissivity (permeability) of the aquifer as it relates to possible affects on the area domestic and agricultural ground-water resources (also see DEIS Section 3.3.1.5). Helsel et.al. (2002) is a good reference for this type of analysis. Pg. 3-29: Because [S]ection 3.3.3 addresses mitigation procedures for the isolation of groundwater from chemical spills, we assume that chemicals will be present on site during both construction and operation. Suggest the document include a discussion of potential chemical spills, and aquifer transmissivity (permeability), as it relates to*

the potential movement of contaminants toward nearby domestic or agricultural water wells. [LTR 164, CMT 4]

Response: As mentioned in Section 5.4.2 of the geotechnical report prepared in support of the Application for Site Certification, during the excavation of test pits at the site, no ground water was encountered up to a depth of 16 feet below ground surface. Presence of groundwater will be determined during subsequent geotechnical investigations to be performed in support of final foundation design. Potential spills to groundwater during construction would be controlled through standard construction BMP's. A Spill Prevention, Control and Countermeasure (SPCC) Plan will be prepared prior to construction.

Comment: *[In reference to Section 3.3] - Roberta Woods, (360) 407-6269, [is available to address concerns related to] any discharge of sediment-laden runoff or other pollutants to waters of the state [as governed by Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington]. Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or storm drains that lead to waters of the state. [LTR 171, CMT 4]*

Response: Coordination efforts with Washington Department of Ecology will be made to ensure that erosion control practices are in place prior to any construction activities if this proposed Project were to move forward. Furthermore, as discussed in Section 3.1.3, EFSEC will require the Applicant to obtain coverage under Ecology's Construction Stormwater General Permit. The Stormwater General Permit (NPDES) will include BMPs to minimize erosion and runoff from Project Areas.

Comment: *[In reference to Section 3.3] - Vicki Cline, (360) 407-0278, [is available to address concerns related to] all water wells shall be constructed in accordance with the provisions of Chapter 173-160 WAC by a driller licensed in the State of Washington. Well reports must be submitted to Ecology within 30 days after completion of a well. All water wells that may be drilled must be a minimum of 100 feet from any known, suspected, or potential source of contamination. Wells shall not be located within 1,000 feet of a solid waste landfill. WAC 173-160-171(1) The proposed water well shall be located where it is not subject to ponding and is not in the floodway, except as provided in Chapter 86.16 RCW. (2) It shall be protected from a one hundred year flood and from any surface or subsurface drainage capable of impairing the quality of the ground water supply. The Growth Management Act (Section 63) requires an applicant to submit evidence of an adequate water supply before a building permit can be issued for any building requiring potable water. Any ground water withdrawals anticipated exceeding 5,000 gallons a day for domestic uses or for commercial/industrial uses*

require a water right permit. Any modification to existing water rights must be approved by Ecology's Water Resources Program. [LTR 187, CMT 3]

Response: The O&M facility will include a water well exempt pursuant to RCW 90.44.050 (withdrawing less than 5,000 gallons per day) for water supply. Sanitary wastewater from the maintenance facility will be discharged to an on-site septic system. The RCW reference on page 3-28 in the DEIS has been revised to reflect the correct citation.

Comment: *The DEIS indicates that water quality may be adversely affected if construction alters the hydrology of springs and surface runoff such that erosion carries sediment to nearby waterbodies. We recommend that this aspect of the project be monitored to assure that water quality is protected. Please also note that anti degradation provisions of the Clean Water Act apply to those waterbodies where water quality standards are currently being met, and prohibit degradation of their water quality. [LTR 189, CMT 6]*

Response: Mitigation measures related to erosion control and their potential effect on water quality standards are discussed in both the Earth section (Section 3.1.3) as well as the Water Resources section (Section 3.3.3). Furthermore, for any Project construction activities, EFSEC will require the Applicant to obtain coverage under Washington Department of Ecology's Construction Stormwater General Permit. No later than sixty (60) days prior to the beginning of Site Preparation, the Certificate Holder would develop and submit for EFSEC approval a Construction Stormwater Pollution Prevention Plan (Construction SWPPP). The Construction SWPPP would meet the requirements of the Ecology stormwater pollution prevention program (chapter 173-230 WAC), and the objectives and requirements in Special Condition S.9. of the National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activities issued by the Department of Ecology on November 16, 2005 or as revised. The Certificate Holder would not begin Site Preparation prior to obtaining Council approval of the Construction SWPPP. The Construction SWPPP would include measures for temporary erosion and sedimentation control. The Construction SWPPP would identify a regular inspection and maintenance schedule for all erosion control structures. The schedule would include inspections after significant rainfall events. Any damaged structures would be addressed immediately. Inspections, and subsequent erosion control structure corrections, would be documented in writing and available for EFSEC's review on request.

Construction activities in the State of Washington related to the construction of the BPA substation is overseen by EPA. EPA retains enforcement and permitting authority for Federal facilities. BPA would prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) to control stormwater pollution associated with construction activities. The SWPPP would be prepared to meet the requirements of the U.S. EPA Construction General Permit (CGP) of the NPDES permitting program. The SWPPP addresses project requirements utilizing low impact construction methods and project-specific erosion and sediment control measures. Best Management Practices (BMPs) for erosion control for the various activities will be developed. The BMP specifications to be utilized are taken from The Department of Ecology's "Stormwater

Management Manual for Eastern Washington," Chapter 7, Sept. 2004, Publication 04-10-076. As part of the SWPPP, a Spill Prevention and Response section will be prepared to address petroleum and hazardous materials handling and management procedures for this project.

Comment: *BPA should coordinate with Washington State Department of Ecology (Ecology) and Tribes affected by the project to assure that the state and tribal water quality standards would be met during implementation of the proposed action. Since the project anticipates obtaining a National Pollutant Discharge Elimination System (NPDES) permit for planned construction activities likely to disturb 1 or more acres, the final EIS should include updated information on such permit application process and conditions to protect water quality. [LTR 189, CMT 7]*

Response: Coordination efforts with Washington Department of Ecology will be made to ensure that erosion control practices are in place prior to any construction activities if this proposed Project were to move forward. Mitigation measures related to erosion control and water quality standards are discussed in both the Earth section (Section 3.1.3) as well as the Water Resources section (Section 3.3.3). Any Tribal water quality standards will be taken into consideration.

Comment: *The [Skamania] Board [of Commissioners] finds [that] in addition to the comment concerning the Scenic Area and the Interstate Highway corridor, [the US Department of] Interior provided specific comments related to purported groundwater issues-issues raised by local citizen neighbor opponents at the NEPA/SEPA comment hearing. Skamania County has regulatory responsibility for groundwater issues, and will work with EFSEC to address the citizen comment. This is not a federal issue. Interior has no authority to insert itself into this uniquely local issue, and its decision to do so demonstrates its lack of regard for Skamania County's authority: strongly suggesting inappropriate collaboration with Whistling Ridge project opponents. [LTR 197, CMT 8]*

Response: Comment acknowledged.

Comment: *Well, I don't want to burst anybody's bubble of happiness, but where are you all planning on getting the water that's necessary to produce pumped-storage hydro power? There is no chance on this green Earth that any water is coming out of the Columbia River. There are already too many users and abusers feasting on the Columbia. This is probably a non-starter idea. But, it should have been addressed in the DEIS. BPA's failure to do so is irresponsible. [LTR 279, CMT 18]*

Response: Water to be used during construction of the proposed Project will be purchased from an outside vendor as outlined in Section 1.4.1.5. During operation of the proposed Project,

a well will be drilled on site to provide water primarily for the bathrooms, showers, and kitchen within the Operations and Maintenance building (see Section 3.3.2.1).

Comment: *Watersheds are very important and should be protected from industrial wind farms. [LTR 281, CMT 9]*

Response: Comment acknowledged.

Comment: *No watershed studies have been done for this Project Area, even though the Soil Surveys clearly state that this is a watershed area. [LTR 281, CMT 18]*

Response: Water resources that occur within the proposed Project Area are outlined in Section 3.3 - Water Resources. This section relies on information collected during field surveys which are found in Appendix C - Wildlife Reports (Section C2 - Wetland Delineation Report). Specifically, runoff that occurs within the proposed Project Area is outlined in Section 3.3.1.2 - Stormwater Runoff.

Comment: *[In reference to Section 3.3,Water Resources] - In 2007, Underwood had a really dangerous water situation, as reported in The Columbian newspaper: [short article text included] "Underwood water deemed safe to drink" The Columbian State health officials Wednesday lifted a boil-water advisory issued Friday for the Underwood area after tests showed the water is now safe to drink. Major firefighting efforts in the Columbia River Gorge last week drained local water supplies, causing Underwood's water system to lose pressure in some areas. The pressure loss could have allowed contaminants to enter the water, so the state Department of Health and the Skamania County Public Utility District issued the boil- water advisory as a precaution. The Underwood system serves 876 residents. Water supplies have returned to normal, officials said, and excess air has been flushed from the system. Water samples sent for bacterial analysis came back indicating the water is safe. Originally published by KATHIE DURBIN, Columbian staff writer, 9/27/2007. (c) 2007 Columbian. Provided by ProQuest Information and Learning. All rights Reserved. Source: Columbian. The DEIS has no data on the watershed in this area and from which or what type of source, in actuality, the residents get their water. This is a fatal flaw in data gathering and analysis. What would be the cumulative effects, on the water resources that these 876 Underwood residents use, of all the impermeable surfaces—wind turbine pads, substation, maintenance roads, etc. -- that would result from the construction of this proposed wind farm? This is a critical question for fire fighters and the residents. We all know that there will be future fires. What if one of the turbines causes a fire in the woods? Where is the water going to come from to combat this type of fire? Would the Underwood reservoir be depleted thus affecting the residents and their health and safety?[LTR 286, CMT 21]*

Response: Please see response to Comment LTR 281, CMT 18 above. The EIS addresses only the water resources currently found within the proposed Project Area and also addresses the future needs and impacts to all water resources found within the proposed Project Area. Any discussion as to how the residents of Underwood, WA, get their water is outside the scope of this EIS. With respect to runoff and cumulative impacts to water resources - runoff from the Project Area are described for the proposed action while in its construction phase, while the proposed Project is in its operational phase, and while the Project is being decommissioned (see Section 3.3.2.1). Cumulative Impacts to water resources are outlined in Section 3.14.3.3 for both surface waters and ground water resources. Lastly, fire fighting and fire prevention plans for the proposed Project are outlined in Section 3.6 - Public Health and Safety. Fire prevention is discussed at length in Section 3.6.1.2 and fire prevention plans are listed under the Mitigation Measures to be implemented within Section 3.6 - Public Health and Safety. The fire prevention plans will be developed in conjunction with the Skamania County Fire Marshall as well as with other appropriate local fire prevention agencies and all plans will be shared with DNR.

Comment: *[In reference to Section 3.8.3.1, Proposed Action] - Since there is no watershed data, the proponent cannot say that the project would or would not cause changes in water use. The proponent does NOT know how this project would affect any aquifer's), water tables, or wells, in the area. [LTR 286, CMT 56]*

Response: Please see response to Comment LTR 281, CMT 18 above.

Comment: *Construction of this facility would create unacceptable impacts on ground water supplies, and contribute to the already high fire hazard. [LTR 283, CMT 15]*

Response: Comment acknowledged.

Comment: *[In reference to DEIS Section 3.3.1.1, Surface Water] - LIDAR reconnaissance would be useful to determine drainages and streambeds. It could also be used for the geologic survey. Why isn't LIDAR a requirement for this DEIS? [LTR 286, CMT 22]*

Response: BPA follows the rules and guidelines set forth by the Council on Environmental Quality (*http://ceq.hss.doe.gov/ceq_regulations/regulations.html*) and EFSEC follows the rules and guidelines set forth by the Washington State Legislature (*http://apps.leg.wa.gov/RCW/default.aspx?cite=43.21C*) for developing their respective environmental documents. The use of LIDAR for analysis of surface waters, drainages, and other landscape-water features is not a requirement for use as a tool of analysis by these agencies (or by any other federal or state agencies for that matter).

Comment: *[In reference to DEIS Section 3.3.1.3, Groundwater] - Why weren't the field investigations done during the rainy season? How does one find perched water tables and if they "may be present at greater depth" shouldn't they be found since SDS and BPA are proposing to put structures that weigh quite a few tons unto unstable ground that is subject to mass wasting? The groundwater issue needs to be addressed with further field studies and deeper coring. Where is the watershed map for this area? What is the extent of the watershed for this area? The 50+ turbine pads are 50 X 50 feet and this would introduce a large quantity of impermeable surface area to unstable ridges. How would these impermeable surfaces affect water saturation and water flow in the watershed? Is this area included in the Water Resource Inventory Area (WRIA) 29? [LTR 286, CMT 23]*

Response: As stated in Section 3.3.1.3, a subsurface investigation conducted in September 2007 that included twelve test pits excavated from 7 to 16 feet in depth did not encounter groundwater in any of the test pits. Because most ground disturbing activities would occur during the drier times of the year, groundwater is not expected to be a construction constraint. Prior to the final siting process, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other Project facilities such as access roads (including improvements to West Pit Road), these facilities will be redesigned or relocated to avoid this risk. Figure 3.3-1 was included in the EIS to show the surface water resources in and near the Project Area. Watershed boundaries were not included on this map. The Project Area is located in the Wind/White Salmon Water Resource Inventory Area #29.

Comment: *[In reference to DEIS Section 3.3.1.5, Private and Public Water Supplies] - Well, where do these "private water supplies" come from? From perched water tables? Other types of groundwater? Are these wells interconnected? Could the construction and excavation from Whistling Ridge affect these wells? [LTR 286, CMT 24]*

Response: Water to be used during construction of the proposed Project will be purchased from an outside vendor as outlined in Section 1.4.1.5. During operation of the proposed Project, a well will be drilled on site to provide water primarily for the bathrooms, showers, and kitchen within the Operations and Maintenance building (see Section 3.3.2.1). Additionally, as outlined on page 3-29 of the DEIS, project water usage is not expected to affect water levels in private wells in the vicinity of the Project.

Comment: *[In reference to DEIS Section 3.3.2.1, Proposed Action] - So there is an aquifer. If there is an aquifer then there is groundwater. What is this aquifer, what is its extent? Do the other wells in the area use this aquifer for their water? [LTR 286, CMT 27]*

Response: Please see response to Comment LTR 286, CMT 24 above.

Comment: *[In reference to DEIS Section 3.3.2.1, Proposed Action] - What are these "mitigation measures" that will be proposed if there are water impacts? What kind of impacts to water resources is SDS anticipating? Why not list these mitigation measures now so that we can all see if they would be adequate? The DEIS should include information on impacts to water resources. [LTR 286, CMT 29]*

Response: Mitigation measures for Water Resources are outlined in Section 3.3.3 (and have been available since the release of the DEIS.

Comment: *[In reference to DEIS Section 3.3.4, Unavoidable Adverse Impacts] - Now see, this is why this DEIS is so frustrating. Since there is no watershed map and the proponents don't know whether there is an aquifer or perched water tables or other sources of groundwater, they cannot make such a blatantly inaccurate statement. There is no data in this DEIS that could be used to conclude "negligible to minor impacts to water resources." The proponents don't have any way of knowing whether "impacts are localized and the disturbance short term" because they have NOT done a CUMULATIVE IMPACTS ANALYSIS for impacts and effects of this project and all other such projects in the region. [LTR 286, CMT 32]*

Response: Figure 3.3-1 lists the drainages that occur nearby and within the Project Area.

Comment: *Very little to no analysis is given to the environment affects of increasing the road mileage on the area (DEIS, Page 3-226-3-227). The Final Environmental Impact Statement should include the analysis of sediment from gravel as well as paved road leaching into streams. [LTR 302, CMT 13]*

Response: Mitigation measures related to erosion control and their potential effect on water quality standards are discussed in both the Earth section (Section 3.1.3) as well as the Water Resources section (Section 3.3.3).

Comment: *The submitted scoping notice identifies the intent of preparing a floodplain and wetland assessment as part of the analysis used in the draft environmental impact statement (DEIS). The assessment should include: An inventory of all wetlands and areas of floodplain in the project area and within the vicinity of the proposal; the environmental values these aquatic features provide to the landscape; what and how the floodplain areas and wetlands will be impacted by the proposal; what environmental values will be lost from these impacts; and mitigation measures to offset the proposed environmental impacts that cannot be avoided. The DEIS should also include an analysis of all other surface water bodies in, and within the vicinity of, the project site. An equivalent documentation of existing environmental values, proposed impacts, and proposed mitigation measures to unavoidable impacts should be outlined in the DEIS as requested for the wetlands and floodplain areas above. [LTR 171, CMT 2]*

Response: Wetland inventories were conducted both within the Project Area as well as near the vicinity of the Project Area (see Figures 3.4-2, 3.4-3a and 3.4-3b) and are described in Sections 3.3.1.1 and 3.4.1.3. Floodplain areas were identified in Section 3.3.1.4 and lie outside of the 100-year floodplain for the White Salmon, Little White Salmon, and Columbia Rivers. The description of the environmental values of these water features are described in Section 3.3.1. The impacts to these water features are described in Section 3.3.2. The mitigation measures to be used due to impacts are described in Section 3.3.3. Unavoidable impacts to these described water bodies are seen in Section 3.3.4 and state that construction and operation of the Project would only result in negligible to minor impacts to water resources because the impacts are localized and the disturbance is short-term.

Comment: *[In reference to DEIS Section 3.4.2.1, Wetlands, where it was stated that] no wetlands or wetland buffers are located within the project footprint. [This is a] misleading statement. A wetland is included in the project footprint, as it is within the project area borders. This wetland has been and will continue to be impacted if the project is permitted. SDS obtained a permit to harvest timber in the WMZ from DNR. This disturbing activity may have, like most logging operations, damaged the WMZ that could remove silt in runoff from construction activities. Reference – DNR Maps and FPA's. Remedy - Update and correct this section with the most recent forestry actions that are planned or have occurred. Correct and place this information in DEIS and resubmit for comments. [LTR 178, CMT 108]*

Response: There are no wetlands or wetland buffers within any of the Project footprint. This assessment is accurate. There is, however, a wetland classified as "palustrine unconsolidated bottom, semi-permanently flooded, impounded (PUBFh) wetland on the National Wetland Inventory (NWI)" and as a "Category II wetland according to the Washington State Wetland Rating System for Eastern Washington." This wetland, referred to as a "cedar swamp" is within the Project Area, but it is not within the Project footprint (or more specifically, it is not within the 650' turbine string corridor for turbine string C1-C4.

Comment: *[In reference to DEIS Section Section 3.4.2.1, Wetlands, where it was stated that] no wetlands or wetland buffers are located within the project operation area. . [This is a] misleading statement. A wetland is included in the project operation area, as it is within the project area borders and a possible wind impediment. This wetland has been and will continue to be impacted if the project is permitted. SDS obtained a permit to harvest trees in the RMZ of the wetland (or is it called a WMZ?) from DNR (FPA #2704045 and #2704443). Because this wetland is along a road accessing project area from the east, it raises the question of whether the logging [occurred] to improve the road for WRE access or for logging operations or in the words of a long time local "to remove an environmental problem" (sensitive species). Remedy - Update and correct this section with the most recent forestry actions that are planned or have occurred. Correct and place this information in DEIS and resubmit to public for comments. [LTR 178, CMT 109]*

Response: Please see response to Comment LTR 178, CMT 108 above. The focus of this EIS is related to impacts from the construction, operation, and decommissioning of the proposed wind facility and its related interconnection transmission request. The focus of this EIS does not take into consideration the logging operations in which the applicant is currently engaged. There is mention of the applicants current logging activities (see Sections 1.4.2 and 2.2, and in multiple areas within Chapter 3), but they are outside the scope of this EIS.

Comment: *[In reference to the statement that] "roadway improvements to the County or private logging roads are not expected to affect wetlands. This information was confirmed through field investigations performed in May and July 2009." - This Report is not cited as existing in Appendix. Remedy - include this report in DEIS and resubmit to public for comments. [LTR 178, CMT 110]*

Response: Both the DEIS and associated appendices were released to the public for comment on May 25, 2010. The appropriate mitigation measures will be in place for any road improvements to ensure little-to-no erosion run-off and also to protect any water resources in the vicinity of these road improvements. See Section 3.3.3 for a listing of all mitigation measures to be used related to water resources.

G.3.4 BIOLOGICAL RESOURCES

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot-tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 2, CMT 2]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant positive impacts to sensitive wildlife and plant habitat. [LTR 3, CMT 1]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the cascade mountains. The project would permanently disturb large areas of forested habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 4, CMT 3]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the cascade mountains. The project would permanently disturb large areas of forested habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 5, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 6, CMT 3]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 9, CMT 2]*

Response: Comment acknowledged.

Comment: *Early research is documenting how these turbines kill birds and bats. [LTR 12, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project could cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 13, CMT 1]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 13, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot-tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 19, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. In addition, locating 426-foot-tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 23, CMT 3]*

Response: Comment acknowledged.

Comment: *I have reviewed the wildlife baseline studies and I have visited the site. There are no significant. Sensitive wildlife and plant habitat areas associated with this project area. [LTR 28, CMT 2]*

Response: Comment acknowledged.

Comment: *There is no evidence that the installation and operations of the proposed facility will have any significant impacts on sensitive or special status animal or plant species. The data and analysis by qualified third parties indicates that no significant impact will occur. The Whistling Ridge Wind Farm is also outside of the Columbia River Gorge Natural Scenic Area. [LTR 28, CMT 5]*

Response: Comment acknowledged.

Comment: *There are no sensitive species and no sensitive habitat in or adjacent to the lands in question, so the impact of the wind farm will be insignificant. [LTR 31, CMT 2]*

Response: Comment acknowledged.

Comment: *They harm wild life. [LTR 32, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is not likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, even though this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. Whistling Ridge has been studies for seven years and found to pose no wildlife impacts. [LTR 34, CMT 2]*

Response: Comment acknowledged.

Comment: *I was happy to learn that the US Department of Fish and Wildlife has found that there would be no significant impact on wildlife as a result of this project. [LTR 35, CMT 3]*

Response: Comment acknowledged.

Comment: *The DEIS provides no evidence to substantiate the applicant's assertion that the proposed Whistling Ridge wind project will not cause mortality to birds and bats in sufficient quantities to affect population viability. The analysis does not include any reasonable estimates of current population levels of sensitive species, nor of the threshold population levels required to maintain viability. [LTR 36, CMT 3]*

Response: The Wildlife Society, in a landmark publication on wind energy and wildlife, concluded that fatalities of passerines from wind turbine strikes generally are not significant at the population level (Arnett et al. 2007). In addition, the National Academy of Sciences (NAS 2008) recent review of wind energy impacts on birds came to the following conclusion: "At the current level of wind-energy development (approximately 11,600 MW of installed capacity in the United States at the end of 2006, including the older California turbines), the committee sees no evidence that fatalities caused by wind turbines result in measurable demographic changes to bird populations in the United States, with the possible exception of raptor fatalities in the Altamont Pass area." The available information suggests that the Project would be unlikely to have population impacts on birds. Additionally, the revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia

Plateau Ecoregion of Eastern Washington and Oregon" (WEST 2010) prepared for Klickitat County does not suggest the possibility of cumulative population impacts on birds.

Comment: *An independent study of Big Horn's monitoring results written by Dr. Smallwood concluded that raptor fatalities are up to 16 times higher than predicted prior to construction? Big Horn also kills twice as many bats as anticipated, according to fatality monitoring reports. Monitoring studies at other wind projects in Klickitat County are not yet completed, but the preliminary results from those projects suggest even higher fatality rates. The above-cited independent scientific analysis based on the results from Big Horn (the only project in Klickitat County where fatality monitoring has been completed) reported a conservative estimate of 243 raptor fatalities annually in Klickitat County. That estimate of 243 raptor fatalities is for a level of development that does not exceed 1,000 megawatts. At its current rate of wind development, Klickitat County is likely to reach a level of 2,000 megawatts or more within the next year or so. For raptors in Klickitat County, these numbers are rapidly approaching population-level impacts. "There is probably no other human source of mortality that comes close to these levels," writes Dr. Smallwood. The DEIS underestimates potential impacts on northern spotted owls and other avian species. The proposed project falls within critical habitat for the northern spotted owl, a species that is not only endangered but has continued to decline since the adoption of the Washington Department of Natural Resources' Habitat Conservation Plan for the species. This species has continued to decline on federal lands, which makes the state's HCP more important than ever. There are only an estimated 500 northern spotted owl pairs remaining in all of Washington State. Even as the state's Habitat Conservation Plan is failing miserably, the applicant is proposing to undermine that plan by allowing commercial-scale energy development within a Spotted Owl Special Emphasis Area. A commercial wind energy project is not appropriate for habitat that is designated as a nesting, roosting and foraging area for a federally endangered species. In materials distributed to the public prior to the mid-June 20 I 0 hearings, SDS Lumber writes: "After years of timber harvest, there's no suitable habitat for the bird." It is ironic that the applicant is pointing the finger at its own destructive timber practices to justify further risk to northern spotted owls. Regardless of whether spotted owls are currently nesting on or near this property, as they did in recent history, this area is designated as prime potential habitat for the species. The fact that Washington's Habitat Conservation Plan for spotted owls is not increasing the numbers of reproductive pairs makes it all the more important to restore this species' habitat-not to damage it even further. The Environmental Impact Statement commissioned by Klickitat County for its Energy Overlay Zone stated (on page 2-15 of the Final EIS) that "forested areas host higher concentrations of owl and other sensitive species habitats." The EIS recommended that areas with high concentrations of forested habitats be excluded from the Energy Overlay Zone because of their "higher potential for use by sensitive species and avian species likely to be impacted by wind turbines." This sensitive forested habitat is exactly what is being proposed for development at Whistling Ridge. Spotted owls are not the only species likely to be significantly impacted by the proposal. Klickitat County's Energy Overlay EIS also found high use of forested habitats by other raptors. The SDS map for the proposed project shows ridge-top locations for turbines, and these are typically the worst possible locations from an avian perspective-i.e., likely to result in the highest number of bird collisions. 6. The DEIS fails to assess compliance with state and federal laws protecting bald eagles, golden eagles, migratory birds, and endangered species. There are reports of bald eagles*

and bald eagle nests at the proposed wind site. Yet there is no evidence that the proposed project will be in compliance with the state's Bald Eagle Protection Act, RCW chapter 77.12, and regulations associated with this act. Nor is there any evidence that the proposed project will be in compliance with the federal Bald and Golden Eagle Protection Act, 16 USC § 668-668(d). This act prohibits any person, association, partnership or corporation from taking a bald or golden eagle at any time or by any manner without a permit. A permit may be issued only if the take would be compatible with the preservation of the species. There is no evidence in the DEIS that the proposed project will be in compliance with the federal Migratory Bird Treaty Act (MBTA), 16 USC §§ 703-712. The MBTA requires that the U.S. Fish & Wildlife Service take enforcement against "any person, association, partnership or corporation" that "by any means or in any manner" pursues, hunts, takes, captures, kills, or attempts to take, capture or kill a migratory bird or any part, nest or eggs of any migratory bird. Under the MBTA, a corporation may take or kill a migratory bird only if the U.S. Fish & Wildlife Service determines that the take or kill is compatible with migratory bird treaties. This determination must include an evaluation of the bird's species abundance and distribution, as well as its migratory and breeding habits. The killing of a single migratory bird is sufficient to create criminal liability, and does not need to be intentional. There is no evidence in the DEIS that the proposed project will be in compliance with the federal Endangered Species Act (ESA) of 1973, 16 USC §§ 1531-1544. Under the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Section 9 of the ESA prohibits any actions that would "take" an endangered species, as well as actions that would cause an act constituting a "take." The Ninth Circuit has held that "a habitat modification which significantly impairs the breeding and sheltering of a protected species amounts to 'harm' under the ESA.["] It seems quite possible that the proposed Whistling Ridge wind project may kill a bald eagle, a migratory bird, or an endangered species. The DEIS must evaluate the likelihood of each of these possibilities, and whether Incidental Take Permits are required from the U.S. Fish & Wildlife Service. A recent court ruling in West Virginia has made it clear that such permits are required under federal law when a wind project is likely to kill any individual animals protected by the Endangered Species Act. [LTR 36, CMT 8]

Response: The baseline avian use study was conducted in compliance with the Washington Department of Fish and Wildlife (WDFW) Wind Energy Guidelines (WDFW 2009). There is a growing body of data available to compare pre-construction avian use estimates with post-construction mortality, and the pre-construction use estimates show a positive correlation with avian mortality. The methods used to show a disparity between pre-construction estimates and elevated post-construction mortality are being contested as not accurate. The proposed Whistling Ridge Project is located in Skamania Co., rather than Klickitat Co., so estimates of wind development for Klickitat Co. were not considered. The American Wind Energy Association reviewed human-caused sources of bird mortality in 2001, and determined that only 0.01 to 0.02 percent of the mortality was from wind developments. As noted in Section 3.4.2.1 (on DEIS page 3-75), the Project has been sited to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the Project Area. No bald eagle nests occur on site and eagle use of the Project Area was determined to be extremely low. Avian and raptor use was also relatively low; therefore, no significant impacts to eagles or migratory birds are anticipated. Section 4.5 of the EIS addresses compliance with the Migratory Bird Treaty Act. Section 4.7 addresses compliance with the Bald Eagle Protection Act. Section 4.7

has been corrected to revise the last sentence to read: "The Project would not involve intentional acts or acts in wanton disregard of bald or golden eagles. Any accidental injuries or deaths would be subject to Federal law." The EIS, in Section 3.4, evaluates the potential for harm to a bald eagle, migratory bird, or an endangered species. BPA prepared a Biological Assessment (dated June 8, 2010) and submitted it to USFWS for informal consultation. In a letter to BPA dated July 19, 2010, USFWS concurred with BPA's conclusion that the Project "may affect, but is not likely to adversely affect, the northern spotted owl, a threatened species." The northern spotted owl is the only listed or threatened species present or with critical habitat in the vicinity of the Project Area. Please see response to Comments LTR 173, CMT 1 to LTR 173, CMT 4 - the USFWS Section 7(a) consultation concurrence for this project.

Comment: *This proposal NOT is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along an actively forested ridgeline in the foothills of the Cascade Mountains. [LTR 40, CMT 2]*

Response: Comment acknowledged.

Comment: *Collisions with turbine blades are a minor concern compared to the impacts of fossil [fuel] generation. [LTR 40, CMT 4]*

Response: Comment acknowledged.

Comment: *While I am a supporter of renewable energy, all the environmental choices we make need to be careful ones, considering all impacts. The Whistling Ridge Energy Project, along the Skamania and Klickitat county line is a mix of positive and negative impacts - the negative effects on wildlife and on the environmental well-being of the Gorge outweigh the benefits. I am aware that the potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. I sincerely hope the decision-makers involved will listen to reason and choose alternatives, preserving what undisturbed areas we have left! [LTR 42, CMT 1]*

Response: Comment acknowledged.

Comment: *Death to thousands of various wild animals (birds and mammals--especially our best friends, BATS/mosquito mowers, which are abundant in the fecund Cascades). [LTR 49, CMT 2]*

Response: Comment acknowledged.

Comment: *Just say "NO" to: Death and malaise to thousands of beautiful and beneficial animals. [LTR 49, CMT 6]*

Response: Comment acknowledged.

Comment: *This proposal is not likely to have any different or greater wildlife impacts than any other wind energy facility proposed in the State of Washington. The project will not permanently disturb any areas of forested habitat and will not result in direct or indirect impacts to the multiple wildlife species. None of the listed or sensitive species including the northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, or elk will suffer detrimental effects from this project. I support renewable energy, and I support industrial-scale wind energy development wherever it can help us become energy self sufficient. [LTR 52, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is unlikely to have any different and greater wildlife impact than any other wind energy facility proposed in the State of Washington, perhaps even less because this project is proposed along an already cleared for utility access low ridgeline in the foothills of the Cascade Mountains. [LTR 53, CMT 2]*

Response: Comment acknowledged.

Comment: *The wind turbines are also detrimental to the birds, big horn sheep and wild life and the endangered species in the area. [LTR 55, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern*

spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. [LTR 57, CMT 3]

Response: Comment acknowledged.

Comment: *I am a renewable energy enthusiast yet I feel I need to speak out about this project. In eastern Oregon there are prolific wind generators located in some key areas of strong wind. All that I have seen so far, are located in grassland areas with virtually no trees nearby. This locating factor reduces the possibility of damage to wildlife because most of the wildlife is lower flying, if at all, having little habitat from 100 feet up. However, to locate 50 wind generators in the middle of a forested area really exposes a great deal of habitat to almost 6000 feet of turbulent rotors, which they will not survive. Please do not allow the dollar signs and the green speak to move us one step forward yet 3 steps back. [LTR 59, CMT 1]*

Response: Comment acknowledged.

Comment: *More recent studies on bat and raptor deaths caused by wind turbines indicate a significantly higher number than expected. Klickitas County has recently begun a new study because many more deaths were occurring than promised by the boiler plate information in their EIS. Please update your study to consider recent results. [LTR 60, CMT 8]*

Response: The revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (WEST 2010) prepared for Klickitat County has been included as an appendix in the FEIS. A revised cumulative impacts analysis that takes into consideration wind energy development within forested habitats of western WA has been added to Section 3.14.3.5 of the EIS.

Comment: *There does not seem to be mention or analysis of that land being designated as "Deer and Elk Winter Range"? I was unable to get a map from WDFW in this short time, but I do know that the land immediately south of the project is designated winter range preserve. If this project is or is not in the preserve, what would be the impacts to elk and deer movement, how will they react to the "strings" of turbines, operational noise, construction, etc? If you believe that this wildlife will simply "go around", what is the impact and how will the applicant mitigate the impact to the surrounding communities now in the path of ranging wildlife? What would be the impact to the surrounding communities when the predators (e.g. cougars) follow the new path, and how will we be protected? [LTR 60, CMT 9]*

Response: Information on the winter range for deer and elk was presented in Section 3.4.1.6 (on page 3-69 of the DEIS). As stated, WDFW Priority Habitat for mule deer and black-tailed deer (winter range) are present east of Underwood Mountain (east of the Project Area), and

Columbia black-tail deer (winter range) is present west, north and south of the Project Area. The only WDFW Priority Habitat that exists in the Project Area is winter range for elk. Potential impacts during construction were presented in Section 3.4.2.1 (on page 3-76 of the DEIS). As noted on DEIS page 3-81, additional coordination with WDFW is on-going regarding elk habitat.

Comment: *I've spent several winters in desert hot springs/palm springs area and not once have I seen any bird kill from the wind turbine windfarms. [LTR 63, CMT 1]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat[s]. [LTR 66, CMT 2]*

Response: Comment acknowledged.

Comment: *In one area it states that this project has to be defined as an "integrated whole" to be worthwhile yet in the design/mitigation measure under Biological Resources that "micrositing of turbines and associated facilities would allow any sensitive resources discovered during construction to be avoided." You can't have it both ways. [LTR 74, CMT 3]*

Response: The EIS considers numerous protected resources, and considers them as an integrated whole in terms of identifying any resource (or resources) that may require additional protection through macro- and micro-siting turbine strings and individual turbines.

Comment: *This EIS is woefully insufficient in its evaluations of wildlife. It does a poor job of covering bat evaluations, lacks significant bird/bat dispersal data and has no mention of large animal. It is so bold as to state, "For potential impacts to big game species (deer and elk), coordination with WDFW will occur if appropriate." It is a known wintering ground for Elk. Also what about cougar, bobcat, coyotes and all the other game? It states that it will "Convene a Technical Advisory Committee to evaluate mitigation and monitoring programs for impacts to wildlife and habitat" - why is this not already in place? [LTR 74, CMT 8]*

Response: Large mammal effects were described in the DEIS on page 3-76. Three years of bat studies were conducted at the Whistling Ridge site, likely more than any other proposed wind project in the country. Bat mortality will be monitored post-construction, and, if warranted, turbine curtailment during low wind speed nights is known to dramatically reduce bat fatalities and would be implemented at the site to reduce fatalities.

Comment: *Birds mortality! Let ['s] close the airport in Portland! [LTR 75, CMT 4]*

Response: Comment acknowledged.

Comment: *In view of the fact that no studies have been conducted in the US that determine what effect wind turbines have upon forest-dwelling species of wildlife, it is inappropriate and misleading to repeatedly state that "No impacts are anticipated..." Frequent statements of conclusion appear throughout the document; some are nebulous, speculative, inaccurate or contradict the material provided in the previous text or appendices and add to the appearance of bias. On [DEIS] page 3-77, it is confidently stated that "Operation of the project would result in no further impacts to habitats on the project site" despite a statement on [DEIS] page 3-81 that "Because data on impacts to big game as a result of wind project operations is limited, it is difficult to predict the impact of the proposed project on wildlife using priority habitats on the proposed project site." ("Additional coordination with WDFW is ongoing, and would continue to address this resource.") [LTR 76, CMT 3]*

Response: The statement on DEIS page 3-77 refers to "no further impacts" beyond those described during the construction phase, while the statement on DEIS page 3-81 indicates the uncertainty regarding the operational effect on big game.

NOTE: Chapter 3 of the EIS (Affected Environment, Impacts, and Mitigation) is organized so that it describes the Impacts during the construction-, operation-, and project decommissioning-phases for the Proposed Action. Impacts under these different phases of the Proposed Action differ in nature and to present them this way allows the reader to know what impacts are expected during each phase.

Comment: *The Columbia River flyway could be considered a cultural resource for the avian species. It has likely existed for a longer time than humans have been here and constitutes a known route for both north-south and east-west migrating birds. It is inconceivable that a project that is known to kill birds could be approved for an area located within the flyway. Larger turbine blades and consequent slower rotation speeds have been reported to minimize bird fatalities, but the fact that Columbia River is the major western flyway in the United States negates this improvement since denser concentrations of birds would be present during migration flights. The rotation speeds mentioned in the document stipulated a wide range and was indicative that the authors were not aware that rotation speed guidelines purporting to offer some protection from bird strikes are available. [LTR 76, CMT 8]*

Response: Based on the avian point count data, bird use in the Project Area is considered too low to identify the site as a flyway or concentrated migration route. Birds are migrating through the Project Area, but not using it as a primary route.

Comment: *The flyer [sent out by the project proponent] further asserts that there will be no "harm" to wildlife populations. This also is a hoax. The raptor mortality from wind energy projects developed in Klickitat county is ten times what the EIS predicted [as reported by Kathy Durbin in The Columbian - "First Golden Eagle killed by Wind Turbines in WA State")]. [LTR 77, CMT 4]*

Response: Comment acknowledged.

Comment: *The draft [EIS] also does not state, as it should, that this project would be the first such project allowed on Pacific Northwest forest lands. Moreover, the draft should recognize that no comprehensive studies have been made concerning effects of wind turbines upon Pacific Northwest forest dwelling wildlife. [LTR 79, CMT 6]*

Response: Both the avian and bat fatality studies in the DEIS appendices acknowledged that no wind energy facilities have been constructed in Pacific Northwest coniferous forests. Because the Whistling Ridge site is in an even aged, relatively young forest managed for timber production, wildlife habitat on the site is already greatly compromised.

Comment: *Potential impacts on mammals other than draft-mentioned bats and a single squirrel species should be described in the EIS. What animals are present in what relative numbers, and which are most likely to be driven from or avoid the area because of the turbines? [LTR 79, CMT 7]*

Response: Section 3.4.1.6 (on page 3-69 of the DEIS) described the large mammals that have the potential to occur within the Project Area, including cougar, bobcat, coyote, and black bear. The site is within the winter range of elk. Douglas squirrels were recorded during surveys for western gray squirrel. Potential construction impacts were discussed in Section 3.4.2.1 (on DEIS page 3-76).

Comment: *Estimates of expected turbine-caused avian and bat mortalities should be included by utilizing available information from studies at existing wind farm projects. Such estimates would perhaps be difficult for those bird and bat species that prefer forest habitats. But most bird species that frequent Whistling Ridge (87 species, including the bald eagle and five others of "Special Concern", have been recorded there) are also found around wind farms where mortality studies have already been made. To simply state, as the draft now does, that the turbines would "not affect viability" of bird and bat populations "in the region" is quite inadequate. Cumulative impact data, rather than unfounded beliefs, are necessary in making decisions of the magnitude that this proposal encompasses. [LTR 79, CMT 8]*

Response: Pre-construction use data for birds was compared with that from eleven other wind developments where post-construction mortality data was available. Use estimates

compared with these other wind developments suggest the mortality from the proposed Project would occur at similar levels (moderate). Bat monitoring data was difficult to use for predicting mortality, because the pattern of use varied compared with the use pattern from the other sites. Data from numerous wind projects were used to predict avian fatality rates at Whistling Ridge. A revised cumulative impacts analysis, which takes into consideration proposed wind energy development in coniferous forests of western Washington and Oregon, has been added to Section 3.14.3.5, under the subheading of Bird and Bat Species.

Comment: *Numerous wildlife species, not just those threatened or endangered, rely of forest habitats. Bird mortality from wind turbines is fairly well documented, but most such studies have focused on turbines located outside of forest areas. Other wildlife concerns are associated with the SDS proposal; these concerns include seasonal use patterns, travel corridors, habitat alteration or removal, soil loss and associated stream sedimentation, and area abandonment by wildlife due to turbine noise. Many animals, with hearing more acute than ours, can be detrimentally affected by noise. [LTR 79, CMT 17]*

Response: Comment acknowledged.

Comment: *[Excerpts from] The Oregonian, June 11, 2010; and, "Birds vs. the wind farms," by Hal Bernton, The Olympian, June 08, 2010: "Based on that information, the windpower turbines currently operating in Oregon and Washington kill more than 6500 birds and more than 3000 bats annually." [LTR 82, CMT 9]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. I am especially concerned about the impact on spotted owls, as recent studies have shown their numbers continue to decrease steadily, even dramatically in some areas. Any development that might disturb their habitat must be closely, closely scrutinized. [LTR 87, CMT 2]*

Response: Comment acknowledged.

Comment: *It [the Project] will be an eyesore and kill many birds. Bald Eagles inhabit the area. [LTR 92, CMT 3]*

Response: Comment acknowledged.

Comment: *The Washington Department of Fish and Wildlife (WDFW) has reviewed the above reference document and offers the following comments at this time. Other comments may be offered as the project progresses. Overall, the Preliminary DEIS is consistent with the 2009 WDFW Wind Power Guidelines, including early and regular consultation, as well as avian and bat studies, habitat characterization, and impact analysis. [LTR 94, CMT 1]*

Response: Comment acknowledged.

Comment: *We support the two-year minimum post-construction avian mortality study, as well as the development of a Technical Advisory Committee (TAC) WDFW is in general agreement with the proposed commercial forestry operations within the vicinity of each turbine as described in [DEIS] Section 3.0 ("turbine timber buffer") and would like to offer the following interpretation. According to [DEIS] Section 3.0, "Vegetation surrounding each turbine would be managed according to the following specifications: A circular area extending 50 feet from each turbine tower base would be harvested and graveled. From 50 feet to 150 feet from the base of the turbine towers, tree heights would be limited to 15 feet above the elevation of the base of the turbine. From 150 feet to 500 feet from the base of the turbine towers, tree height would be limited to 50 feet above the turbine base within an area formed by it 90 degree arc centered on the ordinary downwind direction." From this, we conclude that within a diameter of 100 to 300 feet surrounding each turbine, tree heights would be limited to 15 feet, and from a diameter of 300 to 500 feet, tree heights would be limited to 50 feet, but only within a 90-degree arc on either side of the turbine aligned with the direction of the prevailing wind. The other 90-degree arc on either side of the turbine perpendicular with the direction of the prevailing wind will essentially be unchanged habitat (i.e. existing commercial forest). We are interested in how this type of habitat and commercial forest management in the immediate vicinity of operating wind turbines will or will not affect the avian and bat mortality. We look forward to working with Whistling Ridge through the TAC to address this issue and cooperatively develop management strategies, if needed, to reduce avian and bat mortality. Thank you for the opportunity to review the Preliminary DEIS and offer these comments. [LTR 94, CMT 3]*

Response: Comments acknowledged. The interpretation in the comment is correct with the exception that within the diameter from 300 feet to 1000 feet (not 500 feet) heights would be limited to 50 feet within a 90-degree arc with the direction of the prevailing wind. See Figure 2-4 in the DEIS.

Comment: *As a key participant in these processes, it is our view that the most important element of good wind energy facility siting that minimizes impacts to wildlife and habitat is the early, active and regular consultation with the interested public and with wildlife agencies, including the development of specific protocols to evaluate potential impacts. As noted in a January 19, 2010 letter from WDFW to the Whistling Ridge Energy Project permitting consultant (enclosed), the wildlife data and information supporting the agency review draft of the DEIS "*is consistent with the 2009 WDFW Wind Power Guidelines, including early and regular consultation, as well as avian and bat studies; habitat characterization, and impact analysis*." Under the 2009 Wind Power Guidelines, for commercial forestlands, consultation with WDFW is the principal measure to address habitat and wildlife concerns. Whistling Ridge Energy's early and regular consultation with WDFW, and its use of study protocols and analyses particularly tailored to commercial forestlands, satisfies the spirit and letter of the Guidelines. The Whistling Ridge Energy Project has undergone consistent and regular wildlife and habitat studies for multiple seasons and multiple years, beginning as early as 2003. Avian data has been secured over multiple years and in every season of the year. Whistling Ridge has also completed three years of season-specific analysis of bat populations, demonstrating a commitment to wildlife agency review of data concerning impacts to bats. [LTR 94, CMT 7]*

Response: Comment acknowledged.

Comment: *The wildlife habitat in the area will change, but the habitat itself will not be "lost." Some animals will move out while others will move into the area. In this case, change might be good, or at least neutral. [LTR 96, CMT 4]*

Response: Comment acknowledged.

Comment: *I have been to meetings and listened to the talk about how safe for birds these mills are. The [N]ative Americans told us that they could not imagine how a bird could fly into these blades. About 2 weeks later, front page of the Oregonian, Golden eagle killed by wind turbines at Goodnoe Hills. How many Golden Eagles are there in the gorge? At least one is dead. We were told that up to 7000 bats would be killed if the Whistling Ridge project goes in. How many hawks and eagles will die because of this? [LTR 102, CMT 5]*

Response: The bat data collected at met towers in 2009 in the area most likely to be developed for wind energy does not suggest bat mortality would be excessive at this site. The estimated raptor mortality rate is 0 to 0.25/MW/year.

Comment: *The effect of a wind farm on bird and wildlife populations is negative. Turbines Kill!! [LTR 104, CMT 3]*

Response: Comment acknowledged.

Comment: *[…] killing of birds and wildlife […] [LTR 118, CMT 3]*

Response: Comment acknowledged.

Comment: *There are many items that should be considered from an environmental and ecosystem perspective regarding a large project like this. All projects like this have an "environmental cost" and although it may not appear to affect our community directly, it does affect the earth; ultimately we are all reliant on the environmental resources of the earth to keep us and all other living creatures alive. In particular, we are concerned that, due to this Project's location in a forest ecosystem, far more wildlife will be negatively affected or harmed than if it were located in a wheat field or open plain environment. [LTR 119, CMT 6]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because this project is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The project would permanently disturb large areas of forested habitat and result in direct and indirect impacts to multiple wildlife species through habitat loss and displacement, direct collisions with turbine blades, and other factors. The potentially affected listed and sensitive species include northern spotted owl, western gray squirrel, northern goshawk, several species of bats, multiple migratory bird species, mule deer, black-tailed deer, and elk. [LTR 121, CMT 4]*

Response: Comment acknowledged.

Comment: *More recent studies on bat and raptor deaths caused by wind turbines indicate a significantly higher number than expected. Klickitat County has recently begun a new study because many more deaths were occurring than promised by the boiler plate information in their EIS. Please update your study to consider recent results. Eliminating the A1-A7 turbines would significantly reduce the risk of bat and raptor deaths as the turbines closest to the flyway are eliminated. [LTR 124, CMT 7]*

Response: There is a growing body of data available to compare pre-construction avian use estimates with post-construction mortality, and the pre-construction use estimates show a positive correlation with avian mortality. The methods used to show a disparity between pre-construction estimates and elevated post-construction mortality are being contested as not accurate. Based on the avian point count data, bird use in the Project Area is considered too low to identify the site as a flyway or concentrated migration route. Birds are migrating through the Project Area, but not using it as a primary route.

Comment: *The land immediately south of the A1-A7 turbines project is designated winter range preserve. Eliminating the A1-A7 turbines eliminates a major impact to elk and deer movement in their designated winter range. [LTR 124, CMT 8]*

Response: As noted in Section 3.4.1.6 (on DEIS page 3-69) of the, only elk winter range is present within the Project Area and it is located throughout the Project Area, not just in the location of the A-string.

Comment: *This proposal is likely to cause significant negative impacts to sensitive wildlife and plant habitat. [LTR 127, CMT 2]*

Response: Comment acknowledged.

Comment: *I've been told also that wildlife will be greatly impacted in this location. [LTR 130, CMT 2]*

Response: Comment acknowledged.

Comment: *The Draft EIS found; [bulleted item] - No significant impact on wildlife or bird populations. [LTR 140, CMT 2]*

Response: Comment acknowledged.

Comment: *A recent bird study in Klickitat County is not even mentioned in the EIS. Please, do not rubber stamp this project! [LTR 142, CMT 3]*

Response: The best available data refers specifically and only to the cumulative impacts analysis for the Columbia Plateau Ecoregion. A revised cumulative impacts analysis that considers proposed wind energy development in forested habitats of western WA has been added to Section 3.14.3.5 of the FEIS.

Comment: *It is indeed sad that wind turbines impact individual birds. As a birder and long time volunteer for a raptor rehabilitation center, I'm the last person who would want to see birds die. But they are dying by the thousands---tens of thousands----across the globe because of climate change's impact on habitat. [LTR 156, CMT 3]*

Response: Comment acknowledged.

Comment: *The WEST report prepared for the Klickitat County Planning Department is not applicable to the proposed Whistling Ridge Energy Project, and cannot be relied upon to evaluate cumulative impacts. The report prepared by Western EcoSystems Technology, Inc. (WEST) purports to be a cumulative impacts analysis for Klickitat County. [REFERENCE: Avian, Bat and Habitat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon, Prepared for Klickitat County Planning Department by Gregory D. Johnson and Wallace P. Erickson, Western EcoSystems Technology, Inc., February 2010] Unfortunately, this report sheds little light on the cumulative impacts of wind power development on wildlife in Klickitat County, and it is even less relevant to a project proposed for Skamania County. As the WEST report's title suggests, the Columbia Plateau Ecoregion is located in eastern Washington and Oregon, which have completely different plant and animal communities than the western Washington site proposed for the Whistling Ridge wind project. All of the projects evaluated in the WEST report are located in arid and un-forested lands, whereas Whistling Ridge is located in a coniferous forest that receives much more precipitation and has a much different plant and animal population. Impacts of wind projects on birds and bats are extremely site-specific, and because of that the WEST study has little applicability to the Whistling Ridge proposal. It is no more applicable than studies from the Altamont Pass Wind Resources Area in California, where significant population-level impacts on birds have been documented; or from the forested Mountaineer wind project in Appalachia, where significant population-level impacts on bats have been documented. The WEST report contains fatality monitoring data from 12 projects around the Columbia Plateau Ecoregion. Only one of those projects, Big Horn, is actually located in Klickitat County-and the results from Big Horn show much higher raptor fatality rates than anywhere else in the Pacific Northwest. In other words, the WEST report underestimates the impacts of wind projects in Klickitat County by merging the Big Horn data with results from less lethal projects elsewhere in the region. The WEST report also looked at 24 projects in the Pacific Northwest for which preconstruction estimates of avian use are available. Here too, the results from Klickitat County show a much higher likelihood of avian impacts than elsewhere in the region. Of the 24 projects evaluated in the report, the seven projects located in Klickitat County had much higher estimated use by both raptors and by birds of all types. For example, the highest raptor use estimated anywhere in our region is at the Linden Ranch in Klickitat County. Raptor use there is estimated to be 2.5 times the average for the Columbia Plateau ecoregion. In other words, the WEST report does not give an accurate picture of cumulative impacts from expanding wind power here in Klickitat County, much less any indications of cumulative impacts to be expected in Skamania County. To the contrary, the WEST report uses data from projects in other parts of Oregon and eastern Washington to underestimate how many birds-especially raptors-are likely to be killed here. The WEST report has another fundamental flaw. To arrive at a prediction of cumulative fatalities, the report's authors averaged existing fatalities in the region and then compared those averages with estimates of regional population size based on breeding bird surveys provided by the Partners in Flight North American Landbird Conservation Plan. However, the Partners in Flight estimates include relatively large standard errors, and are not accurate enough to serve as reliable population indicators. The estimates used in the WEST report were designed for detecting long-term population trends but not for estimating population size. As Dr. K. Shawn Smallwood, an ecologist who is one of the nation's leading experts on the interactions between wildlife and wind turbines, points out in a review of the WEST report, the estimates from Partners in Flight are "unsuitable for the use that Johnson and Erickson made of them." [REFERENCE: Review of Cumulative Impacts Analysis of Wind*

Energy Expansion on the Columbia Plateau, K. Shawn Smallwood, May 18, 2010]. Other researchers have pointed out this flaw but WEST continues to rely on these unsuitable estimates. Smallwood further writes: "No studies or monitoring programs have been designed or implemented in the US to document wind energy-related population declines of any bird species. Most fatality monitoring programs have been much too brief to document declines, lasting one or two years. All monitoring programs have been too crude to document declines, and the majority of post-construction studies have not been designed to estimate population size of any bird species. Therefore, Johnson and Erickson's statement about wind energy impacts was misleading." There is no peer-reviewed science in the DEIS submitted by the applicant. Instead the applicant relies on WEST, a wind industry contractor whose work has not been independently reviewed. [LTR 161, CMT 5]

Response: The DEIS recognized that the WEST report was developed for the more arid shrub-steppe lands, rather than the coniferous forests found within the proposed Project Area. The conclusion from their report remains pertinent for the proposed Project, because avian mortality from wind developments is far less significant than the effect from traditional energy development or climate change. There are no other projects in coniferous forests in the west for comparison, so the Klickitat study was used. Only one other wind development is currently proposed, suggesting cumulative effects in this habitat type will remain very limited compared with other habitats. A revised cumulative impacts analysis that takes into consideration proposed wind energy development in coniferous forest habitats of western WA has been added to Section 3.14.3.5 of the FEIS.

Comment: *Pre-construction estimates of avian and bat fatalities have not proved reliable. Although no scientists have done a thorough comparison of pre-construction and post-construction mortality estimates, there is plenty of anecdotal evidence that post-construction mortalities often greatly exceed pre-construction estimates made using the same methodology as has been employed for the Whistling Ridge wind project. For example, the Environmental Impact Statement (EIS) prepared prior to adoption of the Energy Overlay Zone in Klickitat County grossly underestimated the level of wildlife fatalities likely to result from wind development. At all of the wind projects in Klickitat County where monitoring has been completed or is under way, reports prepared by wildlife consultants show that fatalities of raptors and bats are far in excess of what was anticipated by the EIS. Whistling Ridge is using the same consultants and methodology as Klickitat County for its pre-construction fatality estimates. At Big Horn, the first large wind project built in Klickitat County, the developer's wildlife consultants did a full year of monitoring at 100 percent of the turbines, which makes this one of the most comprehensively monitored wind projects anywhere in the United States. The results of that monitoring study show that raptor fatalities are at least eight times higher than what the developer, PPM/Iberdrola, projected. [REFERENCE: Big Horn Wind Power Project Wildlife Fatality Monitoring Study 2006-2007. Prepared for PPM Energy and Big Horn Wind Project Technical Advisory Committee by Northwest Wildlife Consultants, Inc., 2008.] An independent study of Big Horn's monitoring results written by Dr. Smallwood concluded that raptor fatalities are up to 16 times higher than predicted prior to construction. [REFERENCE: Avian and Bat Mortality at the Big Horn Wind Energy Project, Klickitat County, Washington. K. Shawn Smallwood, 2008.] Big Horn also kills twice as many bats as anticipated, according to*

fatality monitoring reports. Monitoring studies at other wind projects in Klickitat County are not yet completed, but the preliminary results from those projects suggest even higher fatality rates. The above-cited independent scientific analysis based on the results from Big Horn (the first of only two projects in Klickitat County where fatality monitoring has been completed) reported a conservative estimate of 243 raptor fatalities annually in Klickitat County. That estimate of 243 raptor fatalities is for a level of development that does not exceed 1,000 megawatts. At its current rate of wind development, Klickitat County is likely to reach a level of 2,000 megawatts or more within the next year or so. For raptors in Klickitat County, these numbers are rapidly approaching population-level impacts. "There is probably no other human source of mortality that comes close to these levels," writes Dr. Smallwood. At the second project in Klickitat County where monitoring has been completed, Goodnoe, the results are similar. [REFERENCE: Goodnoe Hills Wind Project Avian Mortality Monitoring Report, Prepared for PacifiCorp by URS Corporation, March 16, 2010.] The final monitoring report for Goodnoe calculated fatalities of 0.34 raptors per year per turbine, or 0.17 raptors per megawatt per turbine, or 16 fatalities per year for the project. Only one project reviewed in the WEST report had a higher raptor fatality rate than the one found for Goodnoe. The Goodnoe project is killing far more raptors than predicted by pre-construction surveys. [LTR 161, CMT 7]

Response: There is a growing body of data available to compare pre-construction avian use estimates with post-construction mortality, and the pre-construction use estimates show a positive correlation with avian mortality. The methods used to show a disparity between pre-construction estimates and elevated post-construction mortality are being contested as not accurate.

Comment: *With the completion of this DEIS, more biological review has been done than on any other previously sited wind project anywhere in the Northwest, let alone Washington [S]tate. To our knowledge, no other wind energy project has completed the multiple years of biological surveys, including three years of bat survey work. [LTR 162, CMT 8]*

Response: Comment acknowledged.

Comment: *In its "Section 7" consultation letter dated July 19, 2010, the USFWS confirmed that the project will no impact Northern Spotted Owls - a determination that should be considered conclusive on this issue. [LTR 162, CMT 9]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the*

outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 163, CMT 2]

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 165, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 167, CMT 2]*

Response: Comment acknowledged.

Comment: This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The proposed Project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 169, CMT 2]

Response: Comment acknowledged.

Comment: *Thank you for the opportunity to review and comment on the joint NEPA SEPA Whistling Ridge draft environmental impact statement (DEIS). We looked primarily at fire hazard, plant species and communities, northern spotted owls and WA Department of Natural Resources' Habitat Conservation Plan (DNR HCP), forest practice requirements, and surface mines and reclamation. Some of our concerns include: the presence or impacts to Oregon white oak/Idaho fescue plant communities; northern spotted owls, their habitat and associated HCPs; forest practice requirements for this proposal, and a permitted source of aggregate for roads*

and structures. Our adjacent HCP land to the north is managed to provide habitat that makes a significant contribution to demographic support, maintenance of species distribution and facilitation of owl dispersal. [LTR 172, CMT 1]

Response: Comment acknowledged.

Comment: *The DEIS on page 3-56 states there are no HCPs in or near the project area. Forest practices owl protection requirements were also not correctly explained. Please also note that state agency wildlife species review is typically done by WA Department of Fish and Wildlife (WDFW), and DNR biologists did not look at impacts to species not protected under the DNR forest land HCP in eastern Washington, other than compliance with Forest Practices Rules. [LTR 172, CMT 2]*

Response: The Applicant must submit any harvest plan to DNR and WDFW for review and must abide by all forest practices owl protection requirements. If any harvest proposals fall within an HCP there is another layer of regulation that is required. All appropriate legal avenues were followed when submitting permits.

Comment: *[In reference to DEIS Figure 2-2], the map shows a riparian area. The wetland is described in [DEIS Section 3.3.1.1, Surface Water] County protection measures are described on [DEIS Section 3.4.1.3] for category II wetlands. [Our] request [is] if this is on forest land you should verify if it is a Type A or Type B wetland and that the 100 foot buffer would also meet or exceed any FP Rule requirements for a Type A or B wetland (WAC 222-30-020) for that location. [LTR 172, CMT 14]*

Response: The non-forested area of the Cedar Swamp wetland is considered to be a Type A wetland under Forest Practices regulations. According to WAC 222-30-020, the allowable buffer could range from 25 to 100 feet for this size of non-forested wetland community. However, this buffer is measured at transition from non-forested to forested wetland, which is inside the wetland boundary. Nevertheless, the 100-foot buffer on the wetland edge exceeds Forest Practices requirements.

Comment: *[In reference to DEIS page] 3-50, the comment is made that the project is not sited in or near any Spotted Owls or Spotted Owl activity site centers. There are two Spotted Owl circles within portions of the proposal area. Request: Please correct the inaccurate statement concerning spotted owls. [In reference to DEIS pages] 3-50 and 3-53, [it is stated that] "the two Spotted Owl site centers are no longer considered to be occupied pursuant to USF & W protocols and state law." This is an inaccurate statement. The two Spotted Owl circles are still in the state data base and have not been decertified as of this date. Forest Practices rules and regulations still require appropriate protections (WAC 222-16-080(6)). [DNR's] Request: Please correct the inaccurate statement concerning spotted owls and correctly state the*

appropriate FP Rule mitigation measures that are required. [In reference to DEIS pages] 3-75 and 3-78, [it is stated that] "The proposal would not impact the White Salmon SOSEA's 40% suitable Spotted Owl habitat level." This is an inaccurate statement. The habitat level is calculated on a circle by circle basis, not over the entire SOSEA. There is a small mapped portion of potential habitat in one of the two circles in the proposal. [DNR's] Request: Please document whether this proposal (including all of the associated timber harvests) will harvest suitable owl habitat (WAC 222-16-085) and or impact the suitable habitat totals for one of the spotted owl circles, if that is the case (WAC 222-10-040) [LTR 172, CMT 17]

Response: The text in Section 3.4.1.5 (the last sentence on page 3-49 of the DEIS and the first full sentence on DEIS page 3-50) has been revised to read: "There are a total of 9 turbines proposed within the 1.8 mile provincial range of two NSO activity centers. There are no proposed turbines located within the 500 acre core areas of these activity centers. Two historical meeting sites on public lands near the property have not been used in over six and eight years, respectively, and are no longer considered to be occupied by USFW endorsed protocols but have not been decertified by WDFW or USFW and are still considered occupied by state and federal law."

Comment: *This letter responds to your request for consultation under section 7(a)(2) of the Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 et seq.) on the proposed Whistling Ridge Energy Project LLC (Project). Your biological assessment (BA), dated June 8, 2010, was received by the U.S. Fish and Wildlife Service's (Service) Washington Fish and Wildlife Office on June 9, 2010. You requested concurrence with your determination that the Project* "may affect, but is not likely to adversely affect" *the threatened northern spotted owl (Strix occidentalis caurina) (spotted owl). No designated spotted owl critical habitat occurs on or near the Project; therefore, no critical habitat will be affected. This letter is based on information provided in the BA, the 2009 Final Report "Results of Northern Owl, Western Gray Squirrel and Northern Goshawk Surveys Conducted for the Whistling Ridge Wind Energy Project", the Draft Environmental Impact Statement, a field trip to the Project attended by staff of the Service and the Washington Department of Fish and Wildlife on May 14, 2009, and a meeting between Service and Washington Department of Fish and Wildlife staff on August 28, 2009. [LTR 173, CMT 1]*

Response: Comment acknowledged.

Comment: *<u>Status of Spotted Owls in the Project Area</u>. Two spotted owl territories are located on Washington State Department of Natural Resources (DNR) and National Forest lands located north of and adjacent to the Project. The site center for the Mill Creek owl (MSNO #0991) is located in Township 4 North, Range 10 East, Section 28 and the site center for the Moss Creek owl (MSNO #1003) is located in Township 4 North, Range 9 East, Section 35. Both of these owl territories are within Washington State's White Salmon Spotted Owl Special Emphasis Area, which provides added protection for spotted owls located on private lands through the Washington State Forest Practices Rules. Both of the 70 acre core areas are located*

on DNR lands and are provided additional protection from their Habitat Conservation Plan for the State Trust Lands. The estimated median annual home range size for the spotted owl in this physiographic province is approximately 6,657 acres, which for regulatory purposes is assumed to lie within a 1.8-mile radius circle. Best available science indicates that when the amount of suitable spotted owl habitat within a circle falls below 40 percent, there is a likelihood of "take" under section 9 of the ESA. Each of these territories contains more than 40 percent suitable spotted owl habitat (J. Spadaro, pers. com. 2009). A small portion of the Moss Creek circle overlaps the northern end of the Project and contains dispersal habitat and some foraging habitat. However, removal of this small amount of habitat (2 acres) would not reduce the habitat acreage below 40 percent in either territory. Protocol spotted owl surveys were conducted within these estimated home ranges during the 2003, 2004, 2008, and 2009 breeding seasons. Numerous barred owls (Strix varia) were detected, but no spotted owls were detected; however, because of the presence of barred owls with these territories, it is possible that spotted owls were present but did not vocalize. The 2009 surveys followed the Service's revised 2010 protocol to better elicit spotted owl responses in the presence of barred owls (USFWS 2010) (the consultant contacted the U.S. Fish and Wildlife Service on May 29, 2009, how to call for spotted owls in light of the numerous barred owl detections north of the Project and was provided the changes to the 1992 surveying protocol prior to the release of the 2010 revised protocol on February 18, 2010). However, in 2010 surveys were continued in the Project area. On May 6, 2010, a single male spotted owl was detected while conducting a night visit in the far north edge of the Mill Creek provincial range on DNR property. On May 7th, the biologist conducted a follow-up visit during the daytime. The bird exhibited non-nesting behaviors. On May 29, the biologist conducted a second visit and located what appeared to be the same male owl that was detected on May 7th. The bird on both survey visits took and consumed mice, indicating that it is a single male not supporting young. Spotted owl survey protocol requires 3 sightings of a spotted owl single within the same area within the breeding season to be regarded as a territorial single. This does not change the analyses of effects of the Project to spotted owls, as addressed below, regardless of whether or not a territorial status is established. <u>Effects from Construction</u>. Approximately 2 acres of spotted owl dispersal habitat (with some patches of foraging habitat) would be removed from the Moss Creek spotted owl site by the construction of the Project from the northern end of the turbine string. This habitat is located at the southern extremity of the circle and is on the edge of the Project that has already been clear-cut by SDS Lumber Company, and would not remove suitable spotted owl habitat below 40 percent in the territory (J. Spadaro, pers. com. 2009). The discovery of the new owl in 2010 in the extreme north of the Moss Creek owl circle is located more than 2 miles northwest of the northern-most turbine. Because of this and since the remainder of the Project does not contain suitable spotted owl habitat, we believe that potential effects to spotted owls as a result of habitat loss or degradation is expected to be insignificant. [LTR 173, CMT 4]

Response: Comment acknowledged.

Comment: <u>Effects from Maintenance</u>. *The effects of the operation and maintenance of the Project are anticipated to be minor. Maintenance of the Project would occur primarily around the turbine pads, inside the nacelle (the nacelle is the part of the turbine that houses the generator, transmission gears, and the shaft that turns the generator that, on its opposite end,*

bolts to the hub that the blades attach to) and the blades. In addition, because the landscape will be maintained as young second-growth forest we do not expect disturbance to nesting owls from maintenance because owls are not likely to nest in these younger forest stands (non-habitat). Risk of Spotted Owl Collision with Wind Turbines. Bird mortality from collisions with wind turbines is well documented and varies greatly by bird species and flight behavior (Smallwood et al. 2009). Spotted owls are forest-dwelling birds that are strongly associated with older conifer forests. Spotted owls primarily use closed-canopy forested habitats throughout their entire lives for nesting, roosting, foraging, and dispersal (Forsman et al. 1984). Because spotted owls are non-migratory, forest-dwelling owls, they are at much lower risk of exposure to wind turbines than many other bird species, which typically use non-forested upland habitats for foraging and migration. Spotted owls less commonly use recent clear-cuts or burned areas for foraging, but spotted owls do occasionally cross such areas while dispersing between patches of older forest (Forsman et al. 1984; 2002). Although spotted owls do occasionally disperse across open areas, they usually avoid crossing such areas by traveling through corridors of forested habitat (Forsman et al. 1984). The typical flight behavior of the spotted owls is described in the Birds of North America: "Quick wingbeats interspersed with gliding flight. Not a fast flier. Long flights unusual except during dispersal…Flight labored when attempting to fly to a higher perch or up to nest sites. When gaining altitude in the forest canopy, makes a series of short climbing flights rather than continuous flight. Flights above the forest canopy probably rare except during dispersal. (Gutierrez et al 1995, p.9)." During natal dispersal, spotted owls will occasionally cross open areas and, as notes above, may occasionally fly above the level of the forest canopy. Considering spotted owl flight behavior above-canopy flights are most likely to occur in steep-walled valley settings, where the spotted owl may choose to fly across a valley above the level of the forest canopy on the valley floor. The Whistling Ridge site is located on a forested ridge top that will be maintained as a cleared area for the wind turbines. Spotted owls dispersing across the ridge are more likely to disperse through forested areas along the perimeter of the site, rather than crossing the open areas near the turbines. If a spotted owl were to fly through the turbine array, it would most likely cross at an altitude that is at or below the level of the adjacent forest canopy, and well below the height of the lower of the wind turbine blades (164-425 ft. above ground level). To assess the risk of owl collision with the turbine blades or towers, we convened a review panel of three spotted owl biologists from this office and one spotted owl biologist from the Washington Department of Fish and Wildlife. Based on our knowledge of spotted owl flight behaviors and habitat preferences, the group concluded that the risk of spotted owl collisions with turbines at this site is low. Considering the strong association of spotted owls with the forest canopy, and spotted owl flight behaviors, we conclude that it is unlikely that spotted owls would cross the Whistling Ridge site at an altitude that would put the owls at risk of collision with turbine blades. Therefore, the risk of a spotted owl collision at this site is considered to be discountable. Concurrence. Considering the current status of spotted owls in the Project area, and the anticipated Project effects, we concur that the Project is not likely to adversely affect the spotted owl. This concludes informal consultation pursuant to the regulations implementing the ESA (50 CFR 402.13). This action should be re-analyzed if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to an listed species or designated critical habitat that was not considered in this consultation; and/or, if a new species or critical habitat is designated that may be affected by this Project. [LTR 173, CMT 4]

Response: Comment acknowledged.

Comment: *While reading through the DEIS for this Project, we found some issues that require your attention. On [DEIS] Page 4-4, first paragraph, last sentence "As described in Section 3.4 Biological Resources, no listed species or critical habitat are anticipated to be affected by the Project." This statement equates to a finding of no effect. To the contrary, the biological assessment prepared by BPA made a finding of "may affect, not likely to adversely affect"; hence, the need for this informal consultation. [LTR 173, CMT 5]*

Response: The last sentence in Section 4.2 on page 4-4 of the DEIS has been deleted, and the following has been added: "BPA prepared a Biological Assessment (dated June 8, 2010) and submitted it to USFWS for informal consultation. In a letter to BPA dated July 19, 2010, USFWS concurred with BPA's conclusion that the Project may affect, but is not likely to adversely affect, the northern spotted owl, a threatened species."

Comment: *On [DEIS] page 4-5, 4.5 Migratory Bird Treaty Act, both the interpretation of this Act and the effects of the Project to avian species are in error. Both avian studies and the analysis in Section 3.4 Biological Resources state that many avian species occur within the Project and that some of those individuals will be killed (collisions with blades or tower) and contrary to the statements provided in the Biological effects Section. Within this context, how is it concluded at 4.5, that impacts to migratory birds could only occur through temporary disturbance during construction? [LTR 173, CMT 6]*

Response: The phrase "impacts to migratory birds could occur through temporary disturbance during construction" in Section 4.5 of the DEIS has been revised to read "impacts to migratory birds could occur through both temporary disturbance during construction and during operation of the Project."

Comment: *On [DEIS] page 4-5, 4.7 Bald Eagle Protection Act, the last statement "Because the Project would not involve intentional acts or acts in wanton disregard of bald or golden eagles, this Project is not considered to be subject to compliance with the Act," is an inaccurate statement. Federal Law Enforcement and the US Department of Justice decide whether or not an eagle killed by a project is subject to compliance under this Act. The Service appreciates your efforts to protect listed species and the habitats on which they depend while meeting your mission to provide the public with reliable electricity. [LTR 173, CMT 7]*

Response: Section 4.7 has been corrected so that the last sentence reads "The Project would not involve intentional acts or acts in wanton disregard of bald or golden eagles. Any accidental injuries or deaths would be subject to Federal law."

Comment: *[In reference to DEIS] p. 3-39, [t]he final sentence in this section states that "[t]he project site is not located within any known wildlife corridor, flyway, foraging area, or migratory route." This statement is problematic as the site lies within the landscape-scale Pacific Flyway, which is adjacent to the Columbia River gorge (which, in turn, is a significant migratory flyway, particularly for water birds), and all north-south cordilleras in the state support at least a weak raptor migration. Elsewhere in the document (e.g., p. 3-46), raptor activity at the site is ascribed to migratory behavior. Also, some of the bat behavior observed at the site is assumed to be foraging behavior, and birds and other wildlife are known to forage in the project area. Use of the term "known" is also problematic and suggests the need for additional study. For example, no data was collected to assess bird or bat migration activity at the site. [LTR 177, CMT 30]*

Response: Based on the avian point count data, bird use in the Project Area is considered too low to identify the site as a flyway or concentrated migration route. Birds are migrating through the Project Area, but not using it as a primary route. The avian point counts included all raptors observed, not only migrating raptors, so the level of migratory use would be lower than the total use estimated.

Comment: *[In reference to DEIS Section] 3.4.1.5 Special Status Wildlife Species General Comments, Strike Risk Modeling: The avian surveys for the project use a very crude index to rank relative strike risk among the various species of birds recorded at the site. One of the three variables in the strike risk model relies on where in the vertical air column (in or out of the rotor swept zone) birds were initially detected when they were first seen. [Footnote: Glancing at a bird and assigning it to "in" or "out" of the rotor swept area is an exceptionally poor predictor of mortality risk. For example, the avian survey report indicates that Homed Larks are often the most commonly found birds killed at wind tower sites. Homed Larks spend a significant amount of time on the ground. Accordingly, it is likely that an index of this species' strike risk formulated based on this project's model would forecast a low mortality risk and be a very poor predictor.] No observations of bird behavior were made over any extended period of time. The behavior was apparently not even recorded for all observations, as in some years the metric is absent. Furthermore, as highly mobile species, almost any bird will at some point cross the rotor-swept area. Some very sophisticated strike risk models have been developed around wind energy towers. The validity of at least some of these models is still in question. Nonetheless, they attempt to quantify the amount of time a species spends in the rotor strike zone, and assign risk based in part on the size, speed, and flight paths of birds crossing the rotor swept area. While implementation of such complex models may not be necessary (at this point) for this project, reliance on the simplistic model used for this project is misleading and the results should be removed from the DEIS, or at the very least the model's limitations (which are discussed in some detail in avian survey reports) should be fully disclosed in the body of the DEIS to ensure that the reader is not misled. The avian survey report (Appendix C-4) indicates that the index is formulated to help rank the relative risk each species might face in the presence of wind towers. At best, the index may give some insight among the species at this site, but comparison to other sites, particularly in different habitat types from the proposed project, is highly suspect and appears to be untested. Appendix C-4 also states "... no relationships have been observed between overall use by bird types other than raptors, and fatality rates of those bird types at*

wind-energy facility." Such a lack of predictive ability also speaks for a need for long-term follow up monitoring to assess the true impacts of the project on birds. General Comment [on] Species Abundance: Discussion regarding the abundance of species at the site lack context. For example, the DEIS reports that fifteen (15) swifts were seen in fall 2004, four (4) in summer 2006, and eleven (11) in summer 2009. The DEIS, however, fails to place these types of figures into a context. Do these observations constitute "a lot"? "Very few"? Compared to the next watershed west, or the core of the species range? In the case of the swifts, and indeed most species recorded in the project area, subjectively it seems that few of any given species are represented. However, in the case of migrating birds (such as the 15 swifts observed in fall 2004), this could represent a rate. In other words, there could be 15 swifts per day, or per hour trying to migrate across the project site. There is simply no contextual information to put these numbers into a wider perspective. Similar information subject to this same criticism is provided for other species of concern. [LTR 177, CMT 31]

Response: Avian use, rather than the exposure index, was used to predict the level of post-construction avian mortality. The mortality estimate was based on a regression of mortality at other wind developments in the region with the pre-construction use estimate. Bird behavior would not need to be known to apply the regression approach to mortality estimates. Qualifying information on the utility of the risk index is explained in the Avian Baseline Report included in Appendix C of the DEIS.

Comment: *Olive-sided flycatcher, [DEIS] p. 3-56: This section should be expanded to address the following issues. According to Breeding Bird Survey data, this species declined at the rate of 3.3 percent per year between 1966 and 2001. Loss of winter habitat is thought to be one causal mechanism. Another is that managed forests, which superficially replicate the fire-altered forests the birds depend on, may not offer all that the birds need to meet life history requirements. The last sentence in this paragraph states "none were recorded during the fall of 2004 or the winter of 2008-2009." The Olive-sided Flycatcher is a late spring arrival and departs in late summer. Recording the species at the site in fall or winter would be most unusual. [LTR 177, CMT 33]*

Response: The species, Olive-sided flycatcher, would not be expected during winter; however the EIS as written is correct in its report that none were recorded.

Comment: *Vaux's Swift, p. 3-57. See General Comment, Species Abundance above. [LTR 177, CMT 34]*

Response: The abundance of bird species was determined based on field studies, and standardized to bird use for comparison with 13 other wind developments in the region for comparative estimation of the level of mortality. Species-specific analysis was not conducted for non-special status birds that are not known to constitute the majority of passerine mortality at wind developments.

Comment: *[In reference to] Keen's Myotis and Townsend's Big-eared Bat, [DEIS] pp. 59-60: The bat survey, and consequently the distilled discussion in the DEIS, are lacking in detail. The Keen's Myotis discussion discloses "[b]at surveys conducted during 2007, 2008, and 2009 ... did not have the ability to detect individual species of bats." That species composition at the site could not be determined serves to emphasize that too little is known about the bat fauna. At a minimum, this lack of knowledge demands that there be post-construction studies to evaluate bat mortality and species composition of fatalities. Also, as (potentially) the first wind energy site to be built in a forest setting in the Pacific Northwest, this project should be used to study the impacts of such development on bats and birds. The U.S. Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee draft report of March, 2010 states, "[o]ur current state of knowledge about bat-wind turbine interactions... does not allow a quantitative link between pre-construction acoustic assessments of bat activity and operations fatalities." [Footnotes: Wind Turbine Guidelines Advisory Committee. 2010. Wind Turbine Guidelines Advisory Committee Recommendations. US Fish and Wildlife Service Wind Turbine Guidelines Advisory Committee. Draft report to the Secretary of the Interior. March 4.] The report goes on to say: There is growing interest in determining whether "low" position samples (~1.5-2 meters) can provide equal or greater correlation with bat fatalities than "high" position samples because this would substantially lower cost of this work. Developers could then install a greater number of detectors at lower cost resulting in improved estimates of bat activity and, potentially, improved qualitative estimates of risk to bats. Because the applicant sampled at a variety of sites and elevations within the project area, follow up monitoring could contribute to the body of knowledge regarding the ability of various approaches to pre-implementation sampling to predict post-project mortality. The Townsend's discussion states "[t]here are no known roosting structures or maternity colonies occurring iri the vicinity of the project area. Consequently, the likelihood of occurrence on the site is considered to be low." The absence of evidence should not be assumed to be evidence of absence, especially in light of the caveat disclosed about inability to distinguish species during the bat surveys. This species (and many other bats) will roost singly in tree cavities or behind loose bark, so it is impossible to completely dismiss their presence at the site. [LTR 177, CMT 35]*

Response: The bat surveys that were conducted used the best available standard methods for surveying bats, and which have the limitation identified in the comment. Following construction, bat and bird mortality will be surveyed at a minimum for two years. Neither Keen's myotis nor Townsend's big-eared bats have been documented as fatalities at wind developments in the U.S.

Comment: *[In reference to DEIS Section] 3.4.1.6 Other Wildlife Species, Birds, p.3-63: The DEIS states that "[m]ean overall bird use in the study area was low compared to these other wind resource areas studied; ranking 19th compared to 24 other wind resource areas..." This section should explain that comparisons to other wind resource areas in Washington and Oregon may be of little value as these other areas occupy different habitat types-primarily shrub-steppe and agricultural lands. Comparisons to sites located in Eastern deciduous forests are also questionable because of the different suite of bird species, different structural components to the surrounding forests, and dissimilar migration behavior. [LTR 177, CMT 36]*

Response: Although the use estimates were from wind developments in different habitat types, the presence of a correlation between avian use and mortality indicates that avian use is an accurate predictor of whether a site is located in a relatively high or low bird use area independent of habitat. The site data was not compared with sites in eastern deciduous forests.

Comment: *[In reference to] Fall Migration Surveys (2004), [DEIS] p.3-64: Eight species of raptors were observed during the survey. Those with the highest use of the site were sharp-shinned hawk, Cooper's hawk, and red-tail hawk. The highest raptor use observed at the site during 2004 surveys occurred between September 11 and October 12, 2004. This observation is consistent with annual observations made at the Chelan Ridge Raptor Observation Project site in northern Washington, also on the east side of the Cascades. Raptors throughout the West migrate along ridge lines. Some ranges are located at geographic restrictions or at the confluence of ranges that funnel concentrations of raptors. Data do not indicate this is such a site, but do support the idea of a weak raptor migration through the area. Based on the number of raptors encountered during fall surveys, a rough estimate of the number of birds migrating through the site each fall should be made and included as part of the FEIS. [LTR 177, CMT 37]*

Response: Based on the avian point count data, bird use in the Project Area is considered too low to identify the site as a flyway or concentrated migration route. Birds are migrating through the Project Area, but not using it as a primary route. The TAC will determine the scope of post-construction monitoring surveys, and the suggestion to include fall migration estimates for raptors will be considered.

Comment: *[In reference to DEIS Section] 3.4.2.1 Proposed Action Western Gray Squirrel, p. 3-75: This section suggests that the lack of oak trees in the project area indicates that the area has poor habitat quality for this species. In the northern part of the species' range, however, oaks are completely lacking. Accordingly, the absence of oak trees should not be used to conclude that the squirrels are absent from a site. [LTR 177, CMT 38]*

Response: Western gray squirrel surveys were conducted according to protocol and in consultation with WDFW, and no squirrels were detected.

Comment: *[In reference to] Special Status Wildlife Species, [DEIS] p.3-77: This section introduces the collision risk model (or "bird exposure index" as it is called in the avian reports) from the avian survey reports. As discussed above, this model is highly suspect. The avian survey reports present numerous caveats when using this model or index: "This index is only based on initial flight height observations and relative abundance (defined as the use estimate) and does not account for other possible collision risk factors such as foraging or courtship behavior." Reliance upon the Index is subject to criticism on several grounds. Intuitively, the model makes little sense. The model also fails to account for the disproportionate impact of mortality on rare populations. The model also fails to account for many of the other variables*

that influence strike risk. These include size of the bird, speed of flight, and direction of flight, or weather conditions which could obscure blades or towers. Ultimately, there is no indication that this model has any predictive value. Neither the DEIS nor the avian surveys indicate that this model has ever been tested in the field or been utilized prior to the construction of a wind energy facility, followed by post-construction surveys to verify its usefulness. Given these limitations, any use of numbers from the index should be reported judiciously, sparingly, and with all the caveats identified in Appendix C and the DEIS, otherwise unqualified validity and strength are implied for these indices. [In reference to] Other Wildlife Species, Birds, [DEIS] p. 3-79. The final paragraph in the bird impacts lists a host of caveats, which are cause for concern. Although there is no geographic feature suggesting this site constitutes a migratory bottleneck or should host a concentration of migrants, no effort was made to assess passerine migration, particularly at night (when most of these species migrate). In the absence of such an effort and in light of the long list of caveats associated with the collision index, post-construction monitoring and appropriate mitigation (should significant mortality occur) is warranted. Long term impacts should be assessed over a 5 - 10 year period because of our lack of experience with siting wind projects in Western forested ecosystems, and because of the inter-annual variability in migrating bird numbers. [LTR 177, CMT 39]

Response: While the exposure index was calculated for each bird species observed during point count surveys as one measure of the relative risk a species might have to collision, avian use estimates were used to compare with wind developments where mortality data is available so the proposed Project could be evaluated for the relative level of mortality that would be anticipated. No nocturnal surveys were conducted to estimate migratory bird passage, but the regression between avian use and mortality includes nocturnal mortality in addition to daytime mortality.

Comment: *[In reference to] Other Wildlife Species, Bats, [DEIS] p. 3-79: Bats are difficult to study. Nonetheless, the fact that of all the bats detected and all the species that could be present at the site, only the hoary bat was identified to species, leaves much information for the site lacking. The DEIS concludes (based on Appendix C reports) that relatively little bat activity was recorded at elevated heights, and two seasons of monitoring did not detect significant migrations. While these are good signs, the DEIS concludes "variable levels of recorded use by bats across years, habitats and recording height above ground indicate that the extent of impacts is difficult to predict at this time." This conclusion demands years of follow-up monitoring to assess actual impacts. As one of the first sites placed in a forested setting, such monitoring is particularly critical to understanding the environmental impacts of wind energy sites in forests. [LTR 177, CMT 40]*

Response: The bat surveys that were conducted used the best available standard methods for surveying bats, and which have the limitation identified in the comment. Following construction, bat mortality will be surveyed at a minimum for two years.

Comment: *[In reference to Section] 3.4.3 Mitigation Measures Post-Construction Avian [and Bat] Mortality Study: Given the large number of unknowns discussed above regarding both bats and birds, the avian mortality monitoring mitigation measure should be expanded to include bats and its duration should be expanded from 2 years to a 5-10 year horizon. [LTR 177, CMT 41]*

Response: The bird and bat surveys that were conducted used the best available standard methods for surveying. Following construction, bird and bat mortality will be surveyed at a minimum for two years, and potentially longer if the TAC determines that if the level of mortality or that if the species composition of fatalities merit further studies.

Comment: *[With respect to] [r]esearch-oriented [s]tudies: As one of the first wind power projects proposed for construction within a forested habitat in the Pacific Northwest, this project offers a unique opportunity to conduct research-oriented studies regarding the wind energy/wildlife interactions like the research studies identified in the WDFW Wind Power Guidelines (2009) and the USFWS Wind Turbine Guidelines (2010). [LTR 177, CMT 42]*

Response: The pre-construction surveys provide baseline pre-construction survey data to which additional study results can be compared, depending on the study designs that are selected by the TAC and carried out by the applicant.

Comment: *[With respect to] [d]iscussion of [the] West Cumulative Impact Study, pp. 3-275-76: The cumulative impact study prepared by West, Inc. for the Klickitat County Planning Department has contextual issues that need to be addressed. As the DEIS points out, habitat assessed by West for Klickitat County is significantly different from that at the project site. The DEIS states that "none of the estimated fatalities were anticipated to cause a significant loss in population, and no cumulative impacts were anticipated." Since the completion of the West report, however, the number of occupied Ferruginous Hawk nests in Washington has dropped precipitously. [LTR 177, CMT 67]*

Response: The proposed Project Area is not located in or adjacent to ferruginous hawk nesting and/or foraging habitat.

Comment: *The cumulative impacts discussion in the DEIS concludes with the following sentence: For example, one study from 2009 estimated that, based on performance in the United States and Europe, wind farms and nuclear power stations are responsible each for between 0.3 and 0.4 bird fatalities per gigawatt-hour (GWh) of electricity while fossil-fueled power stations are responsible for about 5.2 fatalities per GWh (Sovacool 2009). The Sovacool (2009) paper appears to be fundamentally flawed in its assumptions. Willis et al. (2010) published a rebuttal to this paper that would suggest that its premises are unsound. This line of reasoning should either be removed from the FEIS, or better supporting literature provided to support the point.*

Thank you for this opportunity to submit comments on the Whistling Ridge DEIS. [LTR 177, CMT 70]

Response: Sovacool published a response to the Willis (2010) rebuttal [Energy Policy 38: 2070-2073] which disputes several key statements made by Willis. This dialogue shows that the methods for evaluating impacts to birds and bats as a result of wind turbines are evolving at the present time. However, the Applicant used the best available science at the time of the publication of the DEIS to reach the stated conclusions.

Comment: *I am commenting on the methods, results and conclusions resulting within the Acoustic Bat Surveys and the text of the Whistling Ridge DEIS. METHODS Whistling Ridge Energy (WRE) hired the consultant WEST, Inc to perform bat surveys in 2007, 2008, and 2009. The bat survey consisted only of Anabat recordings at selected locations. This method has the ability to detect and record the ultrasonic calls allowing bat species to be identified and enumerated within the spatial range of the Anabat equipment. Use of the Anabat recorder however has limitations. Anabat recorders are used to determine activity. What specific activity is occurring, such as migration or feeding cannot be determined from the calls themselves. The limitations of the survey methods must be addressed and conclusions need to remain within the methodology limitations and not go beyond. WRE makes assertions that do not have any empirical basis in an attempt to lead reviewers to believe it has fulfilled the requirements of the DEIS. To begin with, WEST, Inc. did not consistently achieve their own stated goals: "(1) characterize the local bat populations in a variety of habitats, (2) identify areas of high usage by bats, and (3) characterize the frequency of bat usage areas representative of where turbine strings would be located" if they were achieved at all. [With respect to WEST's stated goals:], (1) Local bat populations were not characterized in a variety of habitats. Implied in characterizing the bat populations is the identification of species and providing their composition of the calls in each habitat. Only one bat, the hoary bat, was identified. This bat in general only made up approximately 5-6% of the calls. Out of the 15 species of bats that may be present in the WRE area, six have status, and two are candidates for listing. Over 90% of the bat calls remains unidentified. WEST, Inc. states that they did not have the ability to detect individual species of bats. Perhaps WEST, Inc. does not have the ability to do so in house, but they could have sent out the recordings for analysis by a qualified expert. WEST, Inc. provided text in a report for another wind development company Acciona demonstrating they have sent tapes out for expert analysis (Exhibit 1). [LTR 178, CMT 3]*

Response: The acoustic bat studies were conducted using standard methods for pre-construction surveys, and have the limitation that individual species (except for the hoary bat) were not identified. The activity levels were compared to other wind developments to categorically identify the risk level to bats based on the results of mortality monitoring. Post-construction mortality monitoring will provide the species and numbers of bats that may be fatalities at the proposed Project. Four habitat types were studied during pre-construction bat surveys (Table 3.4-7), and results provided the number of bat passes in each habitat type so high-usage areas could be identified. The frequency of bat passes was analyzed in areas where turbine strings would be located (Section 3.4.1.6, DEIS page 3-65). The two candidate species, Townsend's big-eared bat and Keen's myotis, have never been fatalities at a wind development

and have a low likelihood of occurrence in the Project Area. Bat species were grouped into frequency groups that are related to risk of turbine collisions. For example, Myotis bats, most of which have high frequencies, are rarely killed at wind energy facilities whereas hoary and silver-haired bats echolocate at low frequencies and are the two most common species killed in the Pacific Northwest. Categorizing calls according to frequency groups allows a risk assessment without having to identify each call to species.

Comment: *[With respect to WEST's stated goals:], (2) During 2008, four locations closely representing the diversity of habitats and the turbine corridors in the WRE project area were monitored with the Anabat II recorders. These general habitat types included a wetland between two strings, a road corridor, and two clear cut locations. [With respect to WEST's stated goals:], (3) The 2007 survey did not state habitat type monitored and 2009 did not monitor a similar variety of habitats in the WRE area as in 2008. In 2009, WEST, Inc. only monitored areas similar to the one identified in 2008 as having the lowest activity. WEST, Inc. did not indicate whether they surveyed locations that would represent tree stands of 10, 20, and 30 years of growth. These tree ages would be present as the project area becomes reforested. WEST, Inc. surveyed highly disturbed locations only, worst case scenario from a species use standpoint. The results in 2009 therefore only represents the lowest probably use by surveying what appears to be the least desirable bat habitats, and in conditions only present for the first few years following completion of construction. Yet, only the 2009 activity data was used as the basis of comparison to other wind facilities with bat mortality data. Bat activity numbers should be normalized by a fixed time period, like day, week, or month. In the case of WRE, they normalized by study period, when each year's study duration was different, as well as start and stop dates. The longer study period, lasting past normal activity periods for bats will indicate lower average values for the whole year's study. The bat survey did not cover any of the bat activity during spring. The longest survey period covered June thru October. Bats have been seen adjacent to the WRE area as early as March. Wind in the PNW is most frequent during the winter and spring as frontal systems move in from the Pacific Ocean. Bats, with high springtime metabolic requirement would be vulnerable as they forage to recover lost fat from hibernation or migrate through the WRE site. [LTR 178, CMT 4]*

Response: The habitat types monitored in 2007 are provided in Table 3.4-7. Two habitat types, clear cut and young forest, were monitored in 2009 because these habitats were representative of areas where the turbines are proposed and include habitats expected to be present over the 30-year lifespan of the Project. The 2009 data were compared with other sites because they best represent likely bat presence where turbines will be constructed. Bat passes per detector night was calculated to provide comparisons among years and habitats. The timing of the bat study coincides with the period when the majority of bat fatalities occur.

Comment: *The WRE surveys discarded single calls. These single calls could belong to species that range on the quiet or non vocal side of the bat world. A table needs to be created showing which NW bats vocalize with two or more calls and which ones often use single calls. Very significantly, the WRE bat survey failed to assess the prevalence of migrating bats through*

the project area. The DEIS makes statements that appear intended to demonstrate WRE does not believe they pose a significant risk to migrating bats, but these statements are not supported by any study or facts. Anabat recordings do not differentiate between bats feeding, migrating, or engaged in other activities. Simply noting what time of year activity was higher or lower does not even suggest migration. Migration can only be elucidated from carefully designed and executed surveys. Kunz et al. (2007) outlines some of the different technology and methods available for assessing nocturnal bats. Equipment such as tracking radar and thermal infrared imaging cameras can be used in conjunction with ultrasound microphones for bats and audio microphones for birds to obtain a greater picture of bat and bird migration and behavior in and through the WRE area. Because, bird migration was also not assessed, a bird and a bat could be hit with the nearly same proverbial stone should a migration survey be required. Bat experts with specialized knowledge were not consulted for information on location of hibernacula and maternity colonies, the only person consulted was a generalist WDFW habitat biologist, Bill Weiler ([DEIS] pg 3-80). These deficiencies in the methods makes it difficult to truly assess what bat species may be at greatest risk both from a numbers issue a population perspective. [LTR 178, CMT 5]

Response: Recorded bat call length is both a function of species and the quality of the recording, which is less clear with increasing distance from the microphone. Because there is significant overlap in call characteristics for some species, species identification was not made in order to avoid the potential for error. An in-depth migratory bat study was not considered necessary to characterize bat use in the proposed Project Area, because elevated detectors picked up some of the low-flying migratory bats that would have been at risk of collision with wind turbines. The primary means for determining the risk to bats posed by the proposed wind development is comparison with wind developments where pre- and post-construction monitoring has been conducted (Section 3.4.2.1, DEIS page 3-80). Readily available data sources, as from USFWS and WDFW, were researched to determine whether any bat hibernacula or maternity colonies were known to occur near the Project Area. Additionally, biologists familiar with the area were consulted. The most relevant data on bat use of the Project Area are data collected at the site. Three years of on-site bat data were collected at Whistling Ridge, making it one of the most studied project areas in the country related to bat use.

Comment: *The acoustic bat surveys during 2008 better covered the diverse habitats currently available on or near the WRE site than either 2007 or 2009. The WRE project site contains wetlands, streams, ridges, low lying areas, clear cuts, varying ages of forest, and forest fringe areas. Not all these areas were monitored, but in 2008 several of them were. In 2008, three upland sampling locations, two clear cuts and a road corridor (July 3 to Oct 7) were monitored over 97 nights recording 39,326 bat passes and one additional sampling station next to a wetland (located between two rows of turbine strings) was monitored over 97 nights and recorded a whopping 17,269 bat passes (mean of 178.0 bat passes per detector night). The three upland locations had means of 14.3, 73.8, and 397.3 bat passes per detector night. These results appear to be some of the highest bat pass detections reported (and in three locations, the highest detections) of any wind turbine site in the U.S. Compare to the numbers in the Activity column in Table 4 in appendix C-10, page 18. The highest activity on the table is 38.3 bat detections/detector night. WRE suggests that bat use of the site is not high and states that the*

"extent of impacts is difficult to predict at this time ([DEIS] pg. 3-81)." The absolute extent cannot be precisely predicted, but a general ballpark statement can be made upon closer examination of the numbers. WRE agrees "a) bat mortality shows a rough correlation with bat activity as measured by Anabat units (Table 4.)." The WRE Anabat monitors more than suggest high bat activity, it has been clearly demonstrated. It is reasonable to expect that bat mortality could be very high at the WRE location if turbines are installed. It is common knowledge that bats have been killed in far greater numbers than birds, particularly along the mountain ridges of the Eastern US. No information exists in the Pacific Northwest on bat mortality associated on the forested ridges of the Pacific Northwest, simply because no industrial wind projects have been built in this location to date. Whether resident or local populations are more at risk is completely unknown. In absence of information, a conservative approach would be best, especially in light of six status species of which two are candidates for listing, possibly inhabiting or migrating through the WRE area. [LTR 178, CMT 6]

Response: As stated in the DEIS (page 3-67 and page 3-80), the timing of the high levels of bat activity as well as the locations away from proposed turbine locations suggests that the bat mortality may not be high, as observed at other locations in the U.S. (page 3-80 of the DEIS). The 2009 data are from the area around the turbines, and provide the most accurate indicator of background bat use; the previous studies included habitats not located near the proposed turbine strings.

Comment: *Bats do not have to be struck by wind turbines, but simply being in the proximity to a rotating blade may cause fatalities from barotrama (Baerwald et. al 2008). Whether bats are killed as a result of a random event or by some selective mechanism is not fully known. However, it appears that bats may be attracted to wind turbines (Horn et al. 2008). Bats are long-lived and have low reproductive rates, making populations susceptible to localized extinction (Barclay and Harder 2003). Bat populations may not be able to withstand the existing rate of wind turbine fatalities (Kunz et al. 2007; Arnett et al. 2008). As the number of wind turbine facilities increase across the continent, even greater numbers of fatalities will occur. One serious bat problem looming on the horizon is the possibility that White Nose Syndrome may infect western bats. The cumulative effect of wind turbines and this devastating infection on bats has not been addressed in cumulative impacts. This information needs to be added, especially in light of the high bat activity at the WRE location. Society needs to take great care protecting these small flying mammals, Journal of Wildlife Management 71:2449–2486. Please also reference the charted comments on the pages below. Bats are significant consumers of human and agricultural pests. Without them life could be different. CITATIONS: ARNETT, E. B., ET AL. 2008. Patterns of bat fatalities at wind energy facilities in North America. Journal of Wildlife Management 71:61–78. BAERWALD, E. F., G. H. D'AMOURS, B. J. KLUG, AND R. M. R. BARCLAY. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18:R695– 696. Barclay, R.M.R., Harder, L.D., 2003. Life histories of bats: life in the slow lane. In: Kunz, T.H., Fenton, M.B. (Eds.), Bat Ecology. University of Chicago Press, Chicago, pp. 209–253. HORN, J. W., E. B. ARNETT, AND T. H. KUNZ. 2008. Behavioral responses of bats to working wind turbines, Journal of Wildlife Management 72:123–132 KUNZ, T. H., ET AL. 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. [LTR 178, CMT 7]*

Response: Section 3.14.3.5 includes a revised cumulative impacts analysis that considers the amount of wind energy development in coniferous forests of western Washington. The revised analysis indicates little potential for cumulative impacts to bats based on the small amount of development anticipated. Bat mortality at the site will be monitored and, if warranted, effective mitigation techniques (such as turbine curtailment during low wind speed nights, which has been shown to greatly reduce bat fatality levels) will be implemented.

Comment: *[In reference to DEIS Section] 3.4.1.6 Bat acoustic studies conducted from 2007 through 2009 were implemented at various locations on the project site. The goal of the studies were to: (1) characterize the local bat populations in a variety of habitats, (2) identify areas of high usage by bats, and (3) characterize the frequency of bat usage areas representative of where turbine strings would be located. Studies were done across several seasons to estimate annual variation during breeding and periods of migration. Goal (1) was not met. One cannot characterize the local bat populations (note plural) if one does not know what different populations of bats exist at the site. The Anabat recordings were only used to differentiate between high and low frequency calls, and only the call of the hoary bat (approximately 6% of the calls) was identified to species. Goal (3) only addressed one of a number of "representative" habitats, and this one habitat selected had the lowest activity of all monitored habitats. Only goal (2) was accomp[l]ished. Periods of migration were not identified by the study, only an assumption that migrating bats would migrate during the same period as bats on the East Coast of the US. Because migration by bats from or through the area were not studied, WRE cannot make any conclusions about migration. Not all bats migrate, some are residents, so unless one knows what migratory species are in or moving through the area nothing other that counts of presence can be made. Remedy - Identify all common and unique bat calls by Genus and Genus species and report along with location, date, time, wind speeds, and other meteorological information. Provide all information in a supplemental DEIS. Characterize the local bat populations in a variety of habitats. Design study to specifically address MIGRATION according to established best practices. [LTR 178, CMT 9]*

Response: The acoustic bat studies were conducted using standard methods for pre-construction surveys, and have the limitation that individual species (except for the hoary bat) were not identified. The activity levels were compared to other wind developments to categorically identify the risk level to bats based on the results of mortality monitoring. Four habitat types were studied during pre-construction bat surveys (Table 3.4-7), and results provided the number of bat passes in each habitat type so high-usage areas could be identified. The 2009 data were selected for comparison because the habitats were representative of the proposed location of turbine strings. Migratory period ending was determined by the attenuation of bat calls. The second paragraph under "Bats" (on DEIS page 3-65) has been revised in the second sentence for the first goal. "Populations" has been changed to "population" because all bats in the area are members of one population. An in-depth migratory bat study was not considered necessary to characterize bat use in the proposed Project Area, because elevated detectors picked up some of the low-flying migratory bats that would have been at risk of collision with wind turbines. The primary means for determining the risk to bats posed by the proposed wind development is comparison with wind developments where pre- and post-construction monitoring has been conducted (page 3-80 of the DEIS).

Comment: *[In reference to DEIS] Section 3.4.1.6, [f]or all studies, passive Anabat II echolocation detectors coupled with Zero Crossing Analysis Interface Modules (ZCAIM; Titly Electronics Pty Ltd., NSW, Australia) were used in all survey years. Bat species are generally grouped into those that emit low frequency (<35 kHz) or high frequency (≥35 kHz) calls. Bats need to be identified to species, particularly in light of a number of species with an elevated status. The Applicant's consultant, WEST INC, has demonstrated capability to provide this service and needs to perform this analysis. Bats should be grouped by Genus, and Genus Species in addition to low and high frequency calls. [LTR 178, CMT 10]*

Response: The acoustic bat studies were conducted using standard methods for pre-construction surveys, and have the limitation that individual species (except for the hoary bat) were not identified. The activity levels were compared to other wind developments to categorically identify the risk level to bats based on the results of mortality monitoring. Post-construction mortality monitoring will provide the species and numbers of bats that may be fatalities at the proposed Project.

Comment: *[In reference to DEIS] Section 3.4.1.6, [i]n 2009, the bat survey efforts were further refined to focus specifically on the types of locations where turbines would be sited. This statement is patently false and misleading. The study design in 2008 represented the turbine locations by including areas near water sources. There are two water sources bats can use. One is the wetland just outside of 150 feet from some of southern the C string of turbines. The second, although mentioned a number of times during scoping, is from a creek below the southern A-array. This creek flows into an old reservoir located on the east side under the southern A string. It too provides a water source for bats. The 2009 survey selected locations far from water sources and as far from any size of trees that could be attained and is not representative of the diverse environment typical of a mountainous coniferous environment. No comparison to environmental conditions during the time Anabat equipment was operating, No mention of how bat use will increase in clearcuts as trees regrow. Bats data cannot be compared to other PNW use and mortality surveys. A those surveys occurred in the open, dry, unforested farmlands and grasslands and not in the damp coniferous forests and ridgelines of the Cascade Mountains. Patterns in use and activity are highly likely given differences in species and therefore behavior patterns of each individual species. Timing of reproduction and migration or hibernation is very likely to be different in the hot and dry environments than in the forests of the Cascade Mountains for those species that inhabit both areas. Remedy - An expanded, in-depth independent study needs to be performed over multiple years prior to any conclusions about seasonal and temporal use patterns and predicted mortality. [LTR 178, CMT 11]*

Response: The acoustic bat studies were conducted using standard methods for pre-construction surveys, and have the limitation that individual species (except for the hoary bat) were not identified. The habitats studied in 2008 more broadly characterize the site, but in 2009 the habitats were selected for comparison because they are in the immediate area of the proposed turbine strings, where bat mortality could occur. Water sources are away from the proposed turbine strings and could be used by bats flying in the area of the proposed strings, but data from

near the water sources would not accurately represent the bat population at risk which is in the area of the proposed turbine strings.

Comment: *[In reference to DEIS] Section 3.4.1.6, [T]able 3.4-6, [n]eed to identify also what species are high and low frequency. A count shows that two high frequency and four low frequency bats have status. Of the low frequency bats one has been identified but only makes up 5.9% of the total calls. This means that over 94% of the bat calls are unidentified. Of particular interest, in the low frequency group, one species had been identified as being in the area, leaving six not identified. Out of those six, four have status. In the high frequency group, two of the 8 have status. Overall, there is a very good chance that a number, if not all of these status species use this area, given the number of unidentified calls. Remedy - Have expert biologists identify calls and present results along with detailed life history and overall abundance. [LTR 178, CMT 12]*

Response: Table 3.4-6 has been revised to include the high- and low-frequency status of each species. The acoustic bat studies were conducted using standard methods for pre-construction surveys, and have the limitation that individual species (except for the hoary bat) were not identified. The activity levels were compared to other wind developments to categorically identify the risk level to bats based on the results of mortality monitoring. Post-construction mortality monitoring will provide the species and numbers of bats that may be fatalities at the proposed Project, and if mortality of special status species or a large number of bats occurs, the TAC and USFWS will determine mitigation measures.

Comment: *[In reference to DEIS] Section 3.4.1.7, [i]t is likely that some bat mortality would occur during operation; however, mortality estimates are difficult due to our lack of understanding of why bats collide with wind turbines…. It is common knowledge that it is not necessary to know why things happen to be able to assign a number to how often it may happen. It may be necessary to know why things happen to develop an effective solution. For example: Survival studies (mortality) in salmon are able to calculate the estimated number in a species population surviving through each dam, and the number surviving to the ocean based on the survival passage at each dam. Those numbers can be used to develop models of survival based on flow, temperature, size of fish, species, and timing of migration. It is not necessary to determine what exact or behavioral factor is involved. Same with bats. Scientists may not know what behavior exposes bats to be killed by wind turbines, but it IS known that bats are killed based on exposure (activity) to turbines. Significantly more than some are likely to be killed, especially if WRE is along a migration pathway. Population effect could result for a number of the bat species and particularly for Townsend's big eared bat. [LTR 178, CMT 13]*

Response: Post-construction mortality monitoring will provide the species and numbers of bats that may be fatalities at the proposed Project, and if mortality of special status species or a large number of bats occurs, the TAC and USFWS will determine mitigation measures. The Townsend's big-eared bat has never been a fatality at a wind development and has a low likelihood of occurrence in the Project Area.

Comment: *[In reference to DEIS] Section 3.4.1.7, [t]he timing of peak bat activity on the proposed project site (portions of July and August) does not coincide with when the highest levels of bat mortality have been documented at other wind projects in the US. Fatality studies have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (citations)..... Rest of paragraph. This section tries to suggest that because more bat calls were recorded in the summer months that mortality in migrating bats will be low. This does not correlate with other projects in the PNW. These other projects are in the eastern part of the state not having all the same species, a warmer drier environment with moderate fall weather where bat activity will remain higher longer into the fall. Second, bat mortality IS correlated with bat call recordings that indicate activity. Bat activity occurs until late September and early November with a peak in September. Because bat migration was not studied, no conclusions about bat migration can be made. [LTR 178, CMT 14]*

Response: Bat mortality at wind developments is categorically correlated with pre-construction bat pass density, and because the fall monitoring (period of highest mortality of bats) was low relative to other wind developments, it is possible that the proposed wind development also will have low mortality during this period. During summer, higher bat pass density was documented, but as noted in the DEIS (page 3-80), many sites have higher summer bat populations but low summer bat mortality. The elevated Anabat units deployed in 2009 would have picked up migratory bats, and although an in-depth migratory study was not conducted, these elevated units recorded low call density so migration is likely light in the area of the proposed Project.

Comment: *[In reference to DEIS] Section 3.4.1.7, [a]fter August 31, activity for all bats was very low relative to earlier dates, indicating that most bats had left the area for winter hibernacula or warmer climates. This statement is not supported by an analysis of the numbers. Because species of bat calls are not identified and each species of bat has behavioral/physiological differences with response to oncoming winter, it cannot even be suggested that the bats left the area for hibernacula or warmer climates. For example: The Townsend's big eared bat's annual cycle includes an approximate 7 to 8 month period of peak activity in spring and summer when insects are most available and reproduction occurs. The life history and behavior of each bat species that may use the area needs to be incorporated into the timing of bat survey results and discussion. And the results need to include the identification of bat calls by the bat experts that specialize in studying each species of bats, especially the uncommon ones. Reference - http://www.yoloconservationplan.org/yolo_pdfs/speciesaccounts/mammals/townsends-big-earedbat.pdf. Remedy - Identify bat call to species. Conduct a full bat migration study. Use accepted statistical analysis to compare bat abundance and movement in and through the WRE project area. [LTR 178, CMT 15]*

Response: While individual bat species have unique behavioral characteristics, the majority of the migratory period for all bat species in the Project Area occurs within the period of study during each of the three years of monitoring. Discussion of the life history and identification of each species is beyond the scope of work needed to adequately analyze the effect of the proposed Project on bats. The acoustic bat studies were conducted using standard methods for pre-

construction surveys and statistical analysis, and have the limitation that individual species (except for the hoary bat) were not identified. The activity levels were compared to other wind developments to categorically identify the risk level to bats based on the results of mortality monitoring. An in-depth migratory bat study was not considered necessary to characterize bat use in the proposed Project Area, because elevated detectors picked up some of the low-flying migratory bats that would have been at risk of collision with wind turbines. The primary means for determining the risk to bats posed by the proposed wind development is a comparison with wind developments where pre- and post-construction monitoring has been conducted (page 3-80 of the DEIS).

Comment: *[In reference to DEIS] Section 3.4.1.7, [t]he project site does not contain topographic features, such as canyons, that may funnel migrating bats toward corridors where turbines would be placed. Unfounded statements. There is no Pacific NW study on topographic effects on migrating bats to substantiate this. If so, cite the supporting document and do so for bat species that may migrate from or through the Pacific NW. [LTR 178, CMT 16*]

Response: There are no studies that show the effect of topographic features on bat migration. The sentence in the last paragraph on page 3-80 of the DEIS that states "The Project Area does not contain topographic features, such as canyons, that may funnel migrating bats toward corridors where turbines would be placed," has been deleted and replaced with "No significant peaks in bat activity, suggesting high migration activity, were noted during the August-September time frame that bats migrate."

Comment: *[In reference to DEIS] Section 3.4.1.7, [n]o turbines would be constructed near wetlands or ponds, and cleared areas surrounding turbine strings would closely mimic clearcuts or young reforested areas, where to date, recorded bat activity levels on the project site were the lowest. Absolutely incorrect assertion. Cedar swamp, a wetland discussed in the DEIS, is only a little over 150 feet from the C string of turbines to the east and a little further to the E string. The SB2 Anabat placed near the wetland recorded 178.0 bat passes per detector-night. The A string sits above an old reservoir that holds water the entire year. The Anabat placed in the A string corridor recorded 73.8 bats per detector-night even though it was sitting out in the middle of a clearcut as were the detectors in 2009. By no stretch of the imagination is this a low number, only relatively lower than the extremely high numbers at two other locations in 2008. The numbers are so high; the developer did not want to compare them in the Table 4, page 18 [A]ppendix C-10. If 2008 numbers had been placed in the table, it would have reset the bar for all time high numbers of bats recorded per detector-night at wind turbine facilities. Remedy - Repair the deficiencies in the map and show the OLD RESERVOIR at the base of the southern A Array. Provide actual measures in FEET or METERS for each turbine within 2000 ft of a body of water. [LTR 178, CMT 17]*

Response: The distance from the Cedar Swamp wetland is shown on Figure 3.4-2 of the DEIS, and is approximately 660 feet from the centerline of the C turbine string based on the scale shown on the bottom of the figure. Using the same scale, the wetland is approximately

1320 feet from the centerline of the E string. There is no information as to the existence of a surface reservoir under the location for the A string. The habitats studied in 2008 more broadly characterize the site, but in 2009 the habitats were selected for comparison because they are in the immediate area of the proposed turbine strings, where bat mortality could occur.

Comment: *[In reference to DEIS] Section 3.4.1.5, [b]at surveys conducted during ..... did not have the ability to detect individual species of bats. Based on the lack of detailed information of this species life history and habitat requirements and nature of the bat surveys conducted it is difficult to conclude with certainty with the likelihood of Keen's bats occurring on the project site. However, Due to the lack of old growth or mature forest types within the project area and the predominant commercial forestry use of the property, the likelihood of occurrence on the site is considered to be low. Anabat II technology exists to identify, by call, individual bat species. This technology has existed for over 10 years. West has authored a paper where the Anabat technology was used to identify to species the majority of calls. Papers, abstracts, and excerpts are attached. The tapes need to be further analyzed by a highly qualified INDEPENDENT expert to identify bat calls with special emphasis to identify rare species. If WEST failed to set up the Anabat II correctly so that calls can be identified, then additional bat data collection needs to occur. Additionally, cumulative impacts should assess the possible future infection of bats by white nose syndrome. Increased mortality of ANY type, may directly affect these species future. [LTR 178, CMT 18]*

Response: The likelihood of Keen's bat presence was estimated to be low based on lack of preferred habitat and the presence of the proposed wind development along the edge of the predicted range for the species. While the call identification could have been completed, it was considered unnecessary for determination of risk to bats from the proposed Project. The activity levels were compared to other wind developments to categorically identify the risk level to bats based on the results of mortality monitoring at these other sites. At this time, scientific studies do not suggest that white nose syndrome is reasonably foreseeable in the Project Area.

Comment: *[In reference to] Section 3.4.2, Keen's Myotis and Townsend's Big Eared Bat. Surveys for bats were not able to identify all bats to species level. Bats currently identified by the surveys, to Genus and Genus species, must be listed in a table form at the minimum. It is uncontainable to withhold such information, especially in light of this statement verifying the existence of bat species data. Remedy - Provide supplemental DEIS identifying how many Keen's Myotis and Townsend's Big Eared bat calls were detected by the Anabat II and locations, time of year, wind speeds, and other meteorological information. [LTR 179, CMT 19]*

Response: The acoustic bat studies were conducted using standard methods for pre-construction surveys and statistical analysis, and have the limitation that individual species (except for the hoary bat) were not identified. The activity levels were compared to other wind developments to categorically identify the risk level to bats based on the results of mortality monitoring. The two candidate species, Townsend's big-eared bat and Keen's myotis, have

never been fatalities at a wind development and have a low likelihood of occurrence in the Project Area.

Comment: *[In reference to DEIS] Section 3.4.1.6, [t]wo additional special status species, Keen's bat (Myotis keener) and Townsend's big-eared bat (Corynorhinus townsendii), may occur but have not been identified in prior surveys. The reason for doing the WRE survey is to perform a survey and determine what species are identified to use the area. Remedy - State whether either of these two species have been identified in the current DEIS study. This can only be achieved by reporting species calls identified on the Anabat II recording. What PRIOR surveys are being referred to here? Explain why it matters whether something was identified prior? What is the purpose of a current survey that can identify species if it only matters what is identified PRIOR? [LTR 178, CMT 20]*

Response: Please see response to Comment LTR 178, CMT 19 above.

Comment: *[In reference to DEIS] Section 3.4.1.7, [t]he nearest know hibernaculum is located near the town of Trout Lake, nearly 20 miles north of the proposed project (B.Wieler, personal communication). Townsend's big eared bat hibernaculum near Trout Lake is known and is one of the largest in Washington. However, other as of yet identified hibernaculum, may exist nearby. A vast lava flow begin just a few miles west of the project site and it could contain hibernaculum. The project site is an area of old volcanic activity. Given that the Townsends big eared bat is difficult to identify through recordings, it is hard to find maternity colonies, and later in the season they may travel as much as 50 km, extra effort needs to be expended to determine if this at risk species is near to or using areas of the WRE project. [LTR 178, CMT 22]*

Response: The likelihood of Townsend's big-eared bat presence was estimated to be low based on lack of preferred habitat in the Project Area. Additional survey effort was determined to be unnecessary to evaluate the risk to this species because of lack of preferred habitat. To date, no Townsend's big-eared bat fatalities have been recorded at any wind development in the U.S.

Comment: *[In reference to DEIS] Section 3.4.1.5, [t]here are no known roosting structures or maternity colonies occurring in the vicinity of the project area. See comments on Keen's Myotis. Townsend's Big Eared Bat, a species of concern and a candidate for listing, is present in the region. One of the largest colonies at is located in lava cave nearer to Trout Lake to the north (400 bats?). Colonies are small compared to many other bat species and not many colonies are known to exist. The southern end of the old lava flow (can be seen from Google Earth) that may contain additional colonies is approximately three miles from the project. [LTR 178, CMT 23]*

Response: Comment acknowledged.

Comment: *[In reference to DEIS] Section 3.4.1.5, [b]at surveys conducted during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Completely inaccurate statement at the best. Hoary Bats were identified. It is accepted throughout the bat world that the Anabat is a product to collect bat calls and to Identify bat calls to species. Titley Inc, Australia (the company that makes this product)promotes the Anabat as a great product because of this capability! The DEIS text make this assertion a number of times and is just a false the first time stated as every other time stated in the DEIS! [LTR 178, CMT 24]*

Response: It is not necessary to identify each species of bat that made a call during a survey in order to complete a valid risk assessment. Furthermore, clearly separating closely related species (e.g., Myotis spp.) using an Anabat is not an exact science. Risk assessments are made based on the proportion of each frequency group in the dataset, as frequency group is known to be related to bat risk.

Comment: *[In reference to Appendix] C-8, [h]oary bats comprised 5.7% of the total passes detected within the SWRA (20 of 348 bat passes: Table 1). So, it is possible to identify bat species, so why not the remaining 94.3% of the calls? It is clear these tapes need to be reviewed by qualified experts. [LTR 178, CMT 25]*

Response: Some species, but not all, could be identified using the Anabat system. However, efforts to identify all bat species present were determined to be unnecessary for evaluation of the proposed Project.

Comment: *[In reference to Appendix] C-9, [a]coustic bat surveys were unable to determine bat species present in the study area (except for hoary bats).....So, it is possible to identify bat species, so why not the remaining 94.3% of the calls? It is clear these tapes need to be reviewed by qualified experts. [LTR 178, CMT 26]*

Response: Please see response to Comment LTR 178, CMT 25 above.

Comment: *[In reference to Appendix] C-10, [h]oary bats comprised 5.9% of the total passes detected within the WRWRA. So, it is possible to identify bat species, so why not the remaining 94.3% of the calls? It is clear these tapes need to be reviewed by qualified experts. [LTR 178, CMT 27]*

Response: Please see response to Comment LTR 178, CMT 25 above.

Comment: *[In reference to Appendix] C-10, Table 4 - The number 8.09 (activity/detector night) is a lower number from a study that appears to have been manipulated in 2009 in an attempt to achieve a low number. The numbers from the 2008 study should also be placed on this table. The numbers from 2008 are 14.3, 73.8, 178.0, and 397.3 activity/detector night. An average of the three should be generated and put in the table. That average is likely to be well over 100.0 (bat calls) activity/detector night, and will be exceeding high relative to every other number in that column. Is this why it is left off the table? [LTR 178, CMT 28]*

Response: The 2009 data are from the area around the proposed turbines, and provide the most accurate indicator of background bat use; the previous studies included habitats not located near the proposed turbine strings.

Comment: *[In reference to an Exhibit submitted as part of Comment Letter 178. West, Inc.'s Bat Identification White Paper. Section] 3.4 - Nocturnal AnaBat Surveys, The objective of the nocturnal AnaBat surveys was to record the relative abundance of echolocating bats flying through the sampling area during summer breeding season and the spring and fall migration seasons. [LTR 178, CMT 29]*

Response: Comment acknowledged.

Comment: *[In reference to an Exhibit submitted as part of Comment Letter 178. West, Inc.'s Bat Identification White Paper. Section] 3.4.1 - <u>Methods</u> Bat activity at the project area was recorded using an AnaBat II ultrasonic bat detector attached to a zero-crossing analysis interface module (ZCAIM) which houses a compact flash memory card for temporary download of ultrasonic activity files. To sample continuously on remote mode (automatic data collection), the detector and ZCAIM were powered by an external 12V battery. Each AnaBat unit (detector, ZCAIM, and 12V battery) was enclosed inside a plastic box or dry bag with the detector microphone positioned against a PVC tube protruding from the box/bag. This design prevented water from damaging the AnaBat units without compromising the ability of the unit to detect ultrasonic noise in the environment. To limit variation among AnaBats, sensitivity settings were calibrated for each unit prior to data collection. Most AnaBat units were set at or near setting 7 on the sensitivity dial. Each passive AnaBat unit was positioned so that the microphone faced the same cardinal direction for each sampling period. Calls were recorded for passive sampling from approximately sunset to sunrise (1900 – 0700). AnaBat units were removed from the field approximately once per week to download files, recharge batteries, and troubleshoot technical problems. Data gathered from the passive AnaBat units at the met tower were used to calculate bat activity (designated as number of calls/night) present at the site during the sampling periods. Nights that experienced any number of technical difficulties were not included in the final analyses. During the spring sampling season (April 13 – May 29), two AnaBat sampling locations were established. One unit was placed at ground level in the open grassy field at the base of the project met tower and another unit was deployed near a wooded edge (Non-met 1) to increase likelihood of detecting additional species [(Figure 15) - Figure is not included here]. Access issues and technical difficulties with the AnaBat unit at the Non-met 1 location caused the*

unit to be relocated to a small farm pond near a wooded edge (Non-met 2) within the project boundary after a week of sampling. Acoustic sampling at these two locations (Met tower and Non-met 2) continued through spring and these locations were maintained through the summer sampling season (June 28 – August 8). During the fall season (August 13 – October 9), AnaBat sampling continued at ground level at the met tower. A second AnaBat unit was deployed from August 15 – October 16 in a tree approximately 10 m above ground near the radar survey station [(Radar; Figure 15) - Figure is not included here]. In addition to the stationary passive units, a "roaming" or mobile AnaBat unit was deployed during the summer to assess resident/breeding bat species present within the project area. Roaming sampling was conducted using a handheld AnaBat unit for 9 nights (3 sampling periods of 3 consecutive nights each) at habitats likely to have high numbers of resident bats. To select locations for active sampling, reconnaissance visits were made to the project area during the day time to select sampling locations based on the presence of travel corridors (trails and roads), linear landscape features (forest edges), and access to water; habitat features known to be important for bats. Active sampling was conducted from sunset until approximately 4-5 hours after sunset (2100 – 0100). Analysis of bat calls was conducted using Analook software (DOS version). Analook displays ultrasonic activity in a format similar to a sonogram used for analysis of bird vocalizations (e.g., frequency versus time). Species identification was aided by the Preliminary Key to the Qualitative Identification of Calls within the AnaBat System (Amelon 2005, unpublished data) where characteristics such as slope, frequency, minimum frequency, consistency of minimum frequency, and shape of pulse assist in the identification of bat vocalizations. Due to similarity of call characteristics, two species (big brown and silver-haired bat) were lumped into one species category. All Myotis-like calls were identified to genus only and submitted to NYSDEC-recommended biologist, Eric Britzke, for identification to species. To obtain species identifications, an ID filter (Britzke and Murray 2001) was loaded into Analook to determine calls sequences of sufficient quality and length for species identification to be attempted. Once separated, echolocation calls of sufficient quality and length were also identified using quantitative techniques (Britzke 2003). Quantitative analyses are conducted by a cross-validated classification model based on 10 extracted call parameters - duration (Dur), maximum frequency (Fmax), minimum frequency (Fmin), mean frequency (Fmean), duration to the knee (Tk), frequency of the knee (Fk), duration of the body (Tc), frequency of the body (Fc), initial slope (S1), and slope of the body (Sc)] collected from 1,846 sequences (35,979 calls) of 12 eastern U.S. bat species (Britzke 2003). Average accuracy rates for species identification using this statistical method ranges from 56.9% (L. borealis) to 98.5 % (M. grisescens), with accuracy rates for Myotis sodalis ranging from 81.4% to 88.6%. [Section] 3.4.2 - Results, <u>Passage Rates</u> - The total number of calls and number of calls per night, recorded by each AnaBat unit varied by location and season [(Table 4) - Table is not included here]. The met tower AnaBat unit detected 769 bat calls total (19.72 calls/night) during the 39 days of spring sampling. Sampling at the two non-met locations during spring resulted in higher bat activity (29-33 calls/night) than at the met tower, despite changing in sampling location for the non-met unit. Summer sampling occurred at the met tower on 9 nights and recorded a total of 198 calls (22.0 calls/night). Approximately 2.5 times as many calls (55.56 calls/night) were recorded at the non-met 2 location during summer, likely indicating a nearby roosting colony of species and/or better habitat for foraging bats. During fall, the AnaBat unit positioned at ground level at the met tower recorded the lowest number of bat vocalizations per night (9.26 calls/night). Despite a similar number of sampling days, the AnaBat unit located at the radar sampling station recorded more bat calls/night (32.58). Approximately 93% of calls (n=1519) at the radar location were

recorded between August 15 and August 21. Only 25% of the calls recorded at the met tower (n=117) were recorded during the same sampling period. Species Identification - Using qualitative analysis of search calls, 5 species groups of bats were positively identified at the met tower location [(Table 5) - Table is not included here]. As is typical with AnaBat sampling, the majority of vocalizations were unable to be identified due to the few number of pulses per call (<5 pulses/call sequence). Relative call frequency was calculated by dividing the number of calls recorded for each species by the total number of calls recorded at the met tower for each season. Of those calls that were able to be identified to species, Lasiurus borealis calls accounted for the majority of the vocalizations during all seasons at the met tower. Summer sampling with the mobile AnaBat unit occurred on nine nights and recorded 464 bat calls [(Table 6) - Table is not included here]. The objective of the mobile sampling was to identify to the extent possible the species of bats using the St. Lawrence Windpower project area during the summer breeding season. As with the fixed station sampling, many calls could not be identified to species. One individual of an additional species, eastern pipistrelle (Pipistrellus subflavus), was recorded during the roaming surveys and not recorded during sampling at the passive monitoring stations. The highest number of recorded calls was of hoary bat [(Table 6) - Table is not included here]; however, 95% of those calls occurred on one night at one location and may have been from only one or a few individuals echolocating repeatedly near the AnaBat microphone. Following the qualitative screening, 208 call files with characteristics resembling Myotis species were submitted to Eric Britzke for further analysis. Of those files, 76 calls (36.5%) did not contain sufficient enough information to be processed quantitatively. The remaining calls were analyzed quantitatively on a nightly basis by site (Britzke 2003). Calls meeting the quantitative criteria for the following species were identified: eastern red bat (22 calls), little brown bat (50 calls), northern myotis (44 calls), and Indiana bat (16 calls). [LTR 178, CMT 30]

NOTE: The methods described above **are not** in reference to the methods used for bat surveys related to the Whistling Ridge Energy Project. This Exhibit was submitted as part of Comment Letter 178 and given the citation of *www.acciona-na.com/getattachment/6990b88d-6ff0-48e-990d-d208d4cb9776/*, but this document was not available at that website to verify the content.

Response: The protocol used to examine bat activity rates followed standard industry practices. Bat species were grouped into frequency groups that are related to risk of turbine collisions. For example, Myotis bats, most of which have high frequencies, are rarely killed at wind energy facilities whereas hoary and silver-haired bats echolocate at low frequencies and are the two most common species killed in the Pacific Northwest. Categorizing calls according to frequency groups allows a risk assessment without having to identify each call to species. Furthermore, despite claims by the manufacturer, bat biologists are not all in agreement that Anabats are capable of recording calls that can easily be identified to species (see, for example, Barclay, R.M.R. 1999. Bats Are Not Birds: A Cautionary Note on Using Echolocation Calls to Identify Bats: A Comment. Journal of Mammalogy, 80(1):290-296).

Comment: *[In reference to DEIS] Section 3.4.1.1, [a]s a result, the project area includes no native habitat and is permanently committed to use by commercial forestry operations and utility infrastructure. The area contains "no unaffected habitat" but under a normal logging regime that does not include an expedited process for turbines, habitat that can support many of the native species would exist. [LTR 178, CMT 83]*

Response: The last sentence in the second to last paragraph in Section 3.4.1.1 has been revised to read: "As a result, the Project Area includes only heavily managed native habitat and is permanently committed to use by commercial forestry operations and utility infrastructure."

Comment: *[In reference to DEIS] Section 3.4.1.5, [o]ne bald eagle was recorded on the project site in 2009 during surveys for northern goshawk. In addition, three bald eagles were observed during the winter of 2008-2009 during baseline avian surveys. Two were observed flying within the rotor-swept area, and one below. Bald eagles use the Columbia River, Little White Salmon and White Salmon Rivers as over-wintering and nesting habitat. As the bald eagle population recovers further, more eagles will reside in the area. WRE spans a saddle between Underwood Mtn and Nestor Peak between the Little White and the White Salmon River. It is not unexpected that bald eagles would hunt the WRE area and use it as a shortcut between the two river basins. WRE, if permitted, may likely be the first project to kill bald eagles in the Pacific Northwest. Remedy - There must be a discussion of the long-term risks and impacts to Bald Eagles. Nesting and over-wintering are not addressed. [LTR 178, CMT 85]*

Response: Please see Section 3.4.2.1 Proposed Action – Operation (DEIS page 3-77) for a discussion of potential impacts to bald and golden eagles.

Comment: *[Quoting] Section 3.4.1.5, "[i]n Washington State, goshawks occur year-round and in some areas only during the non-breeding seasons. The project site is located in an area where either may occur, and the eastern slope of the Cascades is considered the most common place to find this "uncommon" species (Bird Web 2009)". [This section s]hould state that "The Northern Goshawk occur year round in breeding areas and in some areas only during the non breeding season." "The project site lies in an area that either may occur." [LTR 178, CMT 86]*

Response: The section discussing Northern Goshawk (Page 3-46) accurately represents the information from the cited source (i.e., BirdWeb).

Comment: *[Quoting] Section 3.4.1.5, "Northern goshawks were recorded during avian surveys during the fall of 2004 and the summer of 2006. A total of five individuals were sighted; two during the fall and three during the summer. They were observed flying both within and above the rotor-swept height during surveys." Demonstrates that breeding populations exist and WRE if permitted may be the first project to kill this "uncommon" species and breeding population impacted. [LTR 178, CMT 87]*

Response: The Project Area habitat is marginal for the Northern Goshawk, because of the lack of dense mature forest habitat. While Northern Goshawks will hunt along edge habitats and open areas, the lack of mortality indicates a behavioral avoidance of wind turbines, so the likelihood of a fatality remains low. Intensive surveys for Northern Goshawks in suitable breeding habitat yielded no observations of goshawks in 2004, 2008, and 2009, so it is very unlikely that breeding Northern Goshawks are present within the Project Area. Additionally, please see Figure 3.4-5 to observe where the 2008-2009 Northern Goshawk surveys were conducted.

Comment: *[In reference to DEIS] Section 3.4.1.5, Northern goshawk surveys were conducted during the spring and summer seasons in 2004, 2008, and 2009 (No northern goshawk responses were recorded in 2004, 2008, 2008 [NOTE: It is believed that the commenter meant to say "2009"]). No northern goshawk responses were recorded, but yet they were noted during avian surveys. A basic rule of all survey work is that presence affirms presence; absence does not affirm the subject not present, just that it was not detected by some established measure. In the case of the northern goshawk survey, none were detected but yet, goshawks were affirmed as being present during the avian survey. The only message to take home is that the goshawk survey was not successful at detecting northern goshawks. The surveyors need to reevaluate survey methods and determine why they were not successful at stimulating northern goshawks to respond in a manner that could be recorded. This is a serious issue when one considers that the other bird-of-prey surveys are dependent on a response as well. It throws into doubt all the bird-of-prey response-dependent surveys. [LTR 178, CMT 88]*

Response: The observation of five northern goshawks over two years during avian point count surveys indicates incidental presence, but the intensive three-year survey in suitable habitat for goshawks is considered to successfully establish the absence of nesting or breeding goshawks in the surveyed areas. The summer and fall observations could have been of migrating birds; the absence of spring observations further suggests the absence of breeding birds.

Comment: *[In reference to DEIS] Section 3.4.1.5, [t]wo golden eagles were recorded during the fall of 2004. One was observed flying at a height within the rotor-swept area, and one was observed flying above the rotor-swept area. Golden eagles are documented to fly through the WRE project area and are, like the other raptors, at high risk of being killed. [LTR 178, CMT 89]*

Response: The presence of golden eagles was analyzed and the potential for a golden eagle fatality is considered low, as stated in Section 3.4.2.1 Proposed Action – Operation (on DEIS page 3-78).

Comment: *[Quoting] Section 3.4.1.5, "[t]he Applicant conducted surveys and analysis to confirm the absence of northern spotted owls." This statement demonstrates a bias by looking*

for a specific outcome. It is extremely difficult to definitively "confirm" absence, but reasonable to provide some probability of use at any given time. Spotted owls historically have, with high probability, been present in the area of the project. Vast clear cutting has reduced the modern small chance to a very small chance that spotted owls would be present in the WRE area at any given point in time for the near future. Surveys were conducted for northern goshawks and none were "detected" in a common place to find an uncommon species either. [LTR 178, CMT 90]

Response: The text on page 3-49 of the DEIS, first sentence in the first paragraph, has been revised to indicate that surveys were conducted with no specific intended outcome regarding presence or absence of spotted owls or northern goshawks. The sentence now reads, "The applicant conducted surveys and analysis to determine spotted owl occupancy." Turnstone followed strict adherence to the 1992 revised version of "Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls." This protocol was based on the best available science and endorsed by both USFW and WDFW. Turnstone conducted surveys in a 1.8 (spotted provincial range) mile radius surrounding the proposed Project. All potential habitats were surveyed in 2003, 2004, 2008, 2009, and 2010. Only one spotted owl was detected in 2010 after 5 years of survey effort approximately 1.2 miles from the proposed Project. This single male was later found multiple times approximately 3 miles away and confirmed to be a territorial male outside the 1.8 mile buffer.

Comment: *Section 3.4.1.5 [f]ails to state that the Little White Salmon is approximately 1 mile west of the project area. [This Section also i]gnores the potential flight corridor between the Little White Salmon River and the White Salmon rivers over the saddle formed by Nestor Peak and Underwood Mtn where WRE is located. [LTR 178, CMT 92]*

Response: Avian-use data was collected on site for one full year and there was no evidence of high use by eagles, raptors, or other birds. Therefore, there is no compelling reason to research avian use between the mentioned rivers.

Comment: *[In DEIS] Section 3.4.1.5, [t]here were 21 birds observed during summer 2006 avian surveys, and six recorded during the spring of 2009. All 21 observed in 2006 were within the rotor-swept area; it is not reported in 2009 how many were in the rotor swept area. None were recorded during the fall of 2004 or the winter of 2008-2009. The WRE area is highly used by this species. Reporting absence in the fall and winter is misleading as this bird leaves begins its migration to S. America in August. Because 100% of the birds recorded in 2006 were in the rotor swept area, it is reasonable to assume that 100% of those recorded in spring 2009 would be in the rotor-swept area. Even though fewer numbers were observed in the spring, this is a particularly bad time to lose any member of the species. For each female lost, future recruitment is reduced. If three of the six are females and each female produces 3-4 offspring, then a lost of three females could represent a recruitment of 9-12 additional birds. The bird counts represent a minimum. There is no extrapolation over area. No method for comparing counts to scientific studies of local population levels. There is no mention of how loss of forest habitat from extensive clearcuts affects reproduction. For a species on the decline, it is important to consider*

all actions of direct and indirect losses to the population. This has not been done for a migratory species. [LTR 178, CMT 93]

Response: The text on DEIS page 3-56 of the regarding Olive-Sided Flycatcher in Section 3.4.1.5 has been revised regarding olive-sided flycatcher fatality risk to add the following: "The Olive-Sided Flycatcher is not listed as federally or state threatened or endangered. The Project habitat is not very conducive for this species, and that is why only a few individuals were observed. The species does migrate and it would not be expected in the Project Area in winter or early spring." With respect to migratory species that may occur within the Project Area, wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions within Section 3.4.

Comment: *Section 3.4.1.5 [mentions that i]n Washington, pileated woodpeckers occur year round but are uncommon in the vicinity of the project site. During avian surveys in the project area, six pileated woodpeckers were recorded in the fall, two during the winter, seven during the the spring, and none in the summer. Doing the math, six plus two, plus seven equals 15 pileated woodpeckers observed. According to the Applicants own study numbers, pileated woodpeckers are anything but uncommon in the vicinity of the project site. Fifteen pileated woodpecker sightings is especially significant. These birds are fiercely territorial and the observation of such high numbers in periods separated by many years in some instances, is telling of the perseverance and number of territories in the vicinity of the project. Lack of sighting in the summer months, does not indicate absence, only lack of detection. The DEIS must be changed to reflect the significant use of the project vicinity by pileated woodpeckers. It is important to note here that pileated woodpeckers prefer habitats with large trees. Contrary to the Applicants claim, extensive logging in the area has not completely removed use by species that prefer habitats with older tree areas. Pileated woodpeckers demonstrate the resilience of some species to changing habitats. Therefore it should not be assumed that just because extensive logging has occurred in the project are that species will leave and therefore not be at risk. Pileated woodpeckers will fly at height that puts them into the rotor swept […] [LTR 178, CMT 94]*

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. The habitat is not good for this species due to lack of old growth forest. The 15 observations could be 15 individuals or 15 observations of the same individual; likely somewhere in between. No significant impacts would be anticipated due to very few individuals in the Project Area and due to lack of suitable habitat.

Comment: *[In reference to DEIS] Section 3.4.1.5, [d]uring fall 2004 avian surveys, 15 Vaux's swifts were recorded in three groups, 87 percent of which occurred within the rotor-swept area. Four were recorded in two groups during the summer of 2006, all of which occurred within the rotor-swept area. Doing the math, a total of 17 out of 19 Vaux's swifts were observed in the rotor-swept area for a number of almost 90% in the rotor swept area. This percentage applied to the 11 birds observed in the 2009 period would place a total of 10 swifts in the rotor-swept area. In total, 28 of the 31 of the observed swifts (in that short period alone) were at risk*

of being killed. It is even more reasonable to assume that all the swifts have the potential to use the rotor-swept area and all members of the population are at risk. Again, this is a conservative number due to the very limited nature of the survey. Because original data was not supplied, the temporal separation in years, and lack of overlap between fixed points it is reasonable to assume that most if not all swifts were not counted more than once. [LTR 178, CMT 95]

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. Because only 19 Vaux's swifts were observed over the course of the year, this species has very low use of the Project Area and significant impacts would not be anticipated.

Comment: *[In reference to DEIS] Section 3.4.1.5, [b]at surveys conducted during ..... did not have the ability to detect individual species of bats. Based on the lack of detailed information of this species life history and habitat requirements and nature of the bat surveys conducted it is difficult to conclude with certainty with the likelihood of Keen's bats occurring on the project site. However, Due to the lack of old growth or mature forest types within the project area and the predominant commercial forestry use of the property, the likelihood of occurrence on the site is considered to be low. Anabat II technology exists to identify, by call, individual bat species. This technology has existed for over 10 years. West has authored a paper where the Anabat technology was used to identify to species the majority of calls. Papers, abstacts, and exerpts are attached. The tapes need to be further analyzed by a highly qualified INDEPENDENT expert to identify bat calls with special emphasis to identify rare species. If WEST failed to set up the Anabat II correctly so that calls can be identified, then additional bat data collection needs to occur. Additionally, cumulative impacts should assess the possible future infection of bats by white nose syndrome. Increased mortality of ANY type, may directly affect these species future viability. [LTR 178, CMT 96]*

Response: This duplicative comment was already addressed in response to Comment Letter 178, Comment 18 above.

Comment: *[In reference to DEIS] Section 3.4.1.5, [t]here are no known roosting structures or maternity colonies occurring in the vicinity of the project area. See comments on Keen's Myotis. Townsend's Big Eared Bat, a species of concern and a candidate for listing, is present in the region. One of the largest colonies at 400 bats is located in lava cave nearer to Trout Lake to the north. Colonies are small compared to many other bat species and not many colonies are known to exist. The southern end of the old lava flow (can be seen from Google Earth) that may contain additional colonies is approximately three miles from the project. [LTR 178, CMT 97]*

Response: This duplicative comment was already addressed in response to Comment Letter 178, Comment 22 above.

Comment: *[Referring to DEIS] Section 3.4.1.6, Table 3.4-5, [o]ne year round bird, the northern pygmy owl was not observed during ANY study, yet is common in the area. This speaks again to the basic rule, absence does not absence does not affirm the subject not present. Northern Pygmy owl and any other species that are likely to exist should be added to the list and represented as is the Northern saw-whet owl. [LTR 178, CMT 98]*

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. Northern pygmy and northern saw-whet owls were detected during several northern spotted owl surveys and were reported on field forms.

Comment: *[In reference to DEIS] Section 3.4.1.6, [t]his annual rate is low relative to raptor use at 36 other wind-energy facilities that implemented similar protocols and had three or four season surveys. It is very important to note that a number of raptor species use the WRE area and rotor swept area are sensitive, candidates for listing, or formerly listed recovering species. This number needs to be compared relative to other wind energy facilities as well. Appendix C4 page 9 states: American kestrels..., red tailed hawks...., and golden eagles...were killed more often than predicted based on abundance. ... It is likely that many factors, in addition to abundance, are important in predicting raptor mortality. [LTR 178, CMT 99]*

Response: The potential for raptor mortality was analyzed based on an avian use regression with 13 other wind developments in the region with mortality data (Section 3.4.2.1 Proposed Action – Operation, page 3-79 of the DEIS). This approach avoids the potential for statistical underestimation which can occur from evaluation of exposure risk estimates, or simply comparing raptor use.

Comment: *[In] Section 3.4.1.6, [t]he WDFW Priority Habitats and Species database was searched for known occurrences of raptor nests. The only recorded nest was for an osprey, more than one mile east of the project site. This database is not complete nor comprehensive and cannot be used as an authority. Just as the goshawk survey was not able to generate a response, any attempts, if one had been attempted, would likely not have found nests. WDFW is not allowed to enter SDS property unless permission is obtained and escorted by an SDS representative. It is highly unlikely any nests would be known. [LTR 178, CMT 100]*

Response: Nest surveys were conducted for the focal raptor species of concern in the Project Area, northern goshawk and spotted owl. No nests were found. An aerial survey for raptor nests was also conducted as part of the Klickitat County Energy Overlay Zone project and no nests were found.

Comment: *[In] Section 3.4.1.6 [relating to f]all migration surveys (2004), [t]he DEIS fails to assess bird migration through the project area. This DEIS ONLY makes daytime observational counts of birds during four seasonal time periods, fall, winter, spring, and summer. Nothing in*

this section or study assesses fall migration, the regular seasonal journey of species from one location to another. This is a serious deficiency because migrating birds are at significant risk when flying through the rotor-swept area. Birds migrate at varying heights by species and weather conditions. Conditions with poor visibility such as clouds, mist, fog can lower the migration paths of higher flying species so they too are exposed to the rotor swept area. These weather conditions are common in the spring, winter, and fall along the ridges of the Cascade Mountains. Include studies that describe methods of detecting bird movement at night for migration studies. [LTR 178, CMT 101]

Response: Standard pre-construction avian surveys for raptors and passerines have been conducted for many years, and have provided the avian use data that allows estimation of the relative presence of birds compared with other wind developments in the region. Nocturnal migratory surveys are not generally conducted during pre-construction surveys. Post-construction mortality monitoring will be conducted for at least two years in order to document the number and species of bird fatalities. The TAC and USFWS will determine which mitigation measures should be used for protected species or for any other species of birds should any large number of birds land up being killed.

Comment: *[Referring to DEIS] Section 3.4.1.6, [t]hree species of raptors were observed, including red-tailed hawk, northern goshawk, and sharp-shinned hawk. Northern Goshawk observed in spite of surveys failing to detect any. [LTR 178, CMT 102]*

Response: Please see response to Comment LTR 178, CMT 88 above.

Comment: *[In Appendix] C4, [t]en species were always seen flying within the ZOR (zone of risk); however, these were based on fewer than five observations. These species need to be identified clearly in the text and a table. These species are the ones most likely to be wiped out of the sky, and since these species are likely in low numbers, population impacts could accrue. Remedy - A table needs to be created in the DEIS, not in the appendices only, but in the main text under operation impacts to birds, with species in one column, percent of time birds were seen in the rotor-swept area (zone of risk) the number of birds and the total number of 'groups". Sort by highest percent in rotor-swept area first. Supplemental DEIS (complete redo is better) with this information and others should be issued for comment and review. [LTR 178, CMT 103]*

Response: The species observed flying in the rotor-swept area were identified as potential species that could be killed during operation, and would be documented during post-construction mortality monitoring.

Comment: *[Referring to a]ll general bird surveys. Although over 200 data sheets exist, more information should be given about the locations these birds were observed. [LTR 178, CMT 104]*

Response: A complete list of avian species observed by season is presented in the WEST 2009 Wildlife Baseline Report. Additionally, the use by birds at each site is tabulated. The raw data is not included because the use comparison among wind developments is the basis for understanding avian risk at the proposed wind development.

Comment: *[In] Section 3.4.1.6, [f]or all bird species combined, use of the project site by avian species was slightly higher during the summer breeding season than during the fall migration period. There was no fall migration assessment for birds or any other wildlife in this DEIS. All comments to bird migration need to be removed from the document [LTR 178, CMT 105]*

Response: The fall migration period bird use in the Project Area was assessed during point count surveys, which is the standard method for wind development pre-construction surveys. The fall use estimates were compared with other wind developments in the region to assess the presence of diurnal migratory use, which was low, although nocturnal migration was not assessed (and is not a standard pre-construction survey) so, as noted on DEIS page 3-79, it is unknown what level of nocturnal migration occurs in the Project Area.

Comment: *[In reference to DEIS] Section 3.4.1.6, [s]everal large mammals occur within the project site. No detailed review or study exists on the potential impact to mammal habitats or movement patterns. Remedy - Redo and expand this section and provide for public review through a completely redone DEIS or a supplemental DEIS [LTR 178, CMT 106]*

Response: While several large mammals have the potential to occur within the Project Area (as it is stated in Section 3.4.1.6), very few were observed during the three years of avian and bat surveys.

Comment: *[In reference to DEIS] Section 3.4.1.7, [i]n order to determine which species (including special status species)…..are most at risk for turbine fatalities a relative collision risk…. This analysis is not appropriate for determining risk because it is dependent on observational counts. Uncommon species would never have a high risk. Remedy - Use percent of species observed in rotor swept area. Put in supplemental DEIS or rewritten DEIS. [LTR 178, CMT 113]*

Response: We agree that rare species would have low risk simply because risk is primarily related to abundance, not just flight height characteristics. However, the risk index was not meant to predict numbers of fatalities.

Comment: *[Within] Section 3.4.1.5, [s]urveys were conducted in 2003, 2004, 2008, and 2009. NSO surveys were conducted in 2007 as well. During one of the visits in particular, slash burning on Chemawa Hill above this area could have affected obtaining a result. Survey was known to occur in the fall, which according to Bill Weiler, WDFW Biologist, was not the correct time of the year to be conducting owl surveys. Although the design was flawed, those data sheets need to be made available to the public for review. Remedy - Make available to public in supplemental DEIS or rewritten DEIS. [LTR 178, CMT 114]*

Response: None of the Northern spotted owl surveys for the Whistling Ridge Energy Project were conducted in the fall, but rather during the protocol period of March 15 through August 31. The reports and survey forms were provided in the DEIS and can be found in Appendix C.

Comment: *[In reference to DEIS] Section 3.4.1.7, [b]ald eagles, although fairly common in Washington State, are likely uncommon visitors to the project site. The potential for ongoing occurrence of bald eagle on the project site is very low. The potential for bald eagle fatalities as a result of turbine strike is also considered to be extremely low. DEIS has failed to analyze increasing Bald Eagle presence in the Columbia River Gorge mainstem and tributaries. The central gorge with an overwintering population from other parts of the U.S./Canada and a growing resident nesting population, has become much more common in the area and the numbers in the area is expected to increase as the overall recovering bald eagle population increases. DEIS has failed to address the potential use of the area by bald eagles to shortcut across the saddleback through WRE project area between the White Salmon River and the Little White Salmon River. The potential for use of the area and a turbine strike is increasing with increasing populations, particularly in light of the use of airspace in the rotor-swept area. Remedy - Include USFWS data on producing and overwintering populations. Include the likelihood of a fatality should an eagle pass through two strings of turbines as is present on the site. (Survival as calculated in fish, only in this case estimated from available science) If not calculated, use the number generated from percent of observations in rotor swept area relative to the population in the White Salmon to Little White Salmon Rivers and Columbia River between those two rivers. Extrapolate for an increasing population. [LTR 178, CMT 115]*

Response: Bald eagle use was found to be extremely low during baseline avian survey. Even if populations increase substantially, little use of the Project Area would be expected as the Project Area does not provide suitable foraging habitat for this species.

Comment: *[In reference to DEIS] Section 3.4.1.7, [t]wo golden eagles were recorded on the project site considered to be at a relatively low risk for collision with turbines at this site. Every golden eagle that enters the WRE area, like bald eagles, are at risk of being killed by the turbine blades. Golden eagles are quite possibly using the site more than rarely, perhaps a better word to use is infrequently. Because of the timing and nature of this study, little can be said about the frequency of visits, other than, golden eagles were observed during the limited bird surveys. [LTR 178, CMT 116]*

Response: Based on four seasons of avian use surveys it was found that golden eagle use of the Project Area is very low, therefore no significant impacts would be anticipated. Studies of golden eagle use at other Project Areas in eastern Washington and Oregon have shown golden eagle use to be be much higher than what has been observed at Whistling Ridge, in the absence of golden eagle fatalities.

Comment: *[Referring to DEIS] Section 3.4.1.7, [t]his includes the occurrence of five individuals, four of which were flying within the rotor swept area. Similar to the golden eagle, this species may be at risk of increased foraging activity in open areas around turbines because they hunt for prey that occurs on the ground in cleared areas. However given their rare occurrence on the project site, the potential for turbine related fatalities for this species is extremely low. First, northern goshawks are not "rare" in the WRE area. Northern Goshawks have been observed flying southeast from the WRE project area into the farmland south of the project area, presumably to hunt. During logging under DNR FPA# 2704293 in June-July 2010 on a unit (named Fern) just below Chemawa Hill (southern A-array), a northern goshawk was observed flying and repeatedly crying for two days just south of where the logging activities were taking place. Quite possibly, a nesting tree may have been removed from the riparian zone with reportedly 100+ year old trees (the riparian zone repeatedly not mentioned by the Applicant) being logged. A request was lodged by an adjacent landowner with the Southeast Regional Office in Ellensberg to have a DNR employee enter the area and check for eggs or chicks that might have survived. The request was refused by DNR stating that they have no rules on the books and are not responsible for regulating any wildlife. Remedy - Change text to acknowledge prevalence of this uncommon bird in the WRE area. Change text to state that the potential for turbine related fatalities is high based on the presence of northern goshawk in the area AND the high percent of observed northern goshawks flying in the rotor swept area. Reissue the DEIS with corrections or a supplemental DEIS for public comment. [LTR 178, CMT 117]*

Response: No northern goshawk nests were documented during extensive surveys for this species, and avian use surveys found that this species was very rare in the Project Area. Therefore, no significant impacts to this species would be expected.

Comment: *[In] Section 3.4.1.7, General Relative index using all bird species is not applicable. Remedy - If a relative index is to be used it should be divided into general class of birds, i.e.: raptors. This will give the public a better understanding of which raptor is at greatest risk of turbine caused fatality based on total number of raptors, number of each species observed, and flying in the rotor-swept area. Although a qualifier must be stated that ALL raptors are at significant risk for turbine caused fatality because of their size and hunting behavior. [LTR 178, CMT 118]*

Response: The avian use and exposure indices were calculated for all species and for raptors as a group (DEIS page 3-78). Not all raptors have the same risk of fatality from wind turbines, because of behavioral differences and varying habitat selection, among other variables.

Comment: *[In] Section 3.4.1.7, [b]ased on this analysis and surveys on the project site, the estimated raptor/vulture fatality rate is zero per MW/year, which is an extremely low estimate compared to many wind projects. The so called analysis does not in any way reflect the risk of raptors/vultures to turbine caused fatality. This distorts and falsely implies that a relative index predicts mortality. The relative risk index only provides an indication of how many of a species were in the rotorswept area relative to other species. In fact, larger birds, because of their larger wing spans and body size, are more likely to be struck than a small bird occupying only a small space in the rotor swept area. Birds spending more time in the rotor-swept area are more likely to be killed. Environmental conditions when birds are in the rotor-swept area can affect fatality, and so forth. The lack of assumptions to account for shortcomings is a fatal flaw in any "study" and certainly is for this one. Remedy - This Study's list of assumptions must be reevaluated and independently confirmed. Remove this and other incorrect statements of non-fact. [LTR 178, CMT 119]*

Response: Avian use, rather than the exposure index, was used to predict the level of post-construction avian mortality. The mortality estimate was based on a regression of mortality at other wind developments in the region with the pre-construction use estimate. Passerines (small birds), rather than raptors (large birds), constitute the majority of fatalities at wind developments.

Comment: *[N]onexistent Science based studies require a statement of all assumptions made to design a study and collect, analyze, and interpret data. This is completely nonexistent in the DEIS and Appendices. [LTR 178, CMT 120]*

Response: The baseline studies were consistent with USFWS protocols and the WDFW guidelines and both agencies have stated this in writing.

Comment: *[In reference to DEIS] Section 3.4.1.7, [f]urther, data collected from the project site indicate that the area is not within a major migratory pathway, at least during fall migration. No migration data on any species was collected, only observational counts of animals on different days/seasons. Because migration requires some movement, and movement was not demonstrated in any "study" whatsoever, migration conclusions cannot be made. Remedy - Remove references to "migration" from existing DEIS language until such time actual migration studies are completed and documented. [LTR 178, CMT 121]*

Response: This duplicative comment was already addressed in response to Comment LTR 178, CMT 105 above.

Comment: *[In reference to DEIS] Section 3.4.1.7, [p]ileated woodpeckers were recorded on the site, but not flying. Pileated woodpeckers do fly at rotor-swept height. They do not take the bus. Remedy - A more accurate conclusion is suggested here: "Because pileated woodpeckers were not observed flying, the relative index was zero. Pileated woodpeckers may fly at*

rotorswept height through the WRE project area and may be killed as a result." [LTR 178, CMT 122]

Response: The recorded numbers of pileated woodpeckers were very small, and the habitat is not highly suitable for this species. Therefore the conclusion was derived based on these facts and it is expected that there will be no impacts to this particular population.

Comment: *[As stated in DEIS] Section 3.4.1.7, Vaux's swifts……were commonly observed flying at rotor-swept heights …. More than SOME deaths should be expected based on the percentages of birds in the rotor swept area. Remedy - Change to "Vaux's swifts….were commonly observed flying at rotor-swept heights, and SIGNIFICANT turbine related mortality may occur." [LTR 178, CMT 123]*

Response: Very few Vaux's swifts were observed during baseline surveys. Although some individuals may be killed, it is unlikely that significant impacts to this species would occur as they were not a common migrant or breeding bird in the Project Area.

Comment: *[As stated in DEIS] Section 3.4.1.7, [o]live-sided flycatchers……were commonly observed flying at rotor-swept heights …. More than SOME deaths should be expected based on the percentages of birds in the rotor swept area. Remedy - Change to "Olive-sided flycatchers….were commonly observed flying at rotor-swept heights, and SIGNIFICANT turbine related mortality may occur." [LTR 178, CMT 124]*

Response: Please see response to Comment LTR 178, CMT 105 above.

Comment: *[As stated in DEIS] Section 3.4.1.7, [w]estern bluebird……were commonly observed flying at rotor-swept heights …. More than SOME deaths should be expected based on the percentages of birds in the rotor swept area. Remedy - Change wording to "Western bluebirds….were commonly observed flying at rotor-swept heights, and SIGNIFICANT turbine related mortality may occur." [LTR 178, CMT 125]*

Response: Please see response to Comment LTR 36, CMT 3 above.

Comment: *Waterfowl, waterbirds, and shorebirds were not observed using lands within the project site during this study, and mortality involving this group is expected to be rare. These species area migratory birds and would not be expected to be seen USING LAND within the project site as there is no large body of water, but the AIRSPACE would be used during migration. Migratory birds, including water using species have been killed during migration by wind turbines at many different projects throughout the U.S. and world. Migratory birds of ALL*

species are at risk. Migration has NOT been assessed in any study within this DEIS. Remedy - Remove all reference to "migration" from any study and DEIS text. Require a full study on spring and fall migration be conducted according to best experimental design and current research protocols. Included in any assessment of migration by mammal (including bats) and avian species, needs to cover 24 hour time periods when environmental and seasonal conditions are favorable for every species (particularly status species) and for 3 years to account for annual variation. [LTR 178, CMT 126]

Response: Please see response to Comment LTR 178, CMT 105 above.

Comment: *[In reference to DEIS] Section 3.4.1.7, [t]urkey vultures are known to have very low susceptibility to turbine collisions (Orloff and Flannery 1992). Old Citation based on older, smaller turbines. Provide updated current information to support any assertion. Remedy - Base conclusions on more recent information to reflect the latest generation of industrial wind turbines. Review Canadian and European white and grey papers on turkey vulture and cousin fatalities at wind turbine facilities. [LTR 178, CMT 127]*

Response: Using publicly available data from 58 wind energy facilities in the U.S., turkey vultures have comprised only 5.8% of the raptor fatalities, indicating low susceptibility of this species to turbine collisions compared to other raptors, even at modern wind turbines.

Comment: *[In reference to DEIS] Section 3.4.1.7, [t]he DEIS is deficient because the studies have failed identify the underlying assumptions used in design, data collection, and analysis that could affect extent and validity of conclusions. The assumptions mush be qualified by the authors as to the appropriateness of the study. Because of this lack of assumptions, independent reviewers are unable to confirm the integrity of the methodology and conclusions. Remedy - The reports and the conclusions must be reissued with this information in a SEIS or a replacement DEIS. [LTR 178, CMT 128]*

Response: The opinions of the commenter concerning the completeness and adequacy of the Draft EIS are noted. EFSEC and BPA believe that the DEIS contains a reasonably thorough analysis of the potential environmental impacts of the proposed project, as required by SEPA and NEPA. As discussed in the DEIS, environmental information was compiled based primarily on site-specific field studies, literature reviews, and communications with various knowledgeable resource agencies. Any assumptions made in the analysis were explained to the extent appropriate, and every attempt was made to use the most current data and information reasonably available. Specific issues with the DEIS analysis that are raised in these comments are addressed in the appropriate sections of these responses to comments.

Comment: *[In reference to DEIS] Section 3.4.1.7, [t]hese collisions would likely be rare and it is unlikely that the Project would have any negative impacts on population levels on and near*

the project site. Actually, the opposite is true. Collisions are very likely to occur. The sheer number of turbines and their configuration along a ridge poses a very high risk to special status and uncommon species, as well as migrating birds and bats of all kinds. Remedy - Compare to other forested ridgetop wind turbine projects in Eastern USA, with the statement that because no turbines have been place in conifer forests of the NW, it cannot accurately reflect numbers only provide general basis of comparison. It MUST be stated that placement of wind turbines along ridges is likely to result in extremely high mortality of resident and migratory birds and bats as has occurred in the Eastern US when placed along forested ridges. [LTR 178, CMT 129]

Response: According to the National Academy of Sciences (2008), there is no evidence that "measurable demographic changes to bird populations in the United States" is occurring from fatalities at wind developments. The text in Section 3.4.2.1 Proposed Action – Operation (on DEIS page 3-79, third paragraph) has been revised to include this reference. Please also refer to the response to Comment LTR 36, CMT 3 above.

Comment: *[As stated in DEIS] Section 3.4.1.7 …in Washington and Oregon indicate that less correlation between preconstruction surveys and turbine-related mortality is observed in non-raptor species. The lack of correlation may be because most fatalities are among nocturnal migrants that are not accounted for during surveys. This statement admits there is a lack of a migration study. Most fatalities are among nocturnal migrants, and most species migrate at night. At no point, during day or night, was any study of bird or bat migration through the project area. Remedy - Require a three year study on bird and bat migration by qualified researchers using scientifically accepted methods and design protocols. Provide results for review by public and governmental entities. [LTR 178, CMT 130]*

Response: Please see response to Comment LTR 178, CMT 105 above.

Comment: *The DEIS Fails to Adequately Review the Likely Impacts of the Proposed Development on Natural Resources. The Whistling Ridge project is likely to cause significant adverse impacts to natural resources, including the direct impacts of mortality to wildlife, as well as indirect effects from habitat destruction, displacement, and species avoidance of the project area after construction. Avian species often collide with wind turbines, and bats often die from internal hemorrhaging caused by the massive changes in air pressure near the spinning blades of a wind turbine, a process known as "barotrauma." Also, components of the industrial development, including collector lines, transfer stations, and access roads, can displace wildlife and fragment habitat. The DEIS failed to adequately analyze the likely impacts to wildlife and other natural resources. [LTR 179, CMT 69]*

Response: Comment acknowledged.

Comment: *In addition, as demonstrated in the written testimony of Dr. K. Shawn Smallwood (attached herein), the underlying data and environmental analysis relied upon in the DEIS is severely flawed. For example, without any scientific support the DEIS states that the clearcut project area is poor habitat for wildlife. However, Dr. Smallwood points out that "[b]ird species diversity is much greater at Whistling Ridge than at the Altamont Pass, where bird fatalities caused by wind turbines are notoriously high." Whistling Ridge surveys found more than 1 species per hour of searching, whereas surveys at Altamont found 0.036 species per hour. The proponents' ploy to clearcut the land and present a devastated ecosystem immediately before applying for an industrial energy facility is misleading and results in biased conclusions in the DEIS. As Dr. Smallwood concluded, based on independent analysis of the proponent's own surveys, "Whistling Ridge exhibits a very high level of ecological integrity." This is likely a result of the projects location within a largely intact ecoregion where species diversity remains high. This is also why the Klickitat County Energy Overlay Zone excluded forested areas. [LTR 179, CMT 70]*

Response: The baseline avian use study was conducted in compliance with the Washington Department of Fish and Wildlife (WDFW) Wind Energy Guidelines (WDFW 2009), and was compared to other regional wind developments where avian use and mortality data was available so a categorical prediction of the level of potential mortality could be calculated. While managed forests in clearcut rotation have wildlife value, they are not considered to have a high level of ecological integrity relative to forests that are not in rotation.

Comment: *Dr. Smallwood also points out contradictions between foundational statements and the conclusions in the DEIS. For both Keen's myotis and Townsend's big-eared bat, the DEIS states that the analysts had insufficient knowledge of the species, but nonetheless concluded that it was unlikely that they would occur at the site. [DEIS Pages 3-59 and 3-60]. It is plainly inappropriate to base conclusions on insufficient information. At best, the DEIS should say that impacts to bat species are unknown and then analyze the worst case scenario given that uncertainty.. The DEIS seriously underestimates the potential impacts of this project, both on an individual basis and when considered cumulatively with other wind energy projects. Dr. Smallwood has determined that the baseline studies to assess impacts were cursory and inadequate, the likely impacts to raptors are significant, the cumulative impacts analysis was biased and unrealistic, and the mitigation measures are inadequate. The DEIS also failed to ensure the protection of wildlife and has failed to adequately review impacts to natural resources in a number of other ways, as described below. [LTR 179, CMT 71]*

Response: Please see responses to Comments LTR 161, CMT 5, LTR 161, CMT 7 and LTR 177, CMT 40 above.

Comment: *The DEIS Fails to Include Best Available Science in the Analysis. The avian impacts analysis is inadequate and not based on the Best Available Science. The baseline surveys were too cursory to support a scientifically credible baseline assessment. Failings include an inadequate sample and an inadequate amount of time dedicated to surveys. Avian*

utilization of a site can vary greatly from year to year, so the limited time span of these baseline surveys introduces large uncertainty into the resulting utilization rates. The sample sizes were grossly inadequate for what is needed for comparing bird utilization among project sites or for guiding wind turbine locations to minimize collision rates. Numerous other methodological errors in the analysis introduce additional biases that undermine the SEPA and NEPA review. Wildlife surveys should be conducted using current state-of-the-art field and analysis protocol. At the least, surveys must take into account survey bias including, but not limited to, searcher efficiency, carcass "life expectancy" or persistence, and scavenger removal. The entire site should be surveyed before and after construction. Both pre-development survey and post-development monitoring should take into account the episodic nature of some bird migrations and nocturnal bird migrations. For example, long or inappropriately timed intervals between searches may miss a significant avian presence. The DEIS fails to account for these factors. [LTR 179, CMT 72]

Response: Please see response to Comment LTR 179, CMT 70. The post-construction mortality surveys will be conducted using standard procedures and will be reviewed by the TAC and USFWS.

Comment: *The DEIS Fails to Adequately Consider Displacement Effects on Avian Populations. The DEIS failed to adequately consider displacement effects on avian populations. Impacts of wind projects on birds are not limited to collisions. When a landscape is industrialized by strings of giant machines, birds and other animals may be driven away rather than killed. And when multiple such strings are concentrated in one area, the impacts on species populations can be substantial. The environmental analysis is incomplete and must be supplemented with specific assessments of cumulative displacement impacts. [LTR 179, CMT 73]*

Response: Displacement effects were evaluated in the avian survey report attached in Appendix C of the DEIS. Several studies have found that there is minor displacement of some, but not all bird species, and there is no consistency, among wind energy facilities, about the avoidance levels of a single species from which to draw definitive conclusions. When avoidance has been documented, it has usually been limited to 200 meters or less. To date, no studies of avoidance behavior have been conducted at wind energy facilities in forested landscapes; all have been done in open grassland and shrub-lands. While there are no studies to date that assess avoidance behavior in forest settings, it is possible that the visual obstruction from the trees, as well as familiarity with tall vertical structures, may influence avian avoidance behavior differently than for species that live in vertically unobstructed environments.

Comment: *The DEIS Fails to Ensure Compliance with the Federal Migratory Bird Treaty Act, 16 U.S.C. §§ 703–712. The Migratory Bird Treaty Act ("MBTA") requires that the U.S. Fish and Wildlife Service (USFWS) enforce the MBTA against "any person, association, partnership, or corporation" that "by any means or in any manner," pursues, hunts, takes, captures, kills or attempts to take, capture or kill a migratory bird or any part, nest or eggs of any migratory bird. 16 U.S.C. §§ 703, 707. Under the MBTA, a person may take or kill*

migratory birds only as permitted under USFWS regulations and based on the USFWS's determination that the take or kill is compatible with the migratory bird treaties. Id. §§ 703, 704. The USFWS's determination must take into account scientific factors such as species abundance and distribution, migratory patterns, and breeding habits, as well as the economic value of birds. Id. § 704. The killing of a single migratory bird is sufficient to create criminal liability. United States v. Corbin Farm Service, 444 F.Supp. 510 (E.D. Cal), aff'd, 578 F.2d 259 (9th Cir. 1978). The killing of a migratory bird does not need to be intentional and the killing can occur "by any means or in any manner." United States v. Moon Lake Electric Ass'n, Inc., 45 F.Supp. 2d 1070, 1075–79 (D. Col. 1999) (upholding the prosecution of a utility for unintentionally electrocuting and killing seventeen birds). The DEIS fails to ensure compliance with the MBTA. [LTR 179, CMT 77]

Response: Comment acknowledged. Enforcement of the MBTA is outside the scope of this EIS; however, BPA will comply with all guidelines set forth by the MBTA (as well as with other Acts, Regulations, and Executive Orders).

Comment: *Failure to demonstrate sufficient protections for non-avian wildlife and insects. The application and threshold determination fail to demonstrate sufficient protections for sensitive and rare wildlife species, including a number of sensitive and rare species that the application notes have been observed within the project site. The DEIS also fails to evaluate potential impacts on insects such as butterflies. Here, the impacts are typically not from direct turbine strikes, but rather from habitat disruption or destruction. There are several species of butterflies of particular concern in this area, particularly the rare Western Oak Dusky Wing (Propertius duskywing). [LTR 179, CMT 79]*

Response: As noted throughout the EIS, the Project Area is managed habitat used for commercial forestry. The Project will not alter the disruption of habitat that is already occurring for forestry operations.

Comment: *The DEIS fails to include adequate mitigation measures. The decisions fail to include adequate mitigation measures to protect wildlife. For example, the DEIS include discussion relating to future surveying for wildlife impacts, but fail to include any conditions that would require any concrete actions in response to actual wildlife impacts. [LTR 179, CMT 80]*

Response: The Applicant has proposed to comprehensively mitigate potential wildlife impacts identified in the DEIS. A mitigation plan has been developed in consultation with WDFW to replace impacted habitat and has been approved by WDFW. To meet WAC 463-62-040(2)(a)'s objective of no net loss of wildlife habitat or function, the Applicant has agreed will convey a conservation easement interest in approximately 100 acres of oak woodland and coniferous forest habitat in Klickitat County. Klickitat County has tentatively agreed to act as grantee of this conservation easement, subject to completion of negotiations following issuance of the Site Certificate. The mitigation parcel meets important objectives and WDFW supports this approach.

Comment: *ESTIMATES OF PROJECT IMPACTS – WIND TURBINE COLLISIONS WEST, Inc. appeared to have relied on several types of empirical evidence to predict wind turbine-caused impacts at the proposed 75 MW Whistling Ridge wind energy project. These lines of evidence included a model based on fatality rates regressed on utilization rates, comparisons of exposure index values among species seen at the site, and a comparison of raptor nest density to nesting densities at other wind project sites. However, these approaches have consistently led to inaccurate predictions of project impacts at other locations, and therefore should be examined carefully before relying on them yet again. Predicted Collision Rates Not only have most predictions of raptor fatality rates at wind projects been proven wrong after the project was developed and monitored for fatalities, but some of the wrong predictions have been very wrong (Table 1). Following construction and monitoring, raptor fatalities were estimated to be twice as high as predicted at Stateline, nearly 5 times higher than predicted at Hopkins Ridge, 3 times higher than predicted at Wild Horse, 6.9 times higher than predicted at Shiloh I, at least 11 times higher than predicted at Klondike II, and about 14 times higher than predicted at Big Horn. Even in the scientific field of wildlife biology, prediction errors of these magnitudes would be considered gross failures. Prediction failures are caused by fundamental shortfalls in the assumptions and methodology used to make the predictions. [LTR 181, CMT 2]*

Response: The methods used to conduct the studies and make impact predictions followed standard industry practice as well as WDFW guidelines. The WDFW has stated that the baseline studies were done in compliance with their guidelines. Many of these fatality estimates were made several years ago, when there was little available fatality data to inform predictions. For example, the baseline study for the Klondike project was conducted in 2001 and early 2002. No estimates were made for raptor fatalities at Klondike, except the baseline report stated that they would be "nonexistent to low" based on the raptor use data. Raptor fatalities at Klondike I and III were actually 0 as predicted. We're not sure how the raptor fatality estimate of 0.11 for Klondike II was considered 11 times higher than "low." In addition, the inflated estimates of raptor mortality calculated by Smallwood are flawed (see below) and he used these estimates to compare to predictions. Finally, regardless of what the actual vs. predicted mortality was, all of these projects had low raptor mortality compared to many projects in California noted for having high raptor fatality levels, and the baseline studies all predicted that raptor mortality would be relatively low based on raptor use, as was the case. Please also see response to Comment LTR 36, CMT 8 above.

Comment: *The repeat failures to predict wind project impacts should prompt the States of Washington and Oregon to demand a review of the methods used, and to require new standards, including consequences for wind projects exceeding predicted fatality levels by more than 50%. Predictions of raptor fatality rates at proposed wind projects, and compared to estimated fatality rates following project development. Reported estimates were those appearing in fatality monitoring reports provided by consultants, and the Smallwood estimates were those made by me, using a common set of methods and assumptions, including search detection and scavenger removal rates reported in Smallwood (2007). WEST, Inc. relied on a regression relationship (Figure 8 in App. C-4) that regularly appears in their environmental documentation in support of wind energy projects, and which I have commented on before. Affirming its reliance on the WEST, Inc. approach to assessing potential project impacts, the DEIS (page 3-63) stated, "Mean*

overall bird use in the study area was low compared to these other wind resource areas studied: ranking 19th compared to 24 other wind resource areas…" and, "Mean annual raptor use was 0.28 raptors per plot per 20-minute survey, which is a standardized way to measure use in order to compare results to avian use at other sites." However, this approach was inappropriate for use as a predictive tool due to multiple fundamental flaws, which are addressed in the following paragraphs. [LTR 181, CMT 3]

Response: Please see response to Comment LTR 181, CMT 2 above.

Comment: *[In reference to] Figure 8 in Appendix C-4. The dotted line fitting the clump of data points at the lower left represents an alternative regression relationship if data from the two California WRAs in the upper right aspect of the graph were omitted. The regression relationship was pseudo-replicated. Sufficiency of survey effort. The vertical dashed arrow in Figure 1 [of LTR 181, CMT 4] represents the utilization rate that WEST, Inc. estimated for raptors at the Whistling Ridge project site. Although a non-biologist might be impressed with the number of bird surveys performed at the Whistling Ridge project site, totaling 261 surveys, biologists familiar with utilization surveys at wind project sites have cause for concern regarding conclusions drawn from the level of effort devoted to Whistling Ridge. The 261 surveys lasted 20 minutes each, so totaled 87 hours. Eighty-seven hours was insufficient time to detect multiple raptor species and many other bird species, especially considering the high levels of visual occlusion due to forest cover surrounding observation stations at Whistling Ridge, along with the large volumes of airspace that would have been occluded due to mountainous terrain and cloudiness. Even the large amount of survey time invested in the Altamont Pass WRA -- where no forest occluded views -- failed to detect multiple species that are killed by APWRA wind turbines, including threatened and endangered species such as brown pelican and peregrine falcon, and many hours were needed to detect only one individual of many species. For example, 774 hours of survey at Vasco Caves Regional Preserve in the Altamont Pass WRA4 failed to detect peregrine falcon even though this species was twice documented as killed by Altamont Pass wind turbines. At Vasco Caves, it took 387 hours per merlin observation, even though this species is killed by Altamont Pass wind turbines. It took all 774 hours to detect one redshouldered hawk, and it took 70 hours per Cooper's hawk observation and 55 hours per Swainson's hawk observation, even though members of these species have been killed in the Altamont Pass. [LTR 181, CMT 4]*

Response: The regression analysis is a guide for helping to provide a predicted range of mortality of raptors (0 to 0.25/MW/year; page 3-79 of the DEIS, Appendix C-4). Please also see response to Comment LTR 36, CMT 8 above.

Comment: *Just because a species goes undetected in the minimal survey efforts that have been directed to birds at wind project sites does not mean that that species will avoid collisions with wind turbines. An earlier study in a different part of the Altamont Pass WRA involved 980 hours of bird surveys. In that study the number of hours required per observation was 490 for Cooper's hawk, 980 for white-tailed kite, 163 for rough-legged hawk, 7 for loggerhead shrike (a*

commonly killed species), 43 for cliff swallow (another commonly killed species), and 2 for golden eagle. Even though in the Altamont Pass we invested more than 11 times the hours committed to Whistling Ridge, we were unable to detect any significant relationships between fatality rates and utilization rates among rows or larger plots of wind turbines. [LTR 181, CMT 5]

Response: Please see response to Comment LTR 36, CMT 8 above.

Comment: *My colleagues and I concluded that not only were relatively small sample sizes an impediment to detecting a relationship between fatality rates and utilization rates, but there was the interference of a substantial bias caused by declining survey detection rates with increasing distance from the observer, especially for smaller-bodied bird species. The survey effort at Whistling Ridge was grossly insufficient for informing decision-makers about the impacts of the project that will be caused by wind turbine collisions with birds. The surveys were diurnal. The utilization surveys at Whistling Ridge did not record any birds flying at dawn, dusk, or at night, so they inadequately characterized the suite of bird species that uses the project area. (Utilization surveys are different from protocol-level call-back surveys used to detect northern spotted owls, and the data are recorded differently and used differently, including for wind turbine siting.) No nocturnal owl species would have been detected unless an owl flushed in daylight hours for some reason, and multiple other species would have been missed if they flew at night. This shortfall can be applied to most survey efforts that have been performed at wind project sites throughout the USA, so it was not unique to Whistling Ridge. This shortfall should be acknowledged and the level of uncertainty attributed to conclusions of impacts should be increased. [LTR 181, CMT 6]*

Response: To date no large-scale mortality of night migrating passerines similar to that seen at communication towers has been documented at wind energy facilities. Most mortality to nocturnally migrating passerines occurs at lighted communication towers over 500 feet tall and with guy wires used to support the towers (Longcore et al. 2005). Wind turbines are less than 500 feet tall and do not have guy wires. In addition, several studies have examined bird and bat fatality rates in relation to turbine lighting and have found that turbine lighting does not increase songbird or bat fatality rates. Finally, The Wildlife Society (Arnett et al. 2007) reviewed available information and concluded that fatalities of passerines from turbine strikes generally are not significant at the population level (Arnett et al. 2007). The need for long-term monitoring should be based on results of the first two years of monitoring, which will account for inter-annual variation in bird use of the site. Please also see response to Comment LTR 181, CMT 2 above.

Comment: *Variation in visibility of surveyed airspace.—Survey observation stations are typically located on prominent aspects of the study area so that the observers can scan for birds in as much of the airspace as possible. The surveyed airspace is that airspace between the observer and the maximum survey radius (a maximum distance from the observer), and between the ground and to whatever elevation above the ground (ceiling) the surveyor is scanning for*

birds. WEST, Inc. routinely uses an 800-m maximum survey radius. However, at least some of the airspace between the observer and the maximum survey radius is usually hidden from the observer, due to hills, the slope of the hill upon which the observer stands, trees, and the prevalence of fog or clouds. In hilly or mountainous terrain, observers stationed on prominent locations might be able to see a smaller proportion of the available airspace between 40 and 100 m away due to the slope dropping away from the observer. These observers might be able to survey a larger volume of airspace between 100 and 250 m away because those distances overlap canyon bottoms into which the observer might be able to see and over which there is more airspace due to a larger elevation range extending from below the observer (canyon bottom) to whatever elevation ceiling the observations might extend (assuming there is a ceiling). In other words, prominent locations tend to provide surveyors with variable volumes and proportions of volumes of airspace as functions of distance from the observer, due to the manner in which the ground surface slopes away from the observation station. The ground surface area of a flat circle within 800 m of the observer at a single station equals 2.01 km2. Assuming the WEST, Inc. survey team can see birds as high as they seem to think they can see them in distance, the volume of airspace surveyed on perfectly flat and unobstructed landscapes would be 1.61 km3, which in my opinion is a huge volume of airspace in which to expect to see more than a small fraction of the available birds. In the Altamont Pass my colleagues and I did not believe we could reliably detect most birds flying as high as 800 m, so we selected a ceiling of 140 m above the elevation of the observer, excluding birds above that ceiling from utilization rate estimates. This 140-m ceiling above flat terrain would have the surveyors searching 0.28 km3, which is still a volume I consider unmanageable, but which is much smaller than within an 800-m ceiling. However, flat ground is rarely where bird surveys are performed in WRAs, especially in the Pacific Northwest. From station to station, and from project site to project site across the US, the visible volume of airspace surveyed will vary greatly due to variability in topography and forest cover surrounding each station. [LTR 181, CMT 7]

Response: The 800 meter radius used during surveys of Whistling Ridge refers to horizontal distance from the observer, not height above the observer. The protocol used to collect avian use data at Whistling Ridge was similar to protocols used at over 50 wind energy projects in the U.S. With this protocol, large birds such as raptors, waterfowl, etc. are recorded out to 800 meter horizontal distance, and efforts are made to place survey stations where visibility out to 800 meter is either unhindered or encompasses most of the plot circle. Because all studies are conducted in the same manner, it is appropriate to compare avian use rates among studies. The purpose of the survey is not to count the absolute number of birds but to obtain an index to bird use that can be used to assess risk at the site compared to other facilities where similar data have been collected using an 800 meter plot. Therefore, correcting for visible airspace is not required in these studies.

Comment: *To illustrate the influence of this variability, Lee Neher and I constructed a digital elevation model (DEM) of the Vasco Caves Regional Preserve in the Altamont Pass and we calculated the volume of airspace visible from each of 15 observation stations ([LTR 181, CMT 7] Figure 2). Our results demonstrated that bird observations need to be related to visible volumes of airspace to avoid confounding any comparison that would be made of utilization rates among observation stations or wind project sites. Change in mean and station-specific*

percentage of visible volume of airspace within 140-m ceiling and within specific radial bands from the observer (x-axis) among 15 observation stations at Vasco Caves Regional Preserve in the Altamont Pass. Note that our maximum survey radius was 2009 feet, or 600 m, whereas WEST, Inc. uses a maximum survey radius of 800 m, including at Whistling Ridge. Projecting the trends in this Figure to 800 m, we might expect a mean of 60% of the airspace to be visible, ranging about 20% to 94% among the stations, and this variation did not include airspace hidden by forest surrounding observation stations at Whistling Ridge. Without accounting for this source of variation in utilization rates, comparing utilization among sites within a project area could be misleading, and comparing utilization rates among wind project sites across the US might qualify as very misleading. 800 m maximum survey radius was too far. --Lee Neher and I quantified the effect of variable distances of birds from the observer, using our DEM of a project area in the Altamont Pass ([LTR 181, CMT 7] Figures 3 and 4). We calculated detection functions from the patterns depicted in Figures 3 and 4 (see [LTR 181, CMT 7] Table 2), enabling me to project our detection rates to visible volumes of airspace within the maximum survey radii used by other investigators. Raptor utilization rates within an 800 m maximum survey radius would be reported at about 81% of the rate within a 600 m maximum survey radius, at 60% of the rate within a 400 m survey radius, and 22% of the rate within a 100 m survey radius. Without accounting for the effect of distance from the observer, utilization rates cannot be compared among wind projects, nor can utilization rates be compared appropriately among species. First detections/hr/km3 of visible airspace regressed on distance from observer within radial boundary increased from 30 m to 600 m at Vasco Caves Regional Preserve, California. [LTR 181, CMT 8]

Response: Please see response to Comment LTR 181, CMT 7 above.

Comment: *Pseudoreplication.--The regression relationship in Figure 8 of App. C-4 likely exemplifies psuedoreplication in correlation analysis, which is a fundamental experimental design flaw that is routinely warned against in statistics textbooks. The regression is based on two clusters of data, one from wind projects located mostly in the Pacific Northwest and the other from two projects located nearby each other in California. If the variation in the graph was more representative of the two regions -- Washington/Oregon versus Central California – than of the individual project sites, then the sampling units were really the regions and not the project sites. In presenting their graph, Johnson and Erickson (2008, 2010) presented a value for the coefficient of determination, r2, but they neglected to present an error term. Furthermore, they presented the relationship as significant, and the DEIS repeated that conclusion along with the prediction, based on the regression, that 0 raptors would be killed by Whistling Ridge wind turbines ([DEIS]page 3-79). [LTR 181, CMT 9]*

Response: Please see response to Comments LTR 181, CMT 4 and LTR 36, CMT 8 above.

Comment: *Within specific 100-foot radial bands, mean first detections/hour/km3 of visible airspace decreased with increasing distance from the observer for golden eagle, red-tailed hawk, turkey vulture, northern harrier, prairie falcon, common raven, American kestrel, burrowing*

owl, and all raptors as a group in Vasco Caves Regional Preserve, 2006-2007. Horizontal dashed lines represented detection rates expected of each species assuming spatial distributions were most accurate within the closest 100 or 200 feet to the observer. [LTR 181, CMT 10]

Response: Comment acknowledged.

Comment: *Cumulative mean first detections/hour increased with increasing distance from the observer for golden eagle, red-tailed hawk, turkey vulture, northern harrier, prairie falcon, common raven, American kestrel, burrowing owl, and all raptors as a group in Vasco Caves Regional Preserve, 2006-2007. The solid line in the lower right graph depicts the exponential increase in cumulative detections of raptors, assuming the spatial distribution of raptors was unaffected by the locations of observation stations and detection rate was most accurate within the closest 100 feet. The coefficient of determination is an index of both response and precision, but the reader must be familiar with regression analysis to visually assess the degrees to which variability or precision contributed to r2. A more direct measure of precision is the root mean square error (RMSE) of the regression, otherwise known as standard error. In my experience, RMSE can serve as a diagnostic tool for deciding whether r2 was influenced more by leveraging from outliers or from psuedoreplication. [LTR 181, CMT 11]*

Response: Please see response to Comment LTR 181, CMT 4 above.

Comment: *Another diagnostic test is to omit data from one of the clusters to learn whether the regression slope would change significantly. In fact, omitting the two data points from Central California project sites converted a strongly positive slope to a negative slope (see dotted line in Figure 1 [of LTR 181]), and the revised regression line was a better fit to the data, based on RMSE (RMSE = 0.0567, which was a third of the value for the pseudoreplicated regression slope). In cases like this, when two data points determine whether an estimated regression slope is strongly positive or negative, the analyst should not use the regression equation to make predictions. It was inappropriate for the DEIS to predict that 0 raptors would be killed by Whistling Ridge. [LTR 181, CMT 12]*

Response: Please see response to Comment LTR 181, CMT 4 above.

Comment: *Accuracy of fatality rates.—Where able, and in the time I had before preparing this comment letter, I used data available in reports to independently estimate fatality rates at project sites across the western USA. My estimates averaged 2.44 times higher than reported for all birds as a group (N = 23 reports), 1.34 times higher for all raptors as a group (N = 23), and 2 times higher for all bats (N = 20). Probably the principal reason for my higher estimates was the difference in fatality estimator. Most of the monitoring reports I reviewed had utilized the following estimator of fatalities per MW per year, FA: eqn. 1 where FU is unadjusted average number of carcasses observed per MW per year, t is mean number of days until carcass removal,*

and is estimated by scavenger removal trials, p is proportion of carcasses found by fatality searchers during searcher detection trials, and I is average search interval in days. The other estimator in use, and the one I use, is derived from the Horvitz and Thompson (1952) estimator: Eqn. 2 where RC is the average proportion of carcasses remaining since the last fatality search and is estimated by scavenger removal trials. I assume carcasses are deposited at a steady rate from wind turbines, so I take the average proportion of carcasses remaining each sequential day between searches: Eqn 3 where Ri is proportion of carcasses remaining by the ith day following the initiation of a scavenger removal trial. Thus, the expected proportion of carcasses remaining by the next fatality search should be RC corresponding with the fatality search interval, I. A key difference between the two estimators is the use of t in eqn. 1 and the use of RC in eqn. 2. The sample size of placed carcasses contributing to RC never changes from start to finish of a removal trial, as none of the carcasses need to be censored. On the other hand, the sample size contributing to t starts small and increases quickly as the trial grows longer (Figure 5, left graph [LTR181]). If 10 carcasses were placed to obtain RC, then 10 carcasses will contribute to RC after 1 day, 10 days, or 30 days. If 10 carcasses are placed to obtain t , then it may be that none of them will contribute to t after a day because none had been removed by then, and so all had to be censored from the calculation. If 4 carcasses were removed after 10 days, then only these 4 would contribute to the calculation of t . If 7 carcasses were removed after 30 days, then only these 7 would contribute to the calculation of t . Thus, t increases exponentially with the sample size used to calculate t because the increasingly large sample is also composed of carcasses that have persisted longer into the trial (Figure 5, right graph [LTR181]). Furthermore, t increases nonlinearly with number of days into a trial (Figure 6 [LTR181]), indicating a bias. Perhaps the main bias, however, is the use of t , which is derived from a time period that is necessarily much longer than the average search interval of the fatality monitoring (see text that follows). [LTR 181, CMT 13]

Response: The fatality rate independently estimated by Smallwood for Whistling Ridge was 0.44 raptors/MW/year. Raptor fatality rates at 13 facilities in the Pacific Northwest have ranged from 0 to 0.29 and averaged 0.09/MW/year. Smallwood states that bird and bat fatality rates are underestimated due to a bias in the estimator used by the Applicant's consultant (WEST), which is known as the Shoenfeld estimator. Smallwood did not elaborate on what estimator was used or what the bias was, but it is assumed Smallwood used what a "novel" approach as outlined in Smallwood et al. (2010). One likely assumption in the use of the estimator that Smallwood presumably used is that a carcass, if missed by a searcher during the first search, no longer has any chance of being found during subsequent searches. It has been demonstrated in studies that fatalities that are missed the first time have a good chance of being picked up in subsequent searches (Arnett et al. 2009). Not accounting for this probability of finding carcasses during multiple searches leads to an overestimate of fatality rates in Smallwood's estimator.

Comment: *Sample sizes used to calculate mean days to carcass removal decline with shorter trial duration, and mean days to removal increases exponentially with sample size at Vasco Caves Regional Preserve, Altamont Pass, California. Mean days to carcass removal increases with longer duration of the carcass removal trial at Vasco Caves Regional Preserve, Altamont Pass, California. When censoring remaining carcasses, t cannot be calculated unless at least one carcass has been removed. If no carcasses are removed during a trial, then t will be*

undefined, whereas RC would equal 1 and the fatality rate could still be estimated. To prevent a trial result in which no carcasses are removed, and hence t cannot be calculated, investigators can place larger numbers of carcasses or they can perform longer trials. Placing larger numbers of carcasses can potentially swamp the vertebrate scavengers, thereby increasing mean days to removal. The option to perform longer trials might help explain why many of the trials intended to obtain t have been conducted for 40 to 64 days, or from nearly twice as long to more than four times longer than the average search interval used in the corresponding fatality monitoring. Values of t derived from such long trials will be larger than those derived from trials lasting no longer than the fatality search interval, and the fatality rates will be underestimated. I must also point out that my estimates, relying on eqn. 1, remain conservative because I have yet to account for declining searcher detection rates as the search interval increases (searcher detection trials are based on a search interval of less or equal to one day). I also have not accounted for crippling bias – the non-detection of mortally wounded birds that leave the search area on their own volition before perishing – because there is no means to account for this bias. [LTR 181, CMT 14]

Response: Please see response to Comment LTR 181, CMT 13 above.

Comment: *Underestimates of fatality rates in the Pacific Northwest might be partly caused by reliance on mean days to carcass removal as an adjustment for scavenger removal rates (Smallwood 2007), but some of the scavenger removal trials were sufficiently flawed that I had to replace their results with national averages in Smallwood (2007). Under-estimated fatality rates have been used to predict fatality rates of planned projects, which may be one reason why predicted fatality rates have so often been wrong. The regression analysis appearing in Figure 8 of App. C-4 was based on inaccurate fatality rate estimates. [LTR 181, CMT 15]*

Response: Please see response to Comments LTR 181, CMT 4 and LTR 181, CMT 13 above.

Comment: *Accounting for inter-annual variation. — The data presented in Figure 8 of App. C-4 were derived mostly from one-year monitoring programs. However, inter-annual variation in fatality rates and utilization rates can be very high at a given project site. For example, fatality rates varied 5.7-fold from low to high over 8 years within a 10-year period in the Altamont Pass WRA. They varied nearly 2-fold over a 3-year period at Foote Creek Rim and nearly 3-fold over a 4-year period at Buffalo Ridge. Given this range of variation, single-year estimates are mere snapshots of fatality rates and unlikely to reveal meaningful relationships between fatality rates and utilization rates among wind projects. Inter-annual estimates of raptor fatality rates in the Altamont Pass WRA. Regression relationship based on selective inclusion of data. — Figure 8 of App. C-4 was based on only some of the wind projects for which there exists fatality rate and utilization rate estimates. Including more of the estimates available, the regression slope reported by Johnson et al. in the Whistling Ridge DEIS no longer applies. Fatality rate estimates regressed on utilization rate estimates after including data from additional WRAs to those used by WEST, Inc. Consistency of regression relationship. — WEST,*

Inc. has been inconsistent in its utilization rates and fatality rates used to construct the regression model in Figure 8 of App. C-4. [LTR 181, CMT 16]

Response: The studies were conducted in compliance with the WDFW windpower guidelines, as one full year of avian baseline data were collected to cover all four seasons. In addition, the avian baseline studies were conducted in 2004, 2006, 2008 and 2009 which accounts for inter-annual variation. Please also see response to Comment LTR 181, CMT 4 above.

Comment: *For example, in the environmental review documents prepared for Windy Point, Windy Flats, and Hatchet Ridge, data representing the two extreme California wind projects (Diablo Winds and High Winds) indicated 30% higher utilization rates than depicted in the Whistling Ridge DEIS. Also, the fatality rate representing Diablo Winds was half as great in the Windy point, Windy Flats, and Hatchet Ridge documents compared to the Whistling Ridge DEIS. Compared to the regression model presented in the environmental review documents for Windy Point, Windy Flats, and Hatchet Ridge, the regression slope was more than twice as steep in the model presented for Whistling Ridge. These inconsistencies should be explained. Fitted regression line intercepts 0 fatalities before it intercepts Y-axis. — The DEIS (page 3-79) predicted that Whistling Ridge will cause 0 raptor fatalities because its estimated utilization rate appeared to the left of the Y-axis 0-intercept in Figure 8 of App. C-4. This prediction was unrealistic and inconsistent with the very data that contributed to the estimated regression line. In fact, one of the wind projects that contributed to Johnson et al.'s regression model also appeared to the left of the Y-axis 0-intercept, but it was represented as having killed 0.09 raptors/MW/year (my estimate of the fatality rate of this project was twice as high, however). [LTR 181, CMT 17]*

Response: Please see response to Comment LTR 181, CMT 4 above.

Comment: *In addition to this inconsistency in the use of the regression, omitting the two Central California wind projects from the analysis flips the regression slope from positive to negative, potentially leading to an opposite conclusion – that Whistling Ridge will kill more raptors than any other wind project in Washington or Oregon. However, for multiple reasons discussed below, I advise against using my revised regression line or the Johnson et al.'s regression line for predicting fatality rates. Calculation of utilization rates. — Utilization rates contributing to the regression model were often calculated as means among seasonal totals, rather than annual total observations per year or weighted averages. Weighted averages should be used if surveys were performed regularly across all seasons, where the weightings are based on duration of each season. Without weighting, simple averaging among seasonal total utilization rates likely under-represents the contributions of longer seasons with higher bird use. [LTR 181, CMT 18]*

Response: Please see response to Comment LTR 181, CMT 4 above.

Comment: *Summary of fatality rates regressed on utilization rates. The consultants who prepared the supporting documents for the DEIS have been unable to accurately predict raptor fatality rates, as demonstrated above. In fact, their predictions have been much too low, and the same problem can be demonstrated for bats and other bird species. Upon examination, the methods used to predict fatality rates appear to be ineffective, as raptor fatality rates failed to correlate with nesting densities, utilization rates, and exposure index values. The methods used by the consultants simply do not work. The predictions of fatality rates in the Whistling Ridge DEIS cannot be relied upon. Exposure index values. On page 3-77, the DEIS summarizes the calculation of the exposure index (also see App. C-4), which it said was used to assess the risk of collision of each bird species. In fact, on the same page and on subsequent pages the DEIS did just that – it offered conclusions about the likelihoods of collision-caused fatalities based on values of the exposure index. [LTR 181, CMT 19]*

Response: Please see response to Comments LTR 36, CMT 8 and LTR 181, CMT 2 above.

Comment: *However, I have never seen a test of the relationship between fatality rates and exposure index. Based on my own experience attempting to relate fatality rates to variables similar to the exposure index, I am skeptical that WEST, Inc. has actually generated a hypothesis test result that would support the use of the exposure index as a predictive tool. Therefore, I tested for a relationship using data from the Big Horn and Wild Horse Wind Projects. I found no hint that fatality rates could be predicted by the exposure index. [LTR 181, CMT 20]*

Response: The exposure index was not used to predict fatality rates for the Whistling Ridge Energy Project.

Comment: *Furthermore, between the two projects 27 species (23%) were not detected during utilization surveys at one or both project sites but were killed by wind turbines at the same project site. Of the 22 species that were detected during utilization surveys at one or both project sites and that were also killed by wind turbines, only 4 of them (18%) were given exposure index values >0. In other words, there was no correspondence between the exposure index and fatality rates. The exposure index appears to be completely ineffective as a predictor of fatality rates caused by wind projects. Nesting densities. I collected reports of raptor nesting densities and raptor fatality rates from wind projects throughout the western states. I found no trend in the relationship between fatality rates and nesting density that would suggest that nesting density explains some of the variation in raptor fatality rates. Relationship between fatality rates and exposure index values for each bird species documented in utilization surveys and fatality searches at the Big Horn and Wild Horse Wind Energy projects. I omitted bats and unidentified birds such as sparrow, falcon, or passerine. I included only estimates for individual, named species, totaling 115 estimates between the project sites (some species appear twice, once for each project site). Raptor fatality rates did not correlate significantly with raptor nest densities recorded on project sites and usually within a 2 mile buffer of the project boundaries. Raptor nesting density did not appear to predict raptor fatality rates at wind projects. [LTR 181, CMT 21]*

Response: Please see response to Comment LTR 181, CMT 20 above. Nesting density is surveyed to determine what species are nesting near proposed developments, but are not meant to provide a correlation with fatality.

Comment: *ESTIMATES OF PROJECT IMPACTS – COLLISIONS. The DEIS predicted 0 raptors would be killed by the Whistling Ridge wind turbines, but this conclusion did not comport with the record of fatalities documented at existing wind energy projects. There have been only two wind projects that documented 0 raptor fatalities, but those estimates were based on one year of monitoring, which was insufficient. Based on reports of fatality monitoring at 23 wind projects in Washington, Oregon and California, the average fatality rates projected to 75 MW of rated capacity would predict 33 raptor fatalities per year, 422 bird (including raptor) fatalities per year, and 86 bat fatalities per year. However, the Whistling Ridge project site differs from all the others because it would be in a mountainous and forested environment that is also often enveloped by clouds. Given the absence of existing wind farms in these conditions in the Pacific Northwest, I cannot provide reliable estimates of collision rates at Whistling Ridge, but I caution that fatality rates could be much higher than listed in. [LTR 181, CMT 22]*

Response: Please see response to Comments LTR 36, CMT 8 and LTR 181, CMT 2 above.

Comment: *Furthermore, the fatality rate projections in Table 3 [of LTR 181] are interim rates before I update Smallwood (2007) to improve the adjustment factors for searcher detection error and scavenger removal rate. My 2007 paper was based on available searcher detection and scavenger removal trials available at the time, but hundreds of trials have been performed since then. I have integrated the data from these hundreds of trials, and I have observed much faster removal rates for most taxonomic groups, especially for bats, as well as lower searcher detection rates. I have not had time yet to finalize my analysis of these data from newer trials. I anticipate that my fatality rate estimates will be higher once I have updated Smallwood (2007). [LTR 181, CMT 23]*

Response: Comment acknowledged.

Comment: *Regional Population Estimates. -- Johnson and Erickson (2010) neglected to mention that there exist relatively large standard errors associated with the mean detections per BBS route. I used the standard errors to calculate 95% confidence intervals, which yielded very large ranges of population size for each species addressed in Johnson and Erickson (2008). For example, the lower bound estimate for ferruginous hawk was less than 0, and the differences between one side of the confidence interval and the mean population estimate ranged 29% (American kestrel) to 65% (ferruginous hawk) of the magnitude of the mean. Without addressing the large error terms in the data, Johnson and Erickson (2008) inadequately informed the reader about the suitability of their population estimates for assessing biological significance of "cumulative impacts." [LTR 181, CMT 25*]

Response: The Breeding Bird Survey (BBS) data was used by Partners in Flight to estimate population size for avian species, and is the only available source for population estimates. While the standard errors are large, the population estimates use the best available science and therefore necessary for the basis of cumulative effects. The raptor mortality from wind developments would be a very small proportion of total natural mortality, unless the population sizes for raptors were substantially overestimated.

Comment: *More importantly, Johnson and Erickson (2008) dismissed strong criticism of a review of the Partners in Flight approach. Thogmartin et al. (2006) reviewed the population estimation approach of Partners in Flight, and found the approach to be an inappropriate use of BBS data. The BBS was designed for detecting long-term population trends, but not for estimating population size. Thogmartin et al. (2006) also pointed out several potential biases in the Partners in Flight use of BBS data. The most likely and most substantial bias is the extrapolation of detection rates from roadways across large expanses of potential habitat lacking roads. Having performed many years of bird surveys both along roadways and far from roads, I cannot agree more with Thogmartin et al.'s conclusion that this was a serious bias, and one that likely inflated population estimates of the species addressed in Johnson and Erickson (2008). American kestrels, red-tailed hawks, and ferruginous hawks congregate along roadways because utility poles occur along roadways and are used for perching, especially on agricultural and shrub-steppe landscapes lacking natural tall perch structures. [LTR 181, CMT 26]*

Response: The population estimates used in the cumulative impacts analysis were developed by Partners in Flight (Blancher et al. 2007). Partners in Flight (PIF) is a cooperative effort involving partnerships among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. The mission of PIF includes 1) helping species at risk, 2) keeping common birds common, and 3) voluntary partnerships for birds, habitats and people. PIF felt it was important to generate estimates of bird populations across the U.S., which were lacking for most species and most regions. They used relative abundance counts from the North American Breeding Bird Survey (BBS) to form the basis of their bird population estimates. Although PIF acknowledges that the BBS was not designed specifically to produce population estimates, and there are difficulties to overcome as a result, there are important advantages. The main ones are that data from across much of North America have been collected according to a single standardized method, surveys employ random start points and directions thus enhancing regional representation of the avifauna (roadside bias notwithstanding), and the data are readily available for the bulk of North American landbirds. According to PIF, the population estimates are rough approximations for landbirds breeding in the U.S. and Canada, and the results and the underlying data of this first effort to estimate population numbers for all North American landbirds can be used for several different purposes (*http://www.partnersinflight.org/*). In order to prepare a cumulative impact analysis, estimates of population sizes are required. Otherwise, it is impossible to determine how raptor fatalities associated with wind energy development could affect populations and therefore lead to cumulative impacts. The only population estimates available for most bird species in the Pacific Northwest are those estimates calculated by PIF. Although these estimates may not be completely accurate for all species, they are the only ones available and therefore represent the best available science for this use. Use of the best available

science to make informed decisions is standard practice in ecology and wildlife biology. In the United States, many of the laws governing conservation and management stipulate that the best available science be used as the basis of policy and decision making. One such law, the Endangered Species Act, requires that decisions on listing a species as threatened or endangered be made on the basis of the "best scientific and commercial data available". Similarly, National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act states that conservation and management measures shall be based on "the best scientific information available." In addition, the U.S. Environmental Protection Agency has emphasized the role of best available science in implementing the Clean Water Act (Sullivan et al. 2006). Therefore, use of the PIF population estimates, given that they represent the best available science, is a clearly accepted practice and is in fact mandated by many U.S. laws for making informed policy decisions. Finally, estimated raptor fatality rates in the cumulative impacts analysis (Johnson and Erickson 2010) suggest that raptor mortality associated with 6,700 MW of wind energy comprises a small proportion of the population and further comprises a very small proportion of natural mortality. Therefore, actual bird population sizes in the analysis area would have to be substantially lower than estimated by PIF before conclusions regarding the lack of cumulative effects would not be considered valid.

Comment: *Furthermore, on agricultural landscapes, foraging habitat often occurs as strips between roads and disked fields. Extrapolating densities from roadways will produce absurdly inflated numerical estimates of numerous bird species, especially for American kestrels because their densities were estimates only within 200 m of BBS routes (the usual radius used by Partners in Flight was 400 m). A later version of Johnson and Erickson's cumulative impacts analysis (Johnson and Erickson 2010), which was mysteriously not the analysis used in App. C-11, dismissed Thogmartin et al.'s review because no other regional population estimates exist for the Columbia Plateau. This rationale was unscientific. Johnson and Erickson (2008) did not provide a Partners in Flight estimate of the population size for golden eagles on the Columbia Plateau Ecoregion within Washington and Oregon because golden eagle fatalities had yet to be documented among wind turbines on the Columbia Plateau. [LTR 181, CMT 27]*

Response: Please see response to Comment LTR 181, CMT 26 above.

Comment: *However, golden eagle fatalities were subsequently documented, so the 2010 version of Johnson and Erickson's cumulative impacts analysis included a golden eagle population estimate, which was 1,700. For this number of golden eagles to occur on the Columbia Plateau within Washington and Oregon, the population density would have to be nearly as high as recorded in the Altamont Pass, or nearly one nesting pair per 19 km2. The Altamont Pass golden eagle density was characterized by Hunt et al. as one of the highest ever recorded. Therefore, for the Johnson and Erickson estimate to be true, the Columbia Basin would require an Altamont-level density to extend across the entirety of the Plateau, which is highly unlikely based on my understanding of animal density and distribution. Furthermore, the baseline studies performed by Johnson and Erickson and their WEST, Inc. colleagues have universally reported much lower golden eagle observations per hour among project sites in the*

Columbia Plateau Ecoregion as compared to the utilization rates documented in the Altamont Pass. As examples, WEST, Inc. reported 0 golden eagle observations during baseline surveys at Big Horn, 0.07/hour after 90 hours at Wild Horse, 0.033/hour after 270 hours at Golden Hills, 0.024/hour after 126 hours at Hopkins Ridge. For comparison, representative observation rates from the Altamont Pass have been 0.278/hour and 0.314/hour. The golden eagle population on the Columbia Plateau cannot be just as dense as in the Altamont Pass while at the same time trained observers count them at rates that are 0%, 8%, and 24% of the rates observed in the Altamont Pass. [LTR 181, CMT 28]

Response: To date no studies of wind power facilities have shown a population level decline of any species, but only one study has been conducted to examine this issue. Hunt (2002) conducted a 4-year radio telemetry study of golden eagles at the APWRA and found that the resident golden eagle population appeared to be self-sustaining despite high levels of fatalities, but the effect of these fatalities on eagle populations wintering within and adjacent to the APWRA was unknown. All 58 territories occupied by golden eagle pairs in the APWRA in 2000 remained active in 2005 (Hunt and Hunt 2006). The Wildlife Society prepared a landmark publication on wind energy and wildlife and concluded that fatalities of passerines from turbine strikes generally are not significant at the population level (Arnett et al. 2007). We believe that the reason no other studies have been conducted to determine if wind projects have caused any population declines of any bird species is that measured fatality levels have been low enough that no agencies have expressed concern over population level impacts and required such studies.

Comment: *As for Swainson's hawk, Johnson and Erickson (2008) estimated 10,000 breeding Swainson's hawks reside on the Columbia Plateau within Washington and Oregon. My model of nesting density projected only 579 pairs, or 1,158 adults. My projection was extended beyond all the population density estimates that were available to contribute to the model, so to be conservative I can rationalize doubling my estimate to 2,315, which is still a much smaller population size than estimated by Johnson and Erickson. Johnson and Erickson estimated the breeding American kestrel population to be 170,000 on the Columbia Plateau within Washington and Oregon. This number would amount to 7% of the entire North American breeding population that was estimated 28 years ago, and it would be a much larger percentage of today's North American breeding population. It would have me believe that at least 7% of North America's American kestrel population resides on 0.55% of North America's land mass, or nearly 13 times more densely other than expected in the Columbia Plateau Ecoregion. [LTR 181, CMT 29]*

Response: Please see response to Comment LTR 181, CMT 26 above.

Comment: *This regional population estimate also would have me believe there resides 1 breeding American kestrel for every 0.79 km2, or one pair per 1.58 km2. This density across such a large area would be highly unlikely. Furthermore, Johnson and Erickson (2008) claimed that the level of mortality likely to be caused by wind turbines following desired build-out in the Columbia Plateau would be sustainable and therefore of no significant population impact. This*

conclusion was not supported by a scientifically acceptable analysis, and it was inconsistent with the overall declining trend of American kestrels across North American and within Washington, specifically. [LTR 181, CMT 30]

Response: Please see response to Comment LTR 181, CMT 26 above.

Comment: *Fatality Rates. -- Johnson and Erickson (2008, 2010) compared fatality rates among Oregon and Washington wind farms, and then extrapolated the mean fatality rates to the projected build-out of 6,700 MW of wind power capacity in the Columbia Plateau Ecoregion. The fatality rates in their Table 2 (Table 1 in the 2010 analysis) were too low (Table 4). For example, using the same data, I found their estimates to be low for Big Horn, Wild Horse, and Stateline. The raptor fatality rate reported for Big Horn was 0.15 deaths/MW/year, whereas I estimated the rate to be 60% higher. [LTR 181, CMT 31]*

Response: Please see response to Comment LTR 181, CMT 13 above.

Comment: *The raptor fatality rate at Wild Horse was reported to be 0.09 deaths/MW/year, but I estimate the rate to be 178% higher. The raptor fatality rate at Stateline was reported to be 0.091 deaths/MW/year, but I estimated the rate to be 43% higher. Extrapolating my Wild Horse fatality rate estimates to 6,700 MW of cumulative capacity yielded 1,688 raptors per year and 27,230 total birds per year. Extrapolating my Big Horn fatality rate estimates to 6,700 MW of cumulative capacity yielded 1,625 raptors per year and 23,568 total birds per year. The average of the extrapolations from these two projects yielded 1,656 raptors per year and 25,399 total birds per year. These extrapolations are 3.2 times greater for all raptors and 1.4 times greater for all birds than forecast by Johnson and Erickson (2008, 2010), and I have yet to consider the confidence intervals around the fatality rate estimates, which are very large. [LTR 181, CMT 32]*

Response: Please see response to Comment LTR 181, CMT 13 above.

Comment: *As for American kestrel, Johnson and Erickson (2008, 2010) forecast 162 deaths/MW/year, but my average estimates between Wild Horse and Big Horn, extrapolated to 6,700 MW, indicates the cumulative toll will be 1,381 deaths/MW/year, or 8.5 times greater than forecast by Johnson and Erickson (2008, 2010). [LTR 181, CMT 33]*

Response: Please see response to Comment LTR 181, CMT 13 above.

Comment: *I also compared cumulative annual fatalities predicted by WEST, Inc. (and included in the DEIS) to my predictions based on my independent estimates of fatality rates using data in the same reports (Table 4 [of LTR 181]). Compared to the predictions made by*

WEST, Inc., my predicted cumulative annual fatalities caused by the projected build-out of wind energy facilities in the Columbia Basin Ecoregion were 6.3 times greater for raptors, 2.6 times greater for all birds as a group, and about the same for bats (Table 4 [of LTR 181]). Most of the difference in predictions between those made by me and WEST, Inc. can be explained by the estimators used, and specifically whether scavenger removal rates of carcasses were characterized by mean days to removal or by proportion of carcasses remaining at the ith day into a removal trial (see earlier discussion). [LTR 181, CMT 34]

Response: Please see response to Comment LTR 181, CMT 13 above.

Comment: *Differences in predicted fatality rates across neighboring Klickitat County and across the Columbia Basin Ecoregion, where the predictions were made by WEST, Inc. and by my use of the same data in available reports. Note that Whistling Ridge is not part of the Columbia Basin Ecoregion, but the DEIS nevertheless relied on a cumulative impacts analysis directed toward wind projects in the Columbia Basin Ecoregion. In either case, the WEST, Inc. estimates of fatality rates were much lower than my estimates, based on the same data. [LTR 181, CMT 35]*

Response: Please see response to Comment LTR 181, CMT 13 above.

Comment: *Avian Use Rates. -- It was inappropriate to compare avian use rates among wind farms without accounting for differences in maximum survey distances from the observer and in volumes of visible airspace from observation stations. Topography varies from place to place, and so does the proportion of the survey area that is visible from the observation stations. Also, detection rates of birds decline rapidly with distance from the observer, more so for smaller-bodied birds, so comparing use rates between wind farms will be substantially biased when the maximum survey distance was 800 meters in one wind farm and only 400 meters in another, or when few birds of one species will be detected beyond 300 m whereas most birds of another species will be detectable to 800 m. Without accounting for species-specific detection functions and variation in visible airspace due to topographic occlusion, comparisons of use rates cannot be reliable. [LTR 181, CMT 36]*

Response: Please see response to Comment LTR 181, CMT 7 above.

Comment: *It appeared that overall impacts of wind power projects on wildlife would likely be greater in forested environments. According to the DEIS (page 3-46), "Although [golden eagles] soar at high altitudes, they drop down to the ground to capture prey." This characterization can be misleading. Golden eagles typically hunt while flying low to the ground, using a flight behavior termed 'contour flying.' In fact, the summary of the two golden eagles seen flying on the project site (same page, 3-46) indicated the eagles were at heights above ground typical of the heights used during contour flights. This contour flying appears to be a*

behavior that predisposes golden eagles to wind turbine collisions, and it is not a behavior that this species will change. Table 2 in Young and Poulton (2007) summarized "Mean annual mortality" estimates from various wind power projects in the region. However, most of the cited estimates were for one year only and not multiple years as the heading, "Mean annual mortality," would lead readers to believe. Making the argument that background mortality causes fatality rates to be over-estimated at wind project sites, Young and Poulton (2007: page 14) claimed they found 0.33 bird carcasses per turbine plot equivalent per year in background fatality monitoring at two wind project sites, one in Montana and one at Buffalo Ridge, Minnesota. However, Young and Poulton (2007) neglected to mention that background mortality searches have been performed at multiple wind project sites by multiple investigators over the past decade, and those searches turned up very few or zero naturally occurring bird carcasses (Table 5). The average among reported background mortality surveys (0.0108 dead birds per turbine plot-equivalent) was 32 times lower than claimed by Young and Poulton (2007). In the case of Buffalo Ridge, which was one of the two project sites cited by Young and Poulton (2007), another WEST, Inc. team (Johnson et al 2000) conducted 2,482 searches in reference plots and found one naturally occurring fatality for every 78 person-hours spent searching. They concluded, "The amount of natural mortality occurring in the study area is so small that attempting to correct fatality estimates for natural mortality is not warranted." Results of background mortality surveys in which fatality searches were performed in similar environments as occurred amongst the project's wind turbines, but where there were no wind turbines. The turbine plot equivalent was 0.5625 ha, or the area within a typical square search plot used at modern wind turbines of 75 m per side. Anderson et al. (2005) also performed background mortality searches, but their searches were nearby the wind turbines of the Tehachapi Pass, and appeared to have likely included birds killed by the wind turbines. [LTR 181, CMT 38]

Response: Please see response to comments 36-8, 181-2 and 181-13.

Comment: *There is no established relationship between raptor nest density and wind turbine collision rates. I concur with the need for post-construction fatality monitoring, but I would set the minimum to three years instead of two years, and I would require that all the turbines are searched for fatalities over the first three years and that a subset of the turbines be searched through the life of the project. [LTR 181, CMT 40]*

Response: The avian baseline report did not state that there was any relationship between nest density and fatality rates. The post-construction monitoring protocols will be established by the Technical Advisory Committee (TAC).

Comment: *In truth, there is little if anything that can be done to reduce bird and bat fatalities once the wind turbines are installed. There is no evidence that any measures have been implemented to reduce bird fatalities at modern wind energy projects, and so no evidence that any measures were effective […] [LTR 181, CMT 42]*

Response: Numerous measures, including habitat manipulation and curtailment, have been shown effective at some sites to reduce fatalities of birds and bats.

Comment: *Recommended Mitigation Measures. Once the wind turbines are installed, there is little, if anything, that can be done to reduce fatality rates. Therefore, it is very important to carefully plan the installation of wind turbines, including tower height and wind turbine siting. Lee Neher and I have developed spatial models to predict hazard zones for specific species of raptor in the Altamont Pass, relying heavily on behavior and utilization surveys. Sufficient sample sizes of birds displaying specific flight behaviors, e.g., hovering, contouring, fly-catching, are needed to inform the models, which also rely on a resolute digital elevation model of the project area so that slope and wind conditions can be measured and related to bird flight patterns. Our models are being implemented in two repowering projects. Our approach or a similar approach should be utilized at Whistling Ridge, if the project is developed. [LTR 181, CMT 44]*

Response: Altamont pass is unique for its very high mortality of birds, especially golden eagles, so additional research to inform re-powering as discussed in this comment will assist in understanding how to reduce avian mortality. For the proposed Project, the pre-construction avian survey data suggest high levels of mortality would not occur, and the risk to golden eagles is low, so additional research into flight behavior of birds is not warranted nor is it an industry standard. Rather, post-construction mortality monitoring would provide the species and numbers of birds killed, and based on that data, the TAC would be able to develop appropriate mitigation measures in response to the mortality data.

Comment: *Once wind turbines are carefully sited, tower heights are decided upon to minimize encounters with birds, and the electrical distribution system is designed to minimize impacts, the wind turbine-caused fatalities should be low enough to establish a reasonable nexus between the project's impacts and the benefits gained through compensatory, offset mitigation. [LTR 181, CMT 45]*

Response: Comment acknowledged.

Comment: *Fatality monitoring and post-construction utilization monitoring should be performed for at least three years following project installation. The monitoring is needed to learn of successes and failures of the project planning so that the lessons can be applied to future wind energy projects. It is also needed to inform compensatory mitigation. [LTR 181, CMT 46]*

Response: Monitoring will be performed in conformance with the WDFW Wind Power Guidelines. According to the Wind Turbine Guidelines Advisory Committee (2010), two or more years of post-construction fatality monitoring are only recommended if pre-construction

studies indicate the potential for high mortality or mortality to ESA listed species, and results of initial monitoring indicate fatality levels are high or ESA listed species are found as fatalities. If these situations do not occur, one year of monitoring is considered adequate. The pre-construction studies did not indicate fatality levels would be high relative to other wind energy facilities, and impacts to ESA listed species are not anticipated. Therefore, two years of monitoring are considered adequate for this site. The need for further monitoring will be determined after results of the first two years of monitoring are available. The TAC organized for this Project will be the group responsible for determining the need for additional monitoring after two years.

Comment: *All wind turbines should be included in the fatality monitoring to ensure adequate sample sizes are obtained. Fatality searches should be performed no less frequently than every two weeks, and two teams should perform searches independently of each other so that detection rates can be estimated without performing independent searcher detection and scavenger removal trials, which are fraught with biases and sources of uncertainty. [LTR 181, CMT 47]*

Response: Please see response to Comment LTR 181, CMT 46 above.

Comment: *SUMMARY. Collision Impacts. The analysis of direct impacts caused by bird and bat collisions with wind turbines was incorrect and misleading. It relied on the same methodology that has most often resulted in predicted fatality rates being proven by post-construction monitoring to have been much too low. Measured raptor fatality rates have been up to 14 times higher than predicted fatalities. The impacts assessment relied on raptor fatality rates regressed on utilization rates, but this regression was fundamentally flawed in multiple ways. The regression between fatality rates and utilization rates was pseudoreplicated, meaning the effective study units were not the study units implied in the graph – they were regions instead of wind projects. The positive regression slope was strongly leveraged by two California wind projects, the omission of which reverses the direction of the regression slope. The effort directed toward avian utilization surveys totaled 87 hours, which was grossly insufficient for characterizing utilization rates of many species, especially golden eagle and other raptors. The utilization surveys were diurnal, so were not designed to detect species active in the early morning, evening, or at night. The utilization surveys were extended to 800 m from the observer, which ensured that most flying birds would be undetected during each survey session, and no attempt was made to account for the proportion of the sky over the survey area that was occluded by terrain and forest. [LTR 181, CMT 48]*

Response: This regression analysis referred to is only a guide for helping to provide a prediction and range of mortality. The data collected to date clearly indicate that lower raptor use sites generally have lower raptor mortality and high raptor use indicates higher raptor mortality. The Applicant's consultants have generally reported a range of mortality for predictions, as was done in the baseline report for Whistling Ridge, where the 90% prediction interval around the estimate was 0 to 0.25 raptor fatalities/MW/year. This prediction interval has

been added to the FEIS. The raptor regression graph is just one component used in predicting mortality.

Comment: *For these reasons, the utilization survey results were not comparable to other wind farms or among plots within the Whistling Ridge project site. The regression slope between fatality rates and utilization rates relied on fatality rates that were biased low in most of the available monitoring reports. Most of the fatality rates in the Pacific Northwest were derived from an estimator that relies on mean days to removal of placed carcasses in carcass removal trials, but carcasses in these trials must be censored from the calculation of the mean if the carcasses have not been removed by the end of the trial. This means the trials must extend for much longer periods than the average search interval of the fatality monitoring, and that mean days to removal is biased high and the resulting fatality estimates biased low. The regression between fatality rates and utilization rates was based mostly on monitoring that lasted only one year, but the inter-annual variation measured at other wind projects revealed up to nearly 6-fold differences in low to high fatality rates between years. This high inter-annual variation warrants a much larger sample size before any validity can be given to the regression used in this DEIS. [LTR 181, CMT 49]*

Response: Please see response to Comment LTR 181, CMT 48 above.

Comment: *The prediction of zero raptor fatalities at Whistling Ridge was fallacious because the prediction was based on the regression slope intercept being to the right of Whistling Ridge on the continuum of utilization rates among wind farms. In the very same graph, the slope intercept was also to the right of other wind farms where fatality rates were greater than zero. [LTR 181, CMT 50]*

Response: Please see response to Comment LTR 181, CMT 48 above.

Comment: *The DEIS also appeared to rely on an exposure index value to assess collision impacts of individual species. However, I tested the relationship between fatality rates and this exposure index at other wind farms, and found no relationship whatsoever. [LTR 181, CMT 51]*

Response: The purpose of the model is to provide some insight into which species observed on the site might be the most likely to collide with turbines; it is not meant to accurately predict which species will occur as fatalities and was not used to predict the level of bird fatalities. In the baseline avian survey report it was acknowledged that the index considers relative probability of exposure based on abundance, proportion of daily activity spent flying, and proportion of flight height of each species within the ZOR for turbines likely to be used at the wind-energy facility. The exposure index analysis is based on observations of birds during the daylight period and does not take into consideration flight behavior (e.g., during foraging or courtship) or abundance of nocturnal migrants. It also does not take into consideration habitat selection, the

ability to detect and avoid turbines, and other factors that may vary among species and influence likelihood for turbine collision. For these reasons, the actual risk for some species may be lower or higher than indicated by this index.

Comment: *The DEIS appeared to rely on a comparison of raptor nesting densities among wind project sites, but I was unable to find a significant relationship between fatality rates and raptor nesting densities. [LTR 181, CMT 52]*

Response: Please see response to Comment LTR 181, CMT 26 above.

Comment: *Based on mean fatality rates estimated at other wind projects throughout Washington, Oregon and California, the minimum numbers of annual fatalities at Whistling Ridge would likely be 33 raptors, 422 birds (including raptors), and 86 bats, but actual rates would likely be much higher because unlike the other wind projects used to calculate the means. Whistling Ridge is located in a forested environment that is also frequently enveloped by clouds. [LTR 181, CMT 53]*

Response: The fatality rate independently estimated by Smallwood for Whistling Ridge was 33 raptors/year, or 0.44 raptors/MW/year. Raptor fatality rates at 13 facilities in the Pacific Northwest have ranged from 0 to 0.29 and averaged 0.09/MW/year. The raptor use data collected at the Whistling Ridge site do not suggest raptor mortality would be higher at Whistling Ridge than other projects with similar raptor use estimates, and not as high as what Smallwood predicted. Smallwood states that bird and bat fatality rates are underestimated due to a bias in the estimator used by the Applicant's consultant (WEST), which is known as the Shoenfeld estimator (Shoenfeld 2004). Also, one of the projects Smallwood selected to show how fatality rates were underestimated was the Bighorn project. That project was analyzed by another consultant (Northwest Wildlife Consultants) who used a different estimator, known as the Huso estimator (Huso 2010). Huso (2010) has demonstrated that that estimator is generally unbiased. Hugo also has shown that the Hugo estimator and the Shoenfeld estimator give similar results when the search intervals are large (e.g. 14 - 28 days), which is the case for most of the studies in the Pacific Northwest. Smallwood did not elaborate on what estimator was used or what the bias was, but it is assumed Smallwood used a “novel” approach as outlined in Smallwood et al. (2010). One likely assumption in the use of the estimator that Smallwood presumably used assumes that a carcass, if missed by a searcher during the first search, no longer has any chance of being found during subsequent searches. It has been demonstrated in studies that fatalities that are missed the first time have a good chance of being picked up in subsequent searches (Arnett et al. 2009). Not accounting for this probability of finding carcasses during multiple searches leads to an overestimate of fatality rates in Smallwood’s estimator.

Comment: *Other Impacts. The impacts assessment directed to habitat fragmentation was also fallacious because the DEIS characterized the site as biologically impoverished, whereas*

the mere 87 hours of avian surveys there revealed a much higher avian species diversity than occurs in the Altamont Pass – the site of the most notoriously dangerous wind energy project on Earth to birds. Furthermore, all but one of 90 bird species were endemics, indicating a high level of ecological integrity at the site. [LTR 181, CMT 54]

Response: The studies were conducted in compliance with the WDFW windpower guidelines, as one full year of avian baseline data were collected to cover all four seasons. In addition, the avian baseline studies were conducted in 2004, 2006, 2008 and 2009 which accounts for inter-annual variation.

Comment: *Impacts to northern spotted owl were inappropriately dismissed, because this conclusion relied too much on interpreting US Fish and Wildlife Service protocols and not enough on wildlife biology and common sense. Cumulative Impacts. The cumulative impacts analysis in the DEIS was fundamentally flawed in several ways. First, the DEIS relied on a cumulative impacts analysis of the Columbia Basin Ecoregion, but Whistling Ridge occurs in a forested environment outside this Ecoregion. Second, the analysis relied on a Partners in Flight web site to estimate regional population sizes of bird species, but the Partners in Flight estimator did not pass scientific scrutiny in the scientific literature and the population estimates used in the DEIS were absurdly large. Third, reported avian fatality rates have been underestimated, so low fatality rates were compared to absurdly large population sizes to arrive at erroneous conclusions of no significant cumulative impacts. The cumulative impacts analysis cannot be taken seriously. [LTR 181, CMT 55]*

Response: Although similar avian use data have not been collected in habitats comparable to those at Whistling Ridge, the data have been collected in a variety of habitat types, including grasslands, shrub-steppe, and croplands in both the western and Midwestern U.S. To date, the relationship between raptor use and mortality has been fairly consistent across habitats and locations, and there is no reason to believe that the relationship between raptor use and mortality would be different at Whistling Ridge just because the habitat is different. Because no similar data exist for constructed wind energy projects in coniferous forest habitats that might help inform impact predictions for Whistling Ridge, these data represent the best available science for predicting avian impacts at Whistling Ridge. This will remain the case until several wind energy projects have been constructed in western coniferous forests and post-construction fatality data are available to compare to pre-construction data on avian use. In addition to Whistling Ridge, a handful of wind energy projects have been proposed on coniferous forest landscapes in Washington, some of which are planned for unmanaged, natural forests. It is likely that additional projects will be proposed in forested landscapes across the West in the future. Because it is generally acknowledged that even-aged, managed forests provide far less suitable habitat for most avian species than uneven aged, natural forests (e.g., Buchanan 2005), construction of a wind energy facility at Whistling Ridge would have a much lower potential for wildlife impacts than construction of a wind energy facility within natural forests. Therefore, the Whistling Ridge Project provides an optimum location to obtain data on wildlife impacts that might be used to inform decisions and impact predictions for wind energy facilities proposed for other managed as well as unmanaged, natural forests.

Comment: *Based on means from available reports of fatality monitoring at wind projects in the western US, build-out of 6,700 MW in the neighboring Columbia Basin Ecoregion could be expected to annually kill at least 2,935 raptors, 37,674 birds, and 7,658 bats, far exceeding the annual death toll at the notorious Altamont Pass. [LTR 181, CMT 56]*

Response: The WEST cumulative impacts study for the Columbia Plateau Ecoregion (CPE) only addressed cumulative impacts associated with wind energy development. The WEST report acknowledged that wind energy development is only one factor affecting wildlife populations in the CPE, and is likely minor compared to other past, present, and future actions in the CPE, including large-scale conversion of native shrublands and grasslands to crop land; expansion of urban areas and rural subdivisions; road and highway construction; other forms of energy development, including fossil fuels and dams for hydropower; and increases in other infrastructure, such as communication towers and power lines. The ability to estimate wind energy development impacts on wildlife is unique because several studies have been conducted to quantify bird and bat impacts. Similar quantitative estimates of bird and bat impacts due to direct mortality and loss or fragmentation of habitat caused by other activities are not available, which makes quantitative estimates of cumulative impacts difficult. The DEIS acknowledged that due to the difference in habitat types between the Project Area, which is located in the Eastern Cascades Ecoregion, and the Columbia Plateau Ecoregion, the results of the direct impact analysis for the Whistling Ridge Project cannot be directly applied to the results of WEST's cumulative effects analysis for the CPE. Therefore, results of the WEST report were not used to formulate the cumulative effects analysis in the DEIS. They were simply considered relevant in considering the added impacts of the Proposed Action to the overall cumulative biological impacts of all wind energy projects in the region.

Comment: *Post-construction monitoring should last at least 3 years for all turbines and throughout the life of the project for a subset of turbines. Fatality searches should be no less frequent than twice per month. [LTR 181, CMT 59]*

Response: Please see response to Comment LTR 181, CMT 46 above.

Comment: *Wind turbines should be carefully sited, and the siting should be based on adequate bird surveys, the results of which are related quantitatively to a resolute digital elevation model of the project site. [LTR 181, CMT 61]*

Response: Comment acknowledged.

Comment: *Tower heights and the low and high reaches of the rotor plane should be based on an analysis of adequate avian survey data. [LTR 181, CMT 62]*

Response: Comment acknowledged.

Comment: *Much more effort should be directed toward pre-construction bird and bat surveys, and adequate analysis of the data should be performed. The methods used to predict impacts need to be replaced by scientifically defensible methods. The cumulative impacts analysis needs to be replaced, and the new one should include the impacts of siting wind turbines in the forested environments of Skamania County. The section on mitigation needs to be revised to avoid misleading readers about the effectives of turbine design features and adaptive management. [LTR 181, CMT 63]*

Response: The level of effort conducted for pre-construction exceeds the industry standard level of effort for a proposed Project of this scale, and accommodates the unique forested habitat not currently present at other Washington wind developments. Statistically defensible use estimates were calculated for birds, to estimate the relative mortality that could be expected following construction. Bat pre-construction surveys were conducted, and the level of presence was compared with the levels observed at other wind developments. The cumulative effects section includes analysis of known proposed wind developments in the region.

Comment: *The TAC needs to consist of qualified scientists, and the post-construction monitoring needs to be strengthened. [LTR 181, CMT 63]*

Response: The TAC may include, but need not be limited to, representatives from WDFW, U.S. Fish and Wildlife Service, EFSEC, Skamania County, DNR, and the Certificate Holder. EFSEC, at its discretion, may add additional representatives to the TAC from local interest groups as well as state, local, federal and tribal governments. Both post-construction monitoring and the convening of a TAC to evaluate the mitigation and monitoring program were included as mitigation measures in the DEIS. See Section 3.4.3 Mitigation Measures.

Comment: *A statement from the Bat Acoustic Studies for the Whistling Ridge Wind Resource Area Skamania County, Washington June 4th – October 25th, 2009 (WEST, Inc., 2009) captures our approach to evaluating the entire project: "However, no data on bat mortality levels associated with wind energy developments in western coniferous forests are available to help predict risk to bats at the WRWRA. Bat fatality patterns may differ from those in open habitats as well as in eastern deciduous forests…" We feel that this statement can be extended to address the potential impacts to avian species as well, since, and reiterating from our May 14, 2009 response to the project, … "…other new wind projects in the Pacific Northwest are in shrub-steppe and agricultural habitats; not coniferous forest…" [LTR 183, CMT 2]*

Response: Although similar avian use data have not been collected in habitats comparable to those at Whistling Ridge, the data have been collected in a variety of habitat types, including grasslands, shrub-steppe, and croplands in both the western and midwestern U.S. To date, the relationship between raptor use and mortality has been fairly consistent across habitats and locations, and there is no reason to believe that the relationship between raptor use and mortality would be different at Whistling Ridge just because the habitat is different. Because no similar data exist for constructed wind energy projects in coniferous forest habitats that might help

inform impact predictions for Whistling Ridge these data represent the best available science for predicting avian impacts at Whistling Ridge. This will remain the case until several wind energy projects have been constructed in western coniferous forests and post-construction fatality data are available to compare to pre construction data on avian use.

Comment: *Additionally, the data illustrated in [F]igures 7 and 8 on pages 57 and 58 in Appendix C, Final Wildlife Report, are confusing in that the coniferous-forested Whistling Ridge site is compared to other U.S. wind energy facilities regardless of habitat types. This same type of comparison is also shown for All Birds in [F]igure 9 on page 59. Again, regardless of habitat type. [LTR 183, CMT 3]*

Response: In addition to Whistling Ridge, a handful of wind energy projects have been proposed on coniferous forest landscapes in Washington. It is likely that additional projects will be proposed in forested landscapes across the West in the future. Because it is generally acknowledged that even-aged, managed forests provide far less suitable habitat for most avian species than uneven aged, natural forests (e.g., Buchanan 2005), construction of a wind energy facility at Whistling Ridge would have a much lower potential for wildlife impacts than construction of a wind energy facility within natural forests. Therefore, the Whistling Ridge Project provides an optimum location to obtain data on wildlife impacts that might be used to inform decisions and impact predictions for wind energy facilities proposed for other managed as well as unmanaged, natural forests.

Comment: *Raptor migration routes along the east Cascades are documented at the Bonney Butte, Oregon, Hawk Watch raptor banding and counting stations. The Final Report compared the Whistling Ridge project to other wind energy project through such statements as: "The annual rate was low relative to raptor use at 36 other wind-energy facilities that implemented similar protocols to the present study and had data for three or four different seasons." "A 90% prediction interval around this estimate is zero to 0.25 fatalities per megawatt per year." WDFW would like to emphasize that fluctuations in raptor populations, as well as other avian species, may result in greater mortality than what is predicted in the Final Report. As a result, operational controls may be necessary to address avian mortality that exceeds predicted mortality. [LTR 183, CMT 4]*

Response: The TAC will review and analyze post-construction mortality data and determine appropriate mitigation measures to offset any wildlife effects caused by the wind development.

Comment: *Specifically, WDFW recommends that operational controls be a condition of the site certification, if issued, so that individual turbines or strings of turbines can be shutdown as a result of individual species and cumulative avian and bat fatalities in excess of the predicted mortality. [LTR 183, CMT 5]*

Response: The TAC will evaluate post-construction mortality and will be able to recommend mitigation measures, if needed, to reduce avian mortality. If there is an unacceptable level of mortality to any species, the USFWS has the authority to require curtailment or moving of turbines.

Comment: *In closing, WDFW would like to acknowledge that the applicant has submitted a preliminary mitigation plan that we are currently reviewing. The preliminary mitigation plan encompasses approximately 100 acres in Klickitat County 12 miles due east of the project site. The mitigation site is forested with Oregon White Oak with some Douglas fir and Ponderosa pine and shares a portion of its northern boundary with 40 acres of WDNR land and. [LTR 183, CMT 6]*

Response: Comment acknowledged.

Comment: *This mitigation site provides habitat for several PHS entries including Western gray squirrels. [LTR 183, CMT 7]*

Response: Comment acknowledged.

Comment: *Because wind power technology and configuration of wind turbines in the project area are still relatively new, and their impacts on birds and bats within forested sites remain unclear; effective adaptive management will be important to reduce and mitigate the project impacts. [LTR 189, CMT 5]*

Response: The TAC will review and analyze post-construction mortality data and determine appropriate mitigation measures to offset any wildlife effects caused by the wind development.

Comment: *There is no evidence that the installation and operations of the proposed facility will have any significant impacts on sensitive or special status animal or plant species. The data and analysis by qualified third parties indicates that no significant impact will occur. [LTR 191, CMT 3]*

Response: Comment acknowledged.

Comment: *The DRAFT states on [P]age 2-7 – Proposed Alternatives and Actions; "The basic design for the tower would depend on the style selected. Most towers are un-guyed lattice towers at heights equal to the hub heights of the proposed wind turbines. The location for the*

permanent meteorological tower would be determined during the micrositing process. The selected site would be based on a meteorologist's recommendations for an on-site location that best represents the site's meteorological conditions. [In reference to Section] 2.1.3.5, Meteorological Tower Greg Neely Comment – Jun 16, 10: ["]As the Meteorological Towers will be micro-sited amongst the wind turbines, where bird perching and collisions issues are paramount.["] [LTR 193, CMT 2]

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. Based on pre-construction surveys, the expected mortality of bird species is expected to be relatively low compared to many other wind developments that have higher pre-construction avian use.

Comment: *As one of the first wind power projects to be considered for a forested landscape in Washington state, this environmental review needs to include a more detailed analysis of several issues that make this proposal different from other wind power projects located on agricultural and/or shrub steppe habitat; experience and knowledge gained from existing projects in the state may not be "transferable" to a project such as this being proposed for a very different environment. [LTR 196, CMT 2]*

Response: While the habitat is significantly different that the habitat of other wind developments in the region, the approach of estimating pre-construction species use and estimating the potential mortality is a relationship that is maintained across habitats. Where discrepancies may occur, post-construction mortality monitoring will provide the TAC and USFWS with data to help determine appropriate mitigation.

Comment: *Baseline Avian Use. The DEIS does not adequately address the issue of comparable avian use data. It is vital that the FEIS include an evaluation of the species variety and abundance in the project vicinity in relation to baseline avian use data from other locations with similar landscape and climate features – mountainous conifer forests with cool, wet conditions. The DEIS makes comparisons of bird survey results from Whistling Ridge to data from other wind projects, either in eastern U.S. deciduous forests or shrub-steppe habitat in the Pacific Northwest (DEIS p 3-63, 3-64); such comparisons provide limited benefit for evaluating the potential impacts of this project. Seattle Audubon noted this problem in our scoping comments and we continue to be concerned that the environmental review for this project needs a more appropriate avian use comparison. DNR and the Forest Service each are land managers with significant amounts of forest habitat comparable to the project site; either or both agencies may have / know of avian use survey data that could be used, as could other resource agencies or academic institutions. In order for the public (and the decision-makers regarding permits for Whistling Ridge) to have an accurate understanding of the potential impacts of this project on birds, the FEIS should include a meaningful "apples-to-apples" comparison of avian species. Without such an evaluation, any conclusions regarding the variety and concentration of bird species at the project site are likely to be misleading. In addition, the FEIS should more clearly and specifically describe the results of the avian surveys conducted. While calculations such as*

the "mean annual bird use" and a "relative index to collision risk" do provide some useful information, the DEIS fails to identify the actual total number of birds detected during the study, nor does it reveal the number of birds and bats that were detected passing within the proposed rotor swept area, instead couching the data in terms of percentages. (DEIS p. 3-64) For instance, Table 3.4-5 should be modified to indicate the specific number of each species observed by season rather than burying that data solely in the Appendix. (DEIS p. 3-62, 3-63). [LTR 196, CMT 5]

Response: According to the Wildlife Society, fatalities of passerines (song birds) from turbine strikes generally are not significant at the population level (Arnett et al. 2007). Because raptors are of primary concern with wind energy development, the avian surveys for the Whistling Ridge Project were designed to maximize detections of raptors. Survey points were placed in areas where viewsheds were maximized to increase visibility of raptors (e.g., ridge tops, clearcuts, cleared transmission line rights-of-way), the survey plot radius where birds was recorded was large (i.e., 800 m), and the survey period was long (20 minutes). In contrast, survey methods to document bird use in forested areas are significantly different; the primary focus is usually passerines and other small birds such as woodpeckers; the survey plots are typically placed within the interior of forest stands; the survey plot radius is generally 100 m or less (usually 50 m); and the survey time periods are much shorter (e.g., 5-8 minutes in duration). Because of these differences, data collected for preconstruction wind energy project assessments are not directly comparable to most other forms of avian survey data collected in forested areas and it would be inappropriate use of the data to make these comparisons. Even if such comparisons could be made, and it was found that avian use at Whistling Ridge differed substantially (e.g., higher or lower) from avian use in similar environments elsewhere, the comparisons would not help with a risk assessment as in general there is a low correlation between avian abundance (excluding raptors) measured during preconstruction studies and post-construction avian fatality rates.

Comment: *Olive-sided Flycatcher and Vaux's Swift. The olive-sided flycatcher is a federal species of concern and the Vaux's swift is a state candidate species for listing. Both species were detected at the project site during multiple avian surveys with the majority of detections within the rotor swept area. (DEIS p. 3-56, 3-57) Both forage for insect prey on the wing and would likely utilize the cleared areas associated with the project turbines. The DEIS does not adequately address the potential turbine-related mortality of these sensitive species, simply asserting that collisions would likely be rare and that it is unlikely that the project would have any negative impacts on population levels. (DEIS p. 3-79) The FEIS should more fully evaluate this issue and document the facts underlying these type of statements. In addition, the FEIS should specifically identify the "appropriate mitigating measures" BPA will ensure are employed to minimize and avoid the anticipated project-related impacts on these sensitive species under the Migratory Bird Treaty Act. (DEIS p. 4-5) [LTR 196, CMT 6]*

Response: The Wildlife Society examined the issue of passerine fatalities at wind energy facilities and concluded that fatalities of passerines from turbine strikes generally are not significant at the population level, although exceptions to this could occur if facilities are sited in areas where migrating birds or rare species are concentrated (Arnett et al. 2007). Given the

number of surveys conducted and the small numbers of olive-sided flycatchers or Vaux's swifts (technically not a passerine but similar life history) recorded during the surveys, the data do not suggest the site is in an area where these species are concentrated. Therefore, no population impacts would be expected for these two species. Also, the National Academy of Sciences (NAS 2008) recently reviewed wind energy impacts on birds, and came to the following conclusion: at the current level of wind-energy development (approximately 11,600 MW of installed capacity in the United States at the end of 2006, including the older California turbines), the committee sees no evidence that fatalities caused by wind turbines result in measurable demographic changes to bird populations in the United States, with the possible exception of raptor fatalities in the Altamont Pass area. The available information does not suggest population impacts to birds are likely.

Comment: *Size, Number and Type of Turbines. The DEIS states that the number of wind turbines at the project site already has been minimized to the extent practicable and that if any turbines are removed from the project design, other locations must be found to replace those turbines to maintain the viability of the project. (DEIS p. 1-14) It also states that the project would consist of up to 50 wind turbine generators that would range in size from 1.2 to 2.5 MW and have a total nameplate capacity of up to 75 MW. (DEIS p. 1-9) Yet if the project proponent were to select the 2.5 MW turbines, the number needed could be reduced by 40% without reducing the project capacity. Reducing the number of turbines offers the potential to significantly reduce some of the adverse environmental impacts of the project. The amount of habitat permanently impacted could be reduced, including avoiding the loss of any suitable or potential NSO habitat. Turbine locations in close proximity to the DNR HCP lands could be removed from the project, lessening the potential to disturb NSO in the area. The FEIS should include at least one additional alternative that provides a detailed analysis of how different combinations of turbine sizes and numbers can best meet the identified minimum necessary project capacity while minimizing the habitat disruptions. In addition, the FEIS should identify the specific turbine type that would be used at Whistling Ridge. Different turbine types can have different blade tip speeds as well as utilize either an upwind or downwind style. Research at other wind power projects indicates that these differences can have a direct correlation to avian mortalities (DEIS Appendix B, Wildlife Reports). An evaluation of the specific turbines to be used at the project is essential to the environmental review each of your agencies are responsible for completing. [LTR 196, CMT 7]*

Response: Since the publication of the DEIS, The Applicant has proposed the use of 2 MW or larger turbines, which would reduce the number of turbines to a maximum of 38. In doing so, strings E and F would be eliminated and the A1-A7 section of string A would be reduced from seven turbines to five turbines. However, the EIS provides analysis on the proposed Project consisting of up to 50 wind turbines that could each range in size from 1.2 to 2.5 MW as originally proposed.

Comment: *Monitoring. Seattle Audubon appreciates the inclusion of a post-construction avian mortality study. (DEIS p. 3-82) More details on the protocol to be used for this study*

needs to be included in the FEIS in order to understand whether the proposed "two year minimum" is adequate to evaluate the ongoing impact of project operations on avian species. As the Wind Power Guidelines point out, the duration and scope of the monitoring depends in part on the availability of existing monitoring data at projects in similar habitat types. (WDFW p. 6) In accordance with RCW 80.50.040, EFSEC must prescribe the means for monitoring the effects of project operation in order to assure compliance with the certification. (DEIS p. 1-3) The FEIS should include greater detail on how EFSEC will meet this requirement. In addition, the FEIS should evaluate the potential for use of canine detection for carcass surveys. The Center for Conservation Biology at the University of Washington has demonstrated the precision and efficiency of dogs in locating wildlife in forested settings (for more details, see http://conservationbiology.net/conservation-canines) as one of Washington's first wind power projects in a forested landscape the Whistling Ridge project is an excellent candidate for looking at applying this methodology to post-construction mortality studies. Beyond monitoring the direct avian mortalities caused by the project, it is important to also study the indirect project impacts such as species displacement from territory and cumulative impacts. (WDFW p. 6) The FEIS should require specific project monitoring strategies that include postconstruction avian use surveys of live birds in the project area. It is not enough to just monitor the number of birds directly killed by project operations; post-construction monitoring should also look at how project operation impacts ongoing avian use of the site and adjacent areas. As with our comments regarding mitigation above, a detailed monitoring program should be developed prior to project approval, not left to be determined after the fact. [LTR 196, CMT 10]

Response: The TAC will review and analyze post-construction mortality data and determine appropriate mitigation measures to offset any wildlife effects caused by the wind development. A TAC comprised of federal and state agencies as well as other stakeholders will develop a comprehensive monitoring protocol to be implemented for the Project.

Comment: *It is not suited for the proposed location. The Whistling Ridge site is in a forest, and is in owl habitat. It is a very different location compared to agricultural fields where prior developments have been sited. Forest sites have an order of magnitude greater wildlife population density, and wind farms are incompatible with them. [LTR 201, CMT 3]*

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. Based on pre-construction surveys, the expected mortality of bird species is expected to be relatively low compared to many other wind developments that have higher pre-construction avian use. The Project has received a concurrence letter from USFWS that the Project "may affect, but is not likely to adversely affect" northern spotted owls.

Comment: *To take away from the beauty of the Columbia Gorge would be an outrage; and also all the wildlife disturbance. So I am definitely opposed to any wind turbines going up in that area. [LTR 207, CMT 2]*

Response: Comment acknowledged.

Comment: *The location of the project should not be too close to scenic wilderness areas. Primarily, areas which would affect the spotted owl and others species in wildlife. We should take pains not to disrupt their livelihood and habitat. [LTR 208, CMT 2]*

Response: Comment acknowledged.

Comment: *Frankly, I am also concerned of the increase in traffic, where congestion and the building of roads disrupt wildlife habitat. This includes not only land animals, but aquatic ones too. [LTR 208, CMT 3]*

Response: Comment acknowledged.

Comment: *I have been to meetings and listened to the talk about how safe for birds these mills are. The [N]ative Americans told us that they could not imagine how a bird could fly into these blades. About 2 weeks later, front page of the Oregonian, Golden eagle killed by wind turbines at Goodnoe Hills. How many Golden Eagles are there in the gorge? At least one is dead. We were told that up to 7000 bats would be killed if the Whistling Ridge project goes in. How many hawks and eagles will die because of this? [LTR 225, CMT 2]*

Response: The bat data collected at met towers in 2009 in the area most likely to be developed for wind energy does not suggest bat mortality would be excessive at this site. The estimated raptor mortality rate is 0 to 0.25/MW/year.

Comment: *The wildlife effects would be disastrous. [LTR 233, CMT 2]*

Response: Comment acknowledged.

Comment: *And, of course, there's the little matter of the snowy owls. [LTR 233, CMT 5]*

Response: Comment acknowledged.

Comment: *Now they are trying to incite the people, saying the project is in a avian migration path! This kind of mis-information can only further prolong the financial help this project can bring to our community. [LTR 235, CMT 3]*

Response: Comment acknowledged.

Comment: *Bald Eagles are observed flying overhead in our area, including the proposed Whistling Ridge project site. The central Columbia River Gorge and its tributaries are becoming havens for the recently delisted Bald Eagle. This area in the central gorge is increasingly utilized by overwintering eagles from northern regions. Some eagles have found the area to be suitable for nesting and rearing young. The extent of use of the area, and the long term potential impacts of this project to those individuals and to the breeding and overwintering eagle population as a whole is not enumerated or discussed in the DEIS. Before the full impacts of the WRE project can be assessed by the decision makers, it is imperative that the a careful and honest analysis is performed. Obviously, the Applicant was not able to perform this task, so please see that qualified experts are involved in this issue. The future of the Bald Eagle, once on the brink of extinction is dependent on this. The Bald Eagle is our nations symbol. [LTR 248, CMT 1]*

Response: No bald eagle nests occur on site and bald eagle use of the Project Area was extremely low. Likely due to differences in foraging behavior (bald eagles forage and fish and scavenge carcasses, whereas golden eagles hunt terrestrial prey), bald eagles have not been found to be as susceptible to turbine collisions as golden eagles. Therefore, no significant impacts to bald eagles are anticipated. Please also see response to Comment LTR 36, CMT 9 above.

Comment: *I am also concerned about the environmental impacts on the area and wildlife. [LTR 250, CMT 3]*

Response: Comment acknowledged.

Comment: *Not in the middle of a forest where animals become endangered. [LTR 255, CMT 3]*

Response: Comment acknowledged.

Comment: *The location of the site is significant. The site is on a ridgeline bordered to the east by the White Salmon Wild and Scenic River and to the south by the Columbia River Gorge National Scenic Area. These rivers and the ridgeline the project would be on are known areas*

frequented by raptors, including bald and golden eagles. Raptors are known to be susceptible to wind power blade strike because they are looking down for prey. [LTR 256, CMT 10]

Response: Comment acknowledged.

Comment: *Is this how important bird habitat is encroached upon or lost? Yes, this is exactly how it happens. The bird studies we have reviewed over the years are typically faulty or the conclusions are the opposite of what the information actually suggests. This is not just our opinion, it is the opinion of Washington Department of Fish and Wildlife and the Fish and Wildlife Service, both of whom have repeatedly been extremely critical of the bird "studies" for wind power proposals. Some of those studies have recently come home to roost in Klickitat County immediately to the east of the proposed project site. WDFW recently placed the first monitor on an eagle and it was immediately killed by a wind machine to become the first (known) eagle to be killed by a wind machine in the NW. Quite a coincidence! Then an independent study was done to determine bird kills on a Klickitat County wind power project, and the result was that eight to sixteen times more birds were killed than predicted. Since bird kill projections are Important to securing permits for projects, we believe this to the tip of the ice berg on deflated bird kill projections. We suggest that you increase the projected kills by eight to sixteen times. This means that most projects would not be allowed. [LTR 256, CMT 13]*

Response: Avian use data collected on the site do not suggest mortality would be any higher than 0.25 raptors/MW/year, and would likely be less. An evaluation of wind energy impacts on birds conducted by the Wildlife Society and the National Academy of Sciences found that population impacts have not been documented, with the possible exception of raptors at Altamont Pass, where over 5,000 turbines occur. The avian baseline data and results of other studies suggest that population impacts would not be expected for raptors or other bird species at Whistling Ridge.

Comment: *Proponents like to tout the long list of mitigation measures that they must comply with. After reviewing many such lists we have been hard pressed to discover how any of the mitigation measures will save even one bird. The hard fact is that mitigation is a fraud. There is no mitigation for improperly sited wind power projects, and any project sited in or near the Gorge is an improperly sited project. [LTR 256, CMT 20]*

Response: Comment acknowledged.

Comment: *The Gorge and the cascades are major bird flyways, and projects here are bound to have major impacts, especially as cumulative affects set in, as we believe they already are. [LTR 256, CMT 21]*

Response: Please see response to Comment LTR 76, CMT 8 above.

Comment: *If you still believe that the wildlife agencies will step in to prohibit significant and unnecessary loss of birds to NW wind power, then considers the following true account that demonstrates what is actually occurring. National Audubon Society has designated the Columbia Hills in Klickitat County an Important Bird Area. The Important Bird Area program is National Audubon's plan for saving critical bird habitat areas with proven significant bird populations. It is not easy to secure the IBA designation, the review process is strictly run by NAS bird scientists. Federal and State wildlife agencies have repeatedly warned the wind power industry away from developing on the Columbia Hills, but even though they know the significance of the area for birds these agencies are allowing border to border wind power development of the Columbia Hills Important Bird Area. The next project for the Columbia Hills would involve the creation of huge holding dams that would allow wind power to store energy during periods that transmission lines are fun. We thought things could not get worse on the Hills, but these man-made lakes would prove us wrong when they attract even more birds to their doom. [LTR 256, CMT 24]*

Response: Comment acknowledged.

Comment: *The agencies are failing in their duties to protect huge areas of very significant habitat, and they know It. And the wind power industry knows that if they can develop in this IBA, they can develop just about anywhere. The much touted claim that proper siting is the key to green wind power is just another fraud. [LTR 256, CMT 25]*

Response: Comment acknowledged.

Comment: *BPA has responsibilities to assure that the power they transmit is coming from responsibly sited projects that are not unnecessarily killing significant numbers of birds. How can BPA claim that power from the Columbia Hills ISA is environmentally responsible power? They cannot. Federally protected birds are being killed, and BPA looks the other way. We beg you to not add yet another bird killing wind energy "farm" to the thousands of machines already up. [LTR 256, CMT 27]*

Response: Comment acknowledged.

Comment: *WDFW has carefully reviewed the habitat evaluation prepared by the applicant. The Whistling Ridge Wind Resource Area (WR WRA) is a forested site managed for over 100 years. [LTR 260, CMT 1]*

Response: Comment acknowledged.

Comment: *The pre-project assessment and avian/bat use surveys are consistent with standard protocols utilized throughout the U.S. and are consistent with the WDFW Wind Power Guidelines (WDFW 2009). Because the relationship between avian use and mortality has been reasonably consistent across other habitat types and locations, it is likely that the relationship between avian use and mortality would be similar to that evaluated in other projects. While no similar data exist for constructed wind energy projects in managed coniferous forest habitats that might help inform impact predictions for Whistling Ridge, as we previously confirmed in the attached letters, WDFW confirms that these data represent the best available science for predicting avian impacts at Whistling Ridge. Therefore, if the WRWRA is constructed, WDFW anticipates the opportunity to better understand the relationship between wind energy development in western coniferous forests and wildlife response. [LTR 260, CMT 3]*

Response: Comment acknowledged.

Comment: *WDFW would like to emphasize that fluctuations in raptor populations, as well as other avian species, may result in greater mortality than what is predicted in the Final Report. As a result, operational controls may be necessary to address avian mortality that exceeds predicted mortality. [LTR 260, CMT 4]*

Response: The TAC will review and analyze post-construction mortality data and determine appropriate mitigation measures to offset any wildlife effects caused by the wind development.

Comment: *In closing, WDFW would like to acknowledge that the applicant has submitted a preliminary mitigation plan that we are currently reviewing. This mitigation proposal was developed consistent with the WDFW Wind Power Guidelines at a 2:1 replacement ratio. The preliminary mitigation plan encompasses approximately 100 acres in Klickitat County 12 miles due east of the project site. The mitigation site is forested with Oregon White Oak with some Douglas fir and Ponderosa pine and shares a portion of its northern boundary with 40 acres of WDNR land and. This mitigation site provides habitat for several PHS entries including Western gray squirrels. Additionally, the site includes the fish-bearing Silva Creek, a tributary to the Klickitat River. [LTR 260, CMT 5]*

Response: As stated in the WDFW letter, the applicant has submitted a preliminary mitigation plan that was developed consistent with the WDFW Wind Power Guidelines at a 2:1 replacement ratio. The preliminary mitigation plan encompasses approximately 100 acres in Klickitat County 12 miles due east of the Project Area.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 265, CMT 2]*

Response: Comment acknowledged.

Comment: *I am commenting on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, along the Skamania and Klickitat county lines. This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 266, CMT 1]*

Response: Comment acknowledged.

Comment: *I am a retired Fish and Wildlife Service biologist. I have studied impacts from wind turbines power lines on wildlife resources. I believe the location proposed by the developer for the Whistling Ridge Energy Project is ill advised, and potential impacts are not adequately analyzed in the DEIS. Ridgeline and forested boundaries would make this area highly hazardous for resident and migratory bird populations turbine construction and operation is allowed to go forth. Wind turbine Impacts to bats are only beginning to be addressed through research and are not adequately assessed in the DEIS. I can only surmise that land ownership and political considerations are driving this proposal at this location. Such projects should be located in open country to the east, where potential wildlife impacts are considerably reduced. [LTR 267, CMT 1]*

Response: Pre-construction bird studies were conducted to assess the use of the Project Area so the relative risk of bird mortality could be evaluated. Based on these studies, the level of bird mortality compared with other wind developments is anticipated to be relatively low. Post-construction bird mortality monitoring will be conducted to determine what level of mortality is occurring, and the TAC will determine what mitigation measures to implement.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 270, CMT 1]*

Response: Comment acknowledged.

Comment: *Wildlife Concerns. There are wildlife concerns that need further study and have been addressed by other opponents to this project. I'm not a biologist, but the impacts on just bat populations by wind turbines has been sited by the USGS in this article: http://www.fort.usgs.gov/batswindmills/. "Dead bats are turning up beneath wind turbines all over the world. Bat fatalities have now been documented at nearly every wind facility in North America where adequate surveys for bats have been conducted, and several of these sites are estimated to cause the deaths of thousands of bats per year. This unanticipated and unprecedented problem for bats has moved to the forefront of conservation and management efforts directed toward this poorly understood group of mammals." These affects on bats and the other 300 species of birds in the Gorge, migratory birds, and other wildlife should be studied further before blindly accepting the notion that wind (turbines are "green". Obviously this point isn't limited to just the Whistling Ridge project, but is relevant to all current technology wind farms including this one. [LTR 273, CMT 5]*

Response: Comment acknowledged.

Comment: *The perceived economic shortcomings of some of these possible alternatives is not reason enough to fail to analyze and compare to see if a smaller size or different configuration might be less harmful to wildlife. Economics change with changing conditions, whereas the needs of wildlife are seldom so flexible. [LTR 276, CMT 2]*

Response: The EIS includes analysis of the proposed alternatives that were developed by the applicant. No additional alternatives were developed for analysis.

Comment: *In looking at the avian survey section ([DEIS pages] 3-30 to 3-65), it is not possible to determine how many of which species were found. Therefore, we have no idea of the value of this site to many birds, especially the songbirds. Rufous hummingbirds were found in the spring and summer, but how many? Were they males or females? During the migration season, how many warblers passed through? Were they in the strike zone of the blades? Percentages are not useful for analysis without knowing what they were percentage of. Further, it would be more useful to be able to compare the use and species composition, in numbers, of this site to the use and species composition, in numbers, of the nearby Forest Service and Department of Natural Resources land. The northern spotted owl has been declining in Washington about seven percent a year. Therefore it is no wonder that many historical nest sites are no longer used. There are fewer birds to use them. It stands to reason, however, that to eliminate historical nest sites is to eliminate that chance for a pair of owls to use that site ever again. How, then, is the population to recover? The fact that nearby owl habitat areas are no longer used does not mean that they should be dismissed as potential owl habitat. They must be taken into consideration. It should have been noted that all DNR land in the state is covered by a Habitat Conservation Plan that includes the northern spotted owl along with salmon and many other species. The fact that Vaux's swifts were seen during the fall migration is of concern. Yet, there is inadequate discussion of mitigation measures to avoid mortality of swifts, as well as songbirds and other small birds during migration. We concur with the Seattle Audubon Society*

in their observation of the weakness of the cumulative impact analysis in the DEIS. In addition, considering that any kind of development causes loss of habitat, the DEIS should have considered, not only potential future wind power development in forested areas, but the impact of many other types of development, such as housing, that permanently destroys habitat. We appreciate the opportunity to comment on this DEIS. [LTR 276, CMT 3]

Response: The avian use surveys followed standard protocols used at well over 100 proposed wind energy projects across the country and followed the WDFW Wind Turbine Guidelines (WDFW 2009) and Wind Turbine Guidelines Advisory Committee (2010). Metrics such as mean annual bird use are standard metrics used industry wide to characterize avian use of a wind resource area. These surveys are not designed to determine the absolute number of any given bird species in a Project Area. They are designed to sample the Project Area and provide an index of bird use of the site to determine if bird use is considered low, moderate, or high relative to other wind energy facilities. Without having individually marked birds, it is not possible to quantify the number of birds in a survey area. For example, it is not known if 15 observations of Vaux's swift represent 15 observations of the same individual or single observations of 15 different individuals. According to the Wind Turbine Guidelines Advisory Committee (2010), point counts are a recommended method to provide estimates of bird use, which are assumed to be indices of abundance in the area surveyed. Absolute abundance is difficult to determine for most species and is not necessary to evaluate species risk (Wind Turbine Guidelines Advisory Committee 2010). The FWS has reviewed the Project and concurred that significant impacts to northern spotted owl are not likely to occur. Additionally, please see the response to Comment LTR 267, CMT 1 above relating to the relative risk of bird mortality.

Comment: *How would they [the new transmission lines] affect wildlife and wildlife habitats? Habitat fragmentation? These are only some of the questions that BPA should have addressed in the Whistling Ridge DEIS. They did not and this is a fatal flaw in the DEIS. [LTR 279, CMT 6]*

Response: As described on page 1-10 of the DEIS, the electrical collector system will use a system of underground cables. The Project collector substation and interconnection were described in Section 1.4.1.3 (on DEIS pages 1-10 and 1-11). The transmission interconnection would be placed adjacent to existing lines in areas already cleared and maintained as cleared areas for the existing transmission lines. No new habitat impacts are anticipated.

Comment: *The concept of locating such a facility on ridge lines of dense old growth forested land is ill conceived for numerous reasons. It is of great importance that the approval of such a facility would have far reaching precedential repercussions, encouraging the deforestation and development of thousands of acres of both habitat and scenic resources. Developers are already viewing the potential for the development of similar facilities to the west, which could result in facilities scattered from the western Columbia Gorge to Portland, despoiling the natural ambiance of the area and reducing habitat, carbon sequestration and tourism. [LTR 283, CMT 2]*

Response: Comment acknowledged.

Comment: *Approval of the proposed WRE project would exacerbate this effect due to its established migratory paths as well as the non migratory bat and avian populations, not to mention the wildlife habitat devastation that would result from the sheer amount of deforestation required. [LTR 283, CMT 10]*

Response: Comment acknowledged.

Comment: *I voiced some concerns about birds and bats in my previous comments on Chapter 3 and cumulative effects, but I wanted to voice even more concern and trepidation about the cumulative effects and impacts that regional wind farms, and BPA energy production facilities en toto, have on migratory species. [LTR 284, CMT 1]*

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.14.3.5.

Comment: *The Migratory Bird Treaty Act, see Reference #1, below, is mentioned in the DEIS but I am very concerned that the topic of migrating avian species should have more in-depth and thorough regional data presented in the DEIS. [LTR 284, CMT 2]*

Response: To date, there have been no large-scale mortality events of migrating birds at wind power facilities in the U.S. Unlike communication towers, which are often over 500 feet, use guy wires for support, and are lighted along their entire length, wind turbines are less than 500 feet tall, do not use guy wires for support, and studies have shown lights on turbines do not attract birds (see Kerlinger, P. J. Gehring, W. Erickson, R. Curry, J. Guarnaccia and A. Jain. 2010. Night Migrant Fatalities and Obstruction Lighting at Wind Turbines in North America). The Wilson Journal of Ornithology 122(4):744-754). Therefore, impacts to migrating birds are not anticipated.

Comment: *Will there be "taking" by the wind turbines? How will "taking," basically killing of an avian, be addressed? What type of monitoring will be done throughout the life of the project to collect data on "taking"? Where are the migratory bird maps for the region? I did not find them in the DEIS. [LTR 284, CMT 5]*

Response: The TAC will review and analyze post-construction mortality data and determine appropriate mitigation measures to offset any wildlife effects caused by the wind development.

Comment: *Are there other species, besides avian, that migrate through the area and might be affected by the regional wind farms and BPA's energy generation infrastructure? Apparently, the MBTA was amended to include other species: "The 1974 statute (P.L. 93-300) amended the MBTA to include the provisions of the 1972 Convention between the U.S. and Japan for the Protection of Migratory Birds and Birds in Danger of Extinction.["] This law also amended the title of the MBTA to read: "An Act to give effect to the conventions between the U.S. and other nations for the protection of migratory birds, birds in danger of extinction, game mammals, and their environment." [LTR 284, CMT 6]*

Response: Based on the avian point count data, bird use in the Project Area is considered too low to identify the site as a flyway or concentrated migration route. Birds are migrating through the Project Area, but not using it as a primary route. Additionally, Section 3.4.1.5 discusses the potential for Keen's myotis and Townsend's big-eared bats to occur within the Project Area. Furthermore, BPA will comply with all guidelines set forth by the MBTA (as well as with other Acts, Regulations, and Executive Orders).

Comment: *I do think that the Whistling Ridge DEIS is extremely deficient in data on migration pathways for avian species. This lack of regional data must be addressed or the DEIS is incomplete. It is an established fact that wind farms kill birds. How many is hotly debated. However, that does not mean that we should not attempt to gather data so that we can better understand the regional cumulative impacts and effects of wind farms and energy production infrastructures on avian species, and, of course, on other species. [LTR 284, CMT 8]*

Response: Please see response to Comment LTR 284, CMT 2 above.

Comment: *[In reference to DEIS Section 3.4.1.2, Habitats; PDF pg. 53-54] - Just because "the project site is not located within any known wildlife corridor, flyway, foraging area, or migratory route" does not mean that these do not exist on site. The whole Columbia Gorge region is a well known bird migration route so why would this area be exempt. Flying predators love ridges and ridges are where SDS proposes to put whirling death blades which probably won't do the predators much good. I'm sure the Audubon Society will be glad to provide SDS and BPA with facts and figures on migrating birds. [LTR 286, CMT 37]*

Response: Comment acknowledged.

Comment: *[In reference to DEIS Section 3.4.2.1, Proposed Action; PDF pg. 88] - "…the area is not within a major migratory pathway, at least during fall migration."?!? What is this supposed to mean? That it might be a migratory pathway during other seasons. The entire Columbia River Gorge and its environs is recognized by Audubon and other reasoning people as a migration corridor for a large number of species. Ridges attach raptors. Turbines are sited*

on ridges. Turbines kill raptors. Not good. This contradictory DEIS statement should be clarified. [LTR 286, CMT 42]

Response: Comment acknowledged.

Comment: *[In reference to DEIS Section 3.4.2.2, No Action Alternative; PDF pg. 91] - This is a totally inadequate (how many times will I have to use this word when referencing this very inadequate DEIS!) "No Action Alternative" analysis. SDS doesn't know that other generation facilities would be constructed and operated in the region—based on this DEIS, which might be a Waterloo moment for wind generation and wind farms in the region—it is also likely that wind power and its unpredictability might be reassesses and other methods of conservation found and used. There would be not "increased avian or bat fatalities from turbine operations, but there would also be less pesticide use, less impermeable surfaces built on erosion-prone ridges, less fragmentation of the environment, less impact on wildlife, less impact on humans, etc. There would be many more LESSES if this project wasn't built!!*

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. One other wind development has been proposed, and is analyzed in the cumulative effects section. Based on pre-construction surveys, the expected mortality of bird species is expected to be relatively low compared to many other wind developments that have higher pre-construction avian use. Bat mortality may be low, but is difficult to predict at this site.

Comment: *[In reference to DEIS Section 3.4.4, Unavoidable Adverse Impacts; PDF pg. 92] - This is a really insufferably dataless, inane statement! "Anticipation" is not science. SDS doesn't know what level of mortality would be sufficient to affect or not affect any single species. Until they gather more data and do a thorough analysis of the regional effects of wind farms on species mortality, the DEIS is incomplete and flawed in regard to bird and bat mortality rates; and, the stated non-effects of turbine collisions on species viability is totally unfounded and unsupported by any data. [LTR 286, CMT 44]*

Response: Detailed data on potential levels of mortality is provided in Section 3.4 and in the wildlife reports included in Appendix C of the DEIS.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 287, CMT 2]*

Response: Comment acknowledged.

Comment: *The proposed project could cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 288, CMT 2]*

Response: Comment acknowledged.

Comment: *This current proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains and on the boundary of the Columbia River Gorge National Scenic Area. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 289, CMT 2]*

Response: Comment acknowledged.

Comment: *In addition, this proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains and on the boundary of the Columbia River Gorge National Scenic Area. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 290, CMT 2]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 291, CMT 3]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 292, CMT 2]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 293, CMT 2]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridge line in the foothills of the Cascade Mountains and on the boundary of the Columbia River Gorge National Scenic Area. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 294, CMT 2]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat. [LTR 297, CMT 3]*

Response: Comment acknowledged.

Comment: *Although we are supportive of finding alternative ways of producing energy, we are concerned by the clearing of the forest landscape necessary for this project as well as the potential for interference with bird and wildlife migration, nesting, and foraging. [LTR 302, CMT 1]*

Response: Comment acknowledged.

Comment: *The project is likely to cause significant adverse impacts to the natural resources of the area because of the considerable forest land clearing that must be undertaken for the 50 + wind turbines that will be sited in this location. Some of the effects include direct impacts to wildlife habitat, wildlife displacement, avian death, fragmentation of wildlife migration corridors, and severe edge effects to intact interior forest habitat. [LTR 302, CMT 1]*

Response: Comment acknowledged.

Comment: *Clearing traditionally forested land close to an intact forest boundary (i.e. the Gifford Pinchot National Forest (GPNF)) can create severe edge effects including increased disease incursion on the edge environments, noxious weed invasion, significant changes in microclimates, increase risk of fire, and increase nest predation for birds nesting in traditionally interior habitat. [LTR 302, CMT 2]*

Response: Comment acknowledged.

Comment: *The most glaring failure of this DEIS is the lack of adequate data on potential effects this land clearing will have on barred owl and spotted owl competition. This project will clear forest land near historic activity centers for spotted owl and within the White Salmon spotted owl special emphasis areas (SOSEA). Although the DEIS discusses these areas and claims that destruction of the forested landscape will have little if any effect on spotted owl (DEIS, Page 3-49 - 3-56) it does not discuss or analyze the effects this large clearing can have on increased competition on spotted owl habitat on the edges of this cleared land. [LTR 302, CMT 3]*

Response: The Project Area is located on managed forest lands that are currently in logging rotation, so no old-growth forest would be affected. The SOSEA will continue to have more than 40% of its habitat maintained above the habitat threshold that is associated with supporting a viable spotted owl center, should one return to the area. Neither of the two spotted owl centers near the Project Area have had any activity since 2002.

Comment: *The DEIS also fails to properly assess this area for wildlife migration corridors. [LTR 302, CMT 5]*

Response: The wildlife studies were conducted according to the WDFW 2009 guidelines and were in compliance with these guidelines. Avian use surveys did not suggest the area was used as a migratory corridor for raptors.

Comment: *While the DEIS does specifically look at some species of concerns like the western gray squirrel and indicates that other wildlife were present in the area (DEIS, Page 3-69) it fails to properly assess the loss of this habitat or any potential use as migration corridor from the Gorge to the Gifford Pinchot National Forest. Clearing these areas will significantly affect use of the area by large mammals like bear and cougar as migration routes and will significantly alter use by deer and elk especially if forge is not available for the ungulate species. [LTR 302, CMT 6]*

Response: The Whistling Ridge Project Area is has been heavily managed for commercial forestry for approximately 100 years. The timber is harvested on a regular rotation which results in cleared areas until reforestation takes place. Land to the north is owned and managed by

Washington Department of Natural Resources, and that land is also managed for commercial forestry. The Project Area is crossed horizontally by two BPA transmission corridors that are kept clear of high vegetation. Migration corridors between the Gorge and the Gifford Pinchot National Forest would cross these two existing cleared transmission corridors. The proposed Project will require approximately 56 acres of the total of 1,152 acres of the site. The turbine strings are proposed to be oriented in a north-south direction on the top of ridgelines and would not add an additional east-west clearing. Please refer to Figure 2-1 which depicts the arrangement of the proposed turbine strings.

Comment: *The DEIS fails to properly assess direct and indirect impacts to wildlife because it neglects to analyze an important need of many predator and herd species: migration corridors. [LTR 302, CMT 7]*

Response: Please see response to Comment LTR 302, CMT 6 above.

Comment: *Establishing a wind turbine facility in an important migratory passageway such as the Gorge could significantly increase the risk to the population. [LTR 302, CMT 8]*

Response: Comment acknowledged.

Comment: *The DEIS fails to look at the direct and indirect impacts this wind project can and will have on the surrounding forest environments including on the GPNF. [LTR 302, CMT 10]*

Response: Please see response to Comment LTR 302, CMT 6 above.

Comment: *The wildflowers, birds and mammals will be affected by this project…The nearby wind project in Klickitat County is killing hundreds of birds and bats every year. The ridge top would be even more destructive to birds. [LTR 305, CMT 1]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 307, CMT 2]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 308, CMT 2]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat, and would degrade the outstanding scenic beauty of the Lewis and Clark National Historic Trail and Columbia River Gorge National Scenic Area. [LTR 309, CMT 2]*

Response: Comment acknowledged.

Comment: *Habitat fragmentation? [LTR 311, CMT 14]*

Response: Comment acknowledged.

Comment: *In order to assist in identifying the need for ensuring protection of populations with differential patterns of subsistence consumption of fish and wildlife, Federal agencies, whenever practicable and appropriate, shall collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. Federal agencies shall communicate to the public the risks of those consumption patterns" which is pertinent to the DEIS and I believe was NOT adequately addressed. [LTR 314, CMT 2]*

Response: Assuming the comment is whether or not the site is used for hunting and fishing, the answer is that there are no fish-bearing streams on the Project Area and no evidence of the presence of fish. The property owner permits access for hunting, which is subject to landowner approval.

Comment: *Wind turbines kill birds. [LTR 317, CMT 9]*

Response: Comment acknowledged.

Comment: *There does not seem to be mention or analysis of the land being designated as a deer and elk winter range. The property directly south is designated deer and elk winter range,*

and I saw no discussion of the impact of this project on that range. I personally would like to understand what's going to happen with deer and elk. [LTR 317, CMT 29]

Response: Comment acknowledged.

Comment: *Why isn't barotraumas discussed? [LTR 317, CMT 36]*

Response: Barotrauma is tissue damage to air-containing structures caused by a change in air pressure associated with moving turbine blades. Baerwald (2008) found that 90% of bats necropsies showed signs of internal hemorrhaging consistent with barotrauma at a wind facility in Alberta, but another study in Illinois found that barotrauma accounted for at most 6% of the fatalities (Rollins, K.E., D.K., Meyerholz, G.D. Johnson, A.P. Capparella, and S.S. Loew. 2011. Cause of Bat Mortality at Wind Farms: Barotrauma vs. Collision. Presented at the Society for Integrative and Comparative Biology annual conference, January 2011, Salt Lake City, UT.)

Comment: *The project uses the phrase "loss of habitat" I would argue it is a "change" in habitat. PUD has animals that live at the substations. [LTR 317, CMT 48]*

Response: Comment acknowledged.

Comment: *The EIS does not identify the number of bat species in the area or go into in-depth analysis on how bats are killed by being in proximity of the low pressure zone of moving blades. [LTR 317, CMT 56]*

Response: The bat reports in DEIS Appendix C presents tables showing bat species expected to occur in the area. Please also see response to Comment LTR 317, CMT 36 above.

Comment: *What impact will the wind towers have on the bat population? [LTR 317, CMT 57]*

Response: In addition to what is discussed in Section 3.4.2 Impacts, please see response to Comment LTR 74, CMT 8 above.

Comment: *The DEIS states there are no population level impacts to wildlife. There is no evidence whatsoever to substantiate that. There are no studying of population level impacts, there is no safe threshold. [LTR 317, CMT 72]*

Response: Please see response to Comment LTR 36, CMT 3 above.

Comment: *There is no independent plan included. There needs to be a much broader look at the impacts that could be sustained by this project. [LTR 317, CMT 73]*

Response: Comment acknowledged.

Comment: *This project is located in forested habitat, the potential for impacts is higher in forested habitat. It is located within a designated spotted owl special emphasis area. And will impact two states, Washington and Oregon. [LTR 317, CMT 90]*

Response: Please see response to Comments LTR 36, CMT 8 and LTR 79, CMT 6 above.

Comment: *Need to make sure that the bird surveys and collision risk models address a forested landscape. [LTR 318, CMT 5]*

Response: The bird surveys followed WDFW 2009 wind power guidelines and the methods were appropriate for the managed coniferous forested habitats in the Project Area.

Comment: *May need to update the Washington State guidelines for siting and mitigation to be appropriate for this habitat (current focus is Easter Washington Habitats). [LTR 318, CMT 6]*

Response: Comment acknowledged. Please note that neither the State of Washington EFSEC nor BPA is responsible for updating guidance that is set forth by the State of Washington WDFW.

Comment: *Our concern is mitigation. We would like to see an Audubon representative on the tech advisory committee. Also, we do not feel that a 2 year post-mortality study is adequate. We would like to see a longer post-mortality study and possibly some changes to those. [LTR 318, CMT 7]*

Response: According to the Wind Turbine Guidelines Advisory Committee (2010), two or more years of post-construction fatality monitoring are only recommended if pre-construction studies indicate the potential for high mortality or mortality to ESA listed species, and results of initial monitoring indicate fatality levels are high or ESA listed species are found as fatalities. If these situations do not occur, one year of monitoring is considered adequate. The pre-construction studies did not indicate fatality levels would be high relative to other wind energy

facilities, and impacts to ESA listed species are not anticipated. Therefore, two years of monitoring should be adequate for this site. The TAC organized for this Project will be the group responsible for determining the need for additional monitoring after two years.

Comment: *I have been up to where there are wind towers to watch the harm to birds. There was none, the flew above and around them. They do not go though them. I don't think the towers affect the birds. [LTR 318, CMT 22]*

Response: Comment acknowledged.

Comment: *Migratory birds have been historically effective at circumnavigation these wind farms [LTR 318, CMT 29]*

Response: Comment acknowledged.

Comment: *Bats being very small cannot fly during the high wind speeds needed to operate these turbines. Thus they will be operating at different times. I many places fatalities have been reduced up to 60 percent by compromising when the turbines will be operating and when they will not. The use of radar has also worked towards reducing fatalities from 40 to 60 percent in many locations. [LTR 318, CMT 31]*

Response: Comment acknowledged.

Comment: *The EIS is globally insufficient in the evaluations of wildlife. It does a poor job of covering bat evaluations, lacks significant bird-bat dispersal data, and has no mention of large animals. Why is there not a mitigation and monitoring program already in place? [LTR 318, CMT 37]*

Response: A mitigation plan has been prepared and a monitoring program will be developed by the TAC. The wildlife evaluation was conducted according to WDFW guidelines and the WDFW has stated that surveys conducted for the Whistling Ridge Project have met their guidelines.

Comment: *It is inappropriate to state that no impacts are anticipated to wildlife species - We do not have data that determines the effect wind turbines have on forest dwelling species. [LTR 318, CMT 40]*

Response: Please see response to Comment LTR 79, CMT 6 above.

Comment: *What effect with storm cloud layers (from when it is storming on the coast) that build up behind Underwood Mountain have on birds and aviation? [LTR 318, CMT 50]*

Response: Storm clouds would likely result in decreased activity by birds. Migrating birds may fly at lower altitudes when storm clouds are present, or may cease migration.

Comment: *The statement that there will be no harm to wildlife is a hoax. Raptor mortality from wind projects in Klickitat County is time times what the EIS predicted. [LTR 318, CMT 53]*

Response: Comment acknowledged.

Comment: *I suggest employing a security guard, they would be able to provide real facts about birds flying into the wind turbines. [LTR 318, CMT 62]*

Response: Comment acknowledged.

Comment: *Impact on Raptors – The wind turbines will negatively impact raptor habitat, some of which are listed as endangered species. [LTR 33, CMT 4]*

Response: There are no endangered raptor species known to occur within the proposed Project Area, and the construction of turbines will not change Project Area habitat in the area immediately around the turbines. Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4.

Comment: *The DEIS underestimates the impacts of wind projects on long-lived raptor species. Research on wildlife-turbine interactions in the Pacific Northwest and elsewhere has focused almost exclusively on estimating mortality rates. Although studies dealing with impacts on rare and endangered species are scarce, there is growing evidence that wind projects increase the extinction probability of long-lived species through incremental increases in mortality rates. In other words, while wind turbines may kill a relatively small number of individual birds during any given year, for rare and endangered species this increase can quickly add up to population extinction. A recently published study found that even though wind projects may cause only slight reductions in the survival of birds living in an area associated with wind turbines, those reductions can strongly impact the population viability of long-lived species-and can greatly reduce the time to extinction for those species. [LTR 36, CMT 3]*

Response: Without a citation, it is not possible to review and comment on the article being referenced. Pre-construction raptor use was estimated, and determined to be low relative to other wind developments in the region. Low use estimates are positively correlated with low post-construction mortality. The cumulative effect of the sum of regional wind projects was analyzed in the cumulative effects section. See also response to Comment LTR 36, CMT 3 above.

Comment: *That is the situation we are currently seeing in Klickitat County with species such as ferruginous hawks. Wind projects have already killed at least three ferruginous hawks locally, and there are very few of these animals remaining. There have been no studies in Skamania County, Klickitat County, or anywhere else in the Pacific Northwest to determine the long-term impact of wind projects. Such studies are necessary in order to determine the cumulative impacts of continued industrial wind energy development at the scale now being proposed for Klickitat County. As mentioned above, wind projects pose a threat to long-lived raptors that are already rare or endangered. There are ways to mitigate this problem, as pointed out in the scientific study cited above: "Unlike other non-natural causes of mortality difficult to eradicate or control, wind-farm fatalities can be lowered by powering down or removing risky turbines and/or farms, and by placing them outside areas critical for endangered birds." The applicant has provided insufficient evidence to determine that the project will not have any impact on species viability. Currently, the Whistling Ridge proposal includes no provisions for temporary or permanent shutdowns of problem turbines, nor does it place turbines at a reasonable distance from important bird areas such as Spotted Owl Special Emphasis Areas. These provisions must be included to ensure that long-lived raptors and other species of concern are not driven to extinction locally. In response to unavoidable impacts to wildlife, the applicant proposes "mitigations" including raptor nest surveys, post-construction monitoring studies, and the formation of a Technical Advisory Committee to oversee these activities. None of these actions qualify as mitigation measures. Mitigations are measures that remedy a problem. The applicant is merely proposing to study the problem, not to remedy it. Mitigation cannot be left to a Technical Advisory Committee that is organized and overseen by the developer. I have served on several Technical Advisory Committees, and while such committees may recommend mitigation measures they are not typically empowered to require implementation of any of these measures. 4. Pre-construction estimates of avian and bat fatalities have not proved reliable. Although no scientists have done a thorough comparison of pre-construction and post construction mortality estimates, there is plenty of anecdotal evidence that post construction mortalities often greatly exceed pre-construction estimates made using the same methodology as has been employed for the Whistling Ridge wind project. For example, the Environmental Impact Statement (EIS) prepared prior to adoption of the Energy Overlay Zone in Klickitat County grossly underestimated the level of wildlife fatalities likely to result from wind development. At all of the wind projects in Klickitat County where monitoring has been completed or is under way, reports prepared by wildlife consultants show that fatalities of raptors and bats are far in excess of what was anticipated by the EIS. Whistling Ridge is using the same consultants and methodology as Klickitat County for its pre-construction fatality estimates. At Big Horn, the first large wind project built in Klickitat County, the developer's wildlife consultants did a full year of monitoring at 100 percent of the turbines, which makes this one of the most comprehensively monitored wind projects anywhere in the United States. The*

results of that monitoring study show that raptor fatalities are at least eight times higher than what the developer, PPM/Iberdrola, projected. [LTR 36, CMT 7]

Response: There were no ferruginous hawks observed within the Project Area, and they are not known to occur in Project Area habitat. There are no other wind developments in Project Area habitat for comparison, as Whistling Ridge would be the first one. The TAC will be formed to evaluate post-construction mortality and will be able to recommend mitigation measures, if needed, to reduce avian mortality. If there is an unacceptable level of mortality to any species, the USFWS has the authority to require curtailment or moving of turbines. There is a growing body of data available to conduct pre-construction avian use estimates with post-construction mortality, and the pre-construction use estimates show a positive correlation with avian mortality. The methods used to show a disparity between pre-construction estimates and elevated post-construction mortality are being contested as not accurate. All predictive modeling involves judgment calls based on a host of factors in order to make a prediction. It is scientifically and factually incorrect to state that any prediction that is not borne out by the actual event is the result of a fundamental shortfall in an assumption or methodology. A variety of factors can and does influence the actual outcome of a predicted event. Both the WDFW wind power guidelines and prior siting conditions of the EFSEC embrace the concept of adaptive management to ensure that the predictions that were modeled are, in fact, monitored over time and evaluated in order to adaptively manage the situation in response to the facts as they are borne out on a Project.

Comment: *This wind farm, if built, would not only have scenic impact, but also would potentially have adverse long-term impact on bird habitat and wildlife in the region. No other wind farm project to date has been sited in such a densely forested area in proximity to endangered species - including the Northern Spotted Owl and Northern Goshawk. [LTR 46, CMT 2]*

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. Based on pre-construction surveys, the expected mortality of bird species is expected to be relatively low compared to many other wind developments that have higher pre-construction avian use. The Project has received a concurrence letter from USFWS that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls. Site habitat following construction will not be suitable for the northern goshawk, so no mortality is anticipated for this species.

Comment: *Although a two-year bird mortality monitoring study after construction is mentioned, no concern for documenting bat mortality is evidenced as no provisions for such are listed on Page 3-82, Section 3.4.82 under Mitigation Measures. This, despite the possibility that two federal bat Species of Concern, Townsend's big-eared bat and Keen's myotis, are reported to "likely occur in the project area." The bat echolocation studies that were conducted at the project site were unable to determine bat species, but stated that "we expect that the potential risk to bats from turbine operations to be somewhat higher than the rates observed at other*

western facilities placed in non-forested environments. One estimate from Buffalo Ridge, Minnesota data set a predicted a mortality range from 2.2 to 20.8 individuals per year which, over time, certainly could have an impact upon a species of concern's breeding population numbers. The bat echolocation study consultants, Western EchoSystems Technology, Inc., recommended that "The post-construction monitoring program should be designed to accurately estimate the level of bat mortality." Why is it not included? [LTR 76, CMT 9]

Response: Post-construction mortality monitoring for bats is planned. The TAC will be involved in the development of the monitoring plan. If elevated mortality or mortality of protected species occurs, the study will be extended. No Townsend's big-eared bats or Keen's myotis have been documented as fatalities at any wind developments in the U.S.

Comment: *By comparison, the wind energy industry makes much of birds killed by plate glass windows, cats and vehicle grills, but how many eagles, falcons and hawks are killed by these objects? Wind energy is very selective in its bird mortality and raptors are some of our most threatened bird populations. I would not want to be a raptor trying to negotiate the mid-Columbia landscapes these days, would you? And the US Fish & wildlife Service wants to reintroduce the California Condor to its former range in the Gorge? What a joke! [LTR 77, CMT 6]*

Response: Comment acknowledged.

Comment: *The DEIS underestimates the impacts of wind projects on long-lived raptor species. Research on wildlife-turbine interactions in the Pacific Northwest and elsewhere has focused almost exclusively on estimating mortality rates. Although studies dealing with impacts on rare and endangered species are scarce, there is growing evidence that wind projects increase the extinction probability of long-lived species through incremental increases in mortality rates. In other words, while wind turbines may kill a relatively small number of individual birds during any given year, for rare and endangered species this increase can quickly add up to population extinction. A recently published study found that even though wind projects may cause only slight reductions in the survival of birds living in an area associated with wind turbines, those reductions can strongly impact the population viability of long-lived species-and can greatly reduce the time to extinction for those species. (Large Scale Risk-Assessment of Wind-Farms on Population Viability of a Globally Endangered Long-Lived Raptor Species. Martina Carrete, Jose A. Sanchez-Zapata, Jose R. Benitez, Manuel Loban, and Jose A. Donazar in Biological Conservation 142:2954-2961, 2009). That is the situation we are currently seeing in Klickitat County with species such as ferruginous hawks. Wind projects have already killed at least three ferruginous hawks locally, and there are very few of these animals remaining. There have been no studies in Skamania County, Klickitat County, or anywhere else in the Pacific Northwest to determine the long-term impact of wind projects. Such studies are necessary in order to determine the cumulative impacts of continued industrial wind energy development at the scale now being proposed for Klickitat County. As mentioned above, wind projects pose a threat to long-lived raptors that are already rare or endangered. There are ways*

to mitigate this problem, as pointed out in the scientific study cited above: "Unlike other non-natural causes of mortality difficult to eradicate or control, wind-farm fatalities can be lowered by powering down or removing risky turbines and/or farms, and by placing them outside areas critical for endangered birds." The applicant claims there will be no population-level impacts on any species but has provided has provided insufficient evidence to support this assertion. Currently, the Whistling Ridge proposal includes no provisions for temporary or permanent shutdowns of problem turbines, nor does it place turbines at a reasonable distance from important bird areas such as Spotted Owl Special Emphasis Areas. These provisions must be included to ensure that long-lived raptors and other species of concern are not driven to extinction locally. In response to unavoidable impacts to wildlife, the applicant proposes "mitigations" including raptor nest surveys, post-construction monitoring studies, and the formation of a Technical Advisory Committee to oversee these activities. None of these actions qualify as mitigation measures. Mitigations are measures that remedy a problem. The applicant is merely proposing to study the problem, not to remedy it. Mitigation cannot be left to a Technical Advisory Committee that is organized and overseen by the developer. I have served on several Technical Advisory Committees, and while such committees may recommend mitigation measures they are not typically empowered to require implementation of any of these measures. [LTR 161, CMT 6]

Response: Pre-construction raptor use was estimated, and determined to be low relative to other wind developments in the region. Low use estimates are positively correlated with low post-construction mortality. The cumulative effect of the sum of regional wind projects was analyzed in the cumulative effects section, and included analysis of the other known wind development proposed for northwestern conifer forests. The article referenced (Carrete et al 2009) did show long-term population reduction of a long-lived raptor from wind developments, but primarily was focused on wind developments in territorial breeding grounds of this species. The proposed Project is not located within a territory of a long-lived raptor species. There were no ferruginous hawks observed within the Project Area, and they are not known to occur in Project Area habitat. There are no other wind developments in Project Area habitat for comparison, as Whistling Ridge would be the first one, but since avian use was low, it is anticipated that bird mortality will be low relative to other wind facilities with higher use estimates. The TAC will be formed to evaluate post-construction mortality and will be able to recommend mitigation measures, if needed, to reduce avian mortality. If there is an unacceptable level of mortality to any species, the USFWS has the authority to require curtailment or moving of turbines.

Comment: *The DEIS underestimates potential impacts on northern spotted owls and other avian species. The proposed project falls within critical habitat for the northern spotted owl, a species that is not only endangered but has continued to decline since the adoption of the Washington Department of Natural Resources' Habitat Conservation Plan for the species. This species has continued to decline on federal lands, which makes the state's HCP more important than ever. There are only an estimated 500 northern spotted owl pairs remaining in all of Washington State. Even as the state's Habitat Conservation Plan is failing miserably, the applicant is proposing to undermine that plan by allowing commercial-scale energy development within a Spotted Owl Special Emphasis Area. A commercial wind energy project is not*

appropriate for habitat that is designated as a nesting, roosting and "foraging area for a federally endangered species.["] In materials distributed to the public prior to the mid-June 2010 hearings, SDS Lumber writes: "After years of timber harvest, there's no suitable habitat for the bird." It is ironic that the applicant is pointing the finger at its own destructive timber practices to justify further risk to northern spotted owls. Regardless of whether spotted owls are currently nesting on or near this property, as they did in recent history, this area is designated as prime potential habitat for the species. The fact that Washington's Habitat Conservation Plan for spotted owls is not increasing the numbers of reproductive pairs makes it all the more important to restore this species' habitat-not to damage it even further. The Environmental Impact Statement commissioned by Klickitat County for its Energy Overlay Zone stated (on page 2-15 of the Final EIS) that "forested areas host higher concentrations of owl and other sensitive species habitats,["] (Klickitat County Energy Overlay Final Environmental Impact Statement, September 2004.) The EIS recommended that areas with high concentrations of forested habitats be excluded from the Energy Overlay Zone because of their "higher potential for use by sensitive species and avian species likely to be impacted by wind turbines." This sensitive forested habitat is exactly what is being proposed for development at Whistling Ridge. Spotted owls are not the only species likely to be significantly impacted by the proposal. Klickitat County's Energy Overlay EIS also found high use of forested habitats by other raptors. The SDS map for the proposed project shows ridge-top locations for turbines, and these are typically the worst possible locations from an avian perspective- i.e., likely to result in the highest number of bird collisions. [LTR 161, CMT 8]

Response: The wind development is proposed for construction along the ridgelines rather in valleys, where spotted owls spend the majority of their time and along which they would travel. The Project would not cause suitable habitat loss within the spotted owl site center in the White Salmon SOSEA above 40 percent, which is the viability threshold. A biological assessment of the effect of the proposed Project on the spotted owl was prepared and reviewed by the USFWS, who concurred with the determination that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls. Use estimates for the Project Area were low relative to other wind developments, so it is likely that mortality will be lower the levels observed at sites with moderate or high use.

Comment: *State agency wildlife species review is typically done by WDFW. DNR biologists looked at impacts to those species protected under our DNR forest land HCP in the range of the northern spotted owl, not other eastern Washington wildlife species. See also DNR comments as to Forest Practice Rule requirements related to spotted owls in the next DNR comment section. Whistling Ridge Energy Project Draft EIS, Page 3-50 states surveys were conducted for northern spotted owl presence in 2008-2009 using the 1992 USFWS survey protocol. No spotted owls were detected during these surveys. Page 3-52 states that the longstanding absence of any northern spotted owls at the historic 2 site centers suggest that these site centers likely no longer qualify for special protection. Page 3-53 states that the Turnstone and DNR/NCASI surveys affirmatively documented the absence of northern spotted owl site centers in these historic sites. They also state that surveys conducted in and near the project area indicate that spotted owls are not present. Additional surveys were conducted during three daytime site visits over the seasonal breeding window in 2009 to determine if spotted owls may be in the vicinity but were*

not vocalizing due to the presence of barred owls. No spotted owls were detected. Comment: It is widely understood that one of the most serious threats facing the northern spotted owl is the recent range expansion of another closely related owl species, the barred owl, Strix varia. Because barred owls may attack and kill spotted owls, spotted owls are known to vocalize less when around batted owls. This poses a serious problem when the primary means of establishing spotted owl presence is spotted owl vocal response to simulated calls. Hence, vocalization survey results may be unreliable as spotted owls are unlikely to vocalize due to the presence of barred owls, which was the case during the surveys for this project. Request: Please note that DNR biologists do not believe that three daytime visits over one season is sufficient evidence to determine that spotted owls are not in the vicinity and are just not vocalizing. Vocalization survey results may be unreliable. Whistling Ridge Energy Project Draft EIS, Page 3-56 "A review of USFWS habitat conservation plans issued in the Pacific region indicates there are no spotted owl-related habitat conservation plans applicable in or near the project area." (USFWS 2009b) Literature citation: U.S. Fish and Wildlife Service (USFWS). 2009b. Conservation Plan and Agreement Database. Accessed via the Internet at: http://ecos.fws.gov/conserv plans/public.jsp Comment: DNR accessed this website and found the Washington Dept. of Natural Resources HCP identified with 5 listed species covered under this HCP. One of the listed species identified is the northern spotted owl. The mea covered under the Washington Dept. of Natural Resources HCP conservation strategy for the northern spotted owl covers DNR managed land directly adjacent to the Whistling Ridge Energy Project to the north. Hence, the information provided in the Whistling Ridge Energy Project Draft EIS that "... there me no spotted owl-related habitat conservation plans applicable in or near the project area" is incorrect. Comment: This project may interfere with a spotted owl's ability to disperse from the DNR HCP conservation area to other areas in the vicinity. The state trust lands HCP Amendment #1 Administrative Amendment to the Northern Spotted Owl Conservation Strategy for the Klickitat HCP Planning Unit, April 2004 has designated areas for northern spotted owl Nesting, Roosting, and Foraging (NRF) habitat management located directly adjacent to this project's northern boundary. The DNR conservation objective for the northern spotted owl is to provide habitat that makes a significant contribution to demographic support, maintenance of species distribution and facilitation of dispersal. Request: Please correct the DEIS text concerning DNR HCP location. You might also reconsider and reword your conclusion that no project impacts are expected to spotted owls. [LTR 172, CMT 6]

Response: In an effort to obtain additional strategies to increase response rates from spotted owls in the presence of barred owls, the USFWS suggested that in addition to the three night site visits, the activity center cores be surveyed in the daytime using broadcasting spotted owl calls at a reduced volume and looking for the physical presence of spotted owls, spotted owl sign, juveniles and nests. Three daytime site visits in 2009 and two daytime site visits in 2010 were conducted, and a single non-breeding male was observed. The USFWS reviewed the 2010 survey data, and concurred that the Project "may affect, but is not likely to adversely affect" northern spotted owls. The text in Section, 3.4.1.5 Habitat Conservation Plans (on DEIS page 3-56) has been revised as follows: Habitat Conservation Plans. A review of USFWS habitat conservation plans issued in the Pacific region indicates that there is one spotted owl-related habitat conservation plans (HCP) applicable in or near the Project Area (USFWS 2009b). The HCP covers DNR managed land directly to the north of the Project Area, but not the Project Area itself.

Comment: *Introduction, p. 3-45: The introductory paragraph states that "[t]wo additional special status species, Keen's myotis (Myotis keenii) and Townsend's big-eared bat (Corynorhinus townsendii), may occur but have not been identified in prior surveys." A more accurate statement would be that these two species could occur at the site, but surveys conducted at the site were incapable of identifying these or any other bats, except the hoary bat, to the species level. [Footnote 11: On page 3-59 states: "Bat surveys conducted during 2007, 2008, and 2009 (Appendices C-8, C-9, and C-10) did not have the ability to detect individual species of bats. Instead, bats were grouped into species with either 'high frequency' calls or 'low frequency' calls."] Northern Spotted Owl, Historical Activity Centers, p. 3-52: This section should be revised to discuss and analyze a May 2010 record of a Spotted Owl in one of the owl circles north of the site. The remaining section addressing Spotted Owl issues should be updated to reflect this finding. Northern Spotted Owl, Conservation Support Area, p. 3.54: Although managed forest is not optimal for spotted owls, it is likely better than wind towers which pose greater mortality risk than young even-aged stands of trees. To that end, the project can only be contrary to the purpose of the CSA. It may be just 0.27% of the area, but it is still a loss that should be disclosed in the discussion (including cumulative impacts). Northern Spotted Owl, Spotted Owl Special Emphasis Centers, p. 3-56: The discussion on this point is obtuse and would benefit from illustration on a map. The footnote to this discussion indicates that DNR reports that the Mill Creek site has 48 percent of the recommended 40 percent minimum suitable habitat for a spotted owl special emphasis center. The discussion in this section should be expanded to identify what fraction of that suitable habitat occurs where the 1.4 mile circle overlaps with the northwest corner of the project site. [LTR 177, CMT 32]*

Response: Post-construction mortality monitoring for bats is planned to occur for two years, and if elevated mortality or mortality of protected species occurs, the study will be extended. No Townsend's big-eared bats or Keen's myotis have been documented as fatalities at any wind developments in the U.S. As noted on DEIS page 3-75, the Project has been sited to avoid habitat areas deemed critical to the northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the Project Area. The Project has received a concurrence letter from USFWS that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls. Since the historic activity centers at Moss Creek and Mill Creek have had no detections of spotted owls since 2002, both sites are considered unoccupied.

Comment: *Procedures for Responding to Avian and Bat Mortality Events: The mitigation measures should include the adoption of procedures specifying how the project will respond to large scale avian or bat mortality events or a take of a Bald Eagle or other species subject to protection under Federal or State law. These procedures should include timeframes for notifying relevant authorities (EFSEC, the TAC, and appropriate local, state and federal authorities) and measures to be taken to ensure no additional environmental harm occurs pending investigation of such an event, including curtailment of operations. Consistent with WDFW Wind Power Guidelines, the Applicant should contact the USFWS to determine appropriate measures to resolve unauthorized take of Endangered Species Act listed species or other species covered by other federal regulations. [LTR 177, CMT 44]*

Response: Section 3.4.3, Mitigation Measures, describes the convening of a Technical Advisory Committee (TAC) to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. Mortality monitoring will be conducted for at least two years, and in the instance of a large mortality event or mortality of a BGEPA or ESA protected species, the USFWS would be notified immediately. The USFWS and TAC would review the mortality and determine additional mitigation measures, which could include curtailment or movement of turbines associated with high mortality.

Comment: *[In Section] 3.4.4, Unavoidable Adverse Impacts, [t]his section concludes with the statement "[the potential for ongoing occurrence of either golden or bald eagles is considered extremely rare." This statement is misleading. While both of these species appear to be rare at the site, surveys have documented their presence at the site. Moreover, both of these species are known to range widely in search of food, and bald eagles have been appearing in increasing numbers during the winter in a location that is only two miles away. Under these circumstances, the DEIS should state that periodic occurrences (in low numbers) of these species at the project site are predictable and are to be expected. [LTR 177, CMT 47]*

Response: Table 3.4-5 documents that both bald eagles and golden eagles have been observed in the Project Area. On DEIS page 3-74, it is stated that bald eagle use is considered infrequent and sporadic. It is further stated that removal of grass-forb stand or shrub habitat would decrease the amount of foraging habitat available to golden eagles. Lastly, as currently stated in Section 3.4.4, Unavoidable Adverse Impacts, "the potential for ongoing occurrence of either golden or bald eagles is considered extremely rare."

Comment: *[In reference to DEIS] Section 3.4.1.7, Special Status Species, [the following are n]ot discussed under "special status species": Fringed myotis, Long-legged bat, pallid bat, and Western pipistrelle. These four other bats each have some status as detailed on Table 3.4-6. Remedy - Discuss under special status species or state why their status on the table not qualify them for special status. [LTR 178, CMT 21]*

Response: Table 3.4-2 includes only those species listed as threatened, endangered or candidates for listing under the State or Federal Endangered Species Act, or the Bald Eagle Protection Act, and which have the potential to occur near the Project Area. Table 3.4-6 lists bat species with potential to occur near the Project Area based upon range maps and not on actual surveys.

Comment: *[In reference to DEIS] Section 3.4.1.5, [f]orest practices within a SOSEA are therefore allowed to proceed so long as they do not affect the 40 percent suitable habitat threshold. Forest practices will not continue in the area as outlined in……. because the forest may never be allowed to grow trees of a marketable size. This represents a forest conversion in a SOSEA. This permanently and effectively reduces the SOSEA size and creates more fringe area*

relative to the SOSEA area. Remedy - Don't allow Turbines anywhere near, established SOSEA's, regardless of whether recent Spotted Owl activity has not been "observed." [LTR 178, CMT 91]

Response: Spotted Owl Special Emphasis Areas (SOSEA) are discussed on Page 3-56. The SOSEA limitations on habitat use or modifications do not restrict use of the Project Area as a wind turbine energy facility. Forest practices within a SOSEA are allowed to proceed as long as they do not affect the 40 percent suitable habitat threshold.

Comment: *This is the only project proposed within a designated Special Emphasis Area for the federally listed Northern Spotted Owl. [LTR 179, CMT 2]*

Response: The Project has received a concurrence letter from USFWS which states that the Project "may affect, but is not likely to adversely affect" northern spotted owls.

Comment: *To date the northern spotted owl habitat conservation plan is not succeeding in recovering northern spotted owl populations. Since this project would permanently convert forest land within a Spotted Owl Special Emphasis Area (SOSEA) to non-forestry use, the DEIS must undertake additional analysis of how the industrialization of portions of the SOSEA will affect spotted owl populations within the entire SOSEA and the region. [LTR 179, CMT 54]*

Response: The Project has received a concurrence letter from USFWS which states that the Project "may affect, but is not likely to adversely affect" northern spotted owls. The SOSEA will be managed to maintain more than 40 percent of the home range circle as suitable spotted owl habitat as required to support a level of viable habitat required for each site circle.

Comment: *The DEIS Fails to Ensure Compliance with the Federal Endangered Species Act of 1973 ("ESA"), 16 U.S.C. §§ 1531–1544. Under the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." 16 U.S.C. § 1532(19). Section 9 of the ESA prohibits both acts that would "take" a species, as well as acts that would cause an act that constitutes a "taking." The Ninth Circuit has held that "a habitat modification which significantly impairs the breeding and sheltering of a protected species amounts to 'harm' under the ESA." Marbled Murrelet v. Babbit, 83 F.3d 1060, 1067 (9th Cir. 1996). The DEIS failed to demonstrate that the project will be in compliance with Section 9 of the ESA. The DEIS does state that there has been ongoing consultation with U.S. Fish and Wildlife Service. [As stated in the] DEIS at 1-20, Pursuant to NEPA regulations the BPA is supposed to perform this consultation requirement "concurrently with and integrated with" preparation of the Draft EIS, not after the Draft EIS is complete. 40 C.F.R. § 1502.25. The results of this consultation process should have been included in the DEIS. In Section 2.20.2.2 of the Amended Application, the Applicant states that a Biological Assessment will be prepared. The DEIS fails to make good on this promise. BPA and EFSEC*

must ensure that a biological assessment is prepared, to better inform the agencies about potential adverse impacts to threatened and endangered species. [LTR 179, CMT 74]

Response: BPA has conducted informal consultation with USFWS and the Project has received a concurrence letter from USFWS that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls, and through concurrence from the USFWS has complied with Section 9 of the ESA. The last sentence in Section 4.2 on DEIS page 4-4 has been deleted and replaced with this information. Furthermore, as noted on DEIS pages 4-1 and 4-4 of Section 4, in Section 4.2: "A federal agency is required to consult with USFWS and/or NOAA Fisheries if it is proposing an action that may affect listed species or their designated critical habitat. If listed species or designated critical habitat are present and could be affected by the Proposed Action, Section 7 requires that the federal agency prepare a biological assessment to analyze the potential effects of the action on listed species and critical habitat and make an effect determination for each species." BPA has performed informal consultation with USFWS and has received USFWS's concurrence.

Comment: *The DEIS Fails to Ensure Compliance with the Bald Eagle Protection Act, RCW Chapter 77.12, and Regulations Promulgated Pursuant Thereto, Located at WAC 232-12-292. The DEIS fails to ensure compliance with the state Bald Eagle Protection Act, despite the presence of bald eagles and their habitat within and near the project site. There is no evidence that the Washington Department of Fish and Wildlife has been consulted pursuant to the Bald Eagle Protection regulations. [LTR 179, CMT 75]*

Response: WDFW was consulted during both the preparation of the EFSEC Application for Site Certification and preparation of the DEIS. While comments from WDFW do not specifically mention Bald Eagle Protection regulations , the agency staff participated in numerous meetings from 2004 to 2009 (see DEIS page I-16 of the Application for Site Certification; Appendix A). All wildlife reports were provided to the department, including those reports that discuss the presence of bald eagles (Baseline Avian Use Surveys).

Comment: *The DEIS Fails to Ensure Compliance with the Federal Bald and Golden Eagle Protection Act, 16 USC § 668–668d. The DEIS fails to ensure compliance with the federal Bald and Golden Eagle Protection Act ("BGEPA"), again despite the presence of bald eagles and their habitat within and near the project site. The BGEPA prohibits any person, association, partnership or corporation from taking a bald or golden eagle at any time or by any manner without a permit. 16 USC § 668(a). A permit may be issued only if the taking would be compatible with the preservation of the species. Id. § 668a. [LTR 179, CMT 76]*

Response: Please see response to Comment LTR 179, CMT 75 above.

Comment: *Inadequate review of impacts to northern spotted owl populations. The DEIS states that construction of the proposed facility will not directly impact spotted owl habitat. However, the DEIS fails to address whether the project will adversely affect dispersal habitat and migration corridors that are essential to sustaining genetic diversity of owl populations. For example, the Columbia River Gorge is a likely crossing location for owls moving north and south between Oregon and Washington. The project could also affect the eastwest movement of spotted owls between valleys. The DEIS fails to adequately address whether a major industrial energy facility sited within spotted owl territory will adversely affect the species. The DEIS also fails to address the permanent loss of forested lands within the White Salmon Spotted Owl Special Emphasis Area (SOSEA). The DEIS claims that the project would meet Washington state standards for the retention of sufficient habitat within the SOSEA, but it does not adequately review the impacts of permanently converting forest land to an industrial use, and how that permanent conversion would affect the longterm viability of spotted owl habitat within the SOSEA. [LTR 179, CMT 78]*

Response: The proposed Project is proposing construction of wind turbines along the ridgelines rather than in valleys, where spotted owls spend the majority of their time and along which they would travel. The Project would not cause suitable habitat loss within the spotted owl site center in the White Salmon SOSEA above 40 percent which is the viability threshold. Lastly, the Project has received a concurrence letter from USFWS which states that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls.

Comment: *Northern Spotted Owls. The DEIS contains important information regarding northern spotted owls (NSO), including a description of survey history in the project vicinity. Subsequent to the completion of the DEIS, however, an NSO survey on state Department of Natural Resources (DNR) land adjacent to the proposed project site detected an NSO in May 2010. The presence of an NSO calls into questions many of the conclusions in the DEIS regarding NSO, including the statement that "Given the extensive survey record confirming the absence of northern spotted owls, the proposed the Project [sic] will not pose a risk of taking northern spotted owls under the Endangered Species Act Section 9 and its regulations." (DEIS at 3-49) The FEIS should add a fresh analysis of the potential impacts on NSO, including: a) An evaluation of the potential for NSO to fly through the project's turbine string corridor. While the potential for an NSO to collide with a wind turbine (blade or tower) is likely low, the FEIS should include life history information on NSO behavior in comparable landscapes, including flight patterns in cleared areas and maximum height of flying (i.e. within the rotor-swept area). Telemetry data should be available from the U.S. Fish and Wildlife Service regarding radio tags studies on NSO that can provide information on NSO flight patterns in matrix lands with a combination of forested and commercially harvested lands. b) An evaluation of the specific amount and location of potentially suitable NSO habitat in the proposed project site. While the DEIS states that no forests with suitable structure for NSO nesting or roosting are present within the project site (DEIS p. 3- 49), the map of Harvesting Schedule (DEIS Figure 2-3) indicates forest parcels over 70 years old inside the Mill Creek Core Area. In addition, there are multiple reference made to "suitable habitat" and "northern spotted owl habitat" located in the proposed project site (DEIS p. 3-50, 3-52). The FEIS should provide a much clearer and more detailed inventory of the existing NSO habitat conditions on both the project site and within the*

historic NSO activity centers (including information on stand age, tree species diversity, snags per acre, etc.). In addition, while the DEIS notes that the Mill Creek site center contains 48 percent suitable habitat (DEIS p. 3- 56), Seattle Audubon is concerned that this calculation by DNR is based on outdated data. The FEIS should detail the specific process used for that calculation and ensure that it is based on up-to-date habitat mapping of the site center. c) An evaluation of the potential for existing "degraded" habitat in the proposed project site to develop into suitable NSO habitat during the projected 30 year life span of the project. Although NSO may currently be absent from the project lands, the FEIS should evaluate the potential for NSO to utilize those lands in the future. One of the guiding principles in the 2009 Wind Power Guidelines states "From a wildlife conservation perspective, a species in decline may be absent from an area … yet the habitat remains important for the conservation or recovery of that species." (WDFW, p 2) d) An evaluation of the likely NSO utilization of existing habitat in the project vicinity with the presence of project facilities (turbines, roads, etc.). The DNR land where the NSO was detected is covered by the state's Habitat Conservation Plan (HCP) and is intended to serve as habitat for NSO. If the project is built, would it displace NSO from this habitat on DNR land as they sought to avoid the project facilities? We appreciate that this option was rejected from further consideration due to comments from the public and DNR's reluctance to consider leasing the site. This decision gained significantly increased importance with the May 2010 detection of an NSO on this DNR land. [LTR196, CMT 4]

Response: As stated in the letter (dated July 19, 2010) responding to a request for consultation under section 7(a)(2) of the Endangered Species Act. WDFW convened a review panel of three spotted owl biologists to review owl interactions with turbine blades or towers of the Whistling Ridge Energy Project. Based on their knowledge of spotted owl flight behaviors and habitat preferences they concluded that the risk of spotted owl collisions with turbines at this site is low. The suitable habitat calculation for the Mill Creek site center was conducted by DNR. There are no suitable nesting or roosting habitats within the proposed Project footprint. The references to potentially suitable habitat where broadcast surveys were conducted were in reference to dispersal habitat. No suitable roosting or nesting habitat is present within the Project Area, and 70-year old stands within a core area would be protected from harvest. No harvesting is proposed within the Mill or Moss Creek cores which encompassed a 1/2 mile radius which is approximately 500 acres around the nest site. Lastly, the Project has received a concurrence letter from USFWS which states that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls.

Comment: *It [referring to the Project] would destroy important wildlife habitat, including for the northern spotted owl. [LTR 240, CMT 2]*

Response: Comment acknowledged.

Comment: *Just up the ridge and to the north is DNR land that has been identified by the DNR as significant habitat for spotted owls. DNR recently "forgot" that fact and were forging an agreement with SDS that was to allow them to extend their wind power project onto those*

public lands. It seems the development on public lands was necessary to make the proposal on the SDS land economically viable. Then members of the public, including CGAS, reminded DNR of their commitment to the spotted owl, and the SDS project on DNR lands was dropped. We believe this to be yet another example of how this powerful corporation seeks to manipulate agencies. Would the proposed Whistling ridge wind power project negatively impact the nearby spotted owl habitat on DNR lands? We believe it would. If the project was built of SDS lands, would the fact that a project is up and running so close to the DNR spotted owl protection zone make that zone less desirable as critical habitat? We believe that argument could be made. [LTR 256, CMT 11]

Response: Please see response to Comment LTR 196, CMT 4 above.

Comment: *I've heard that the Whistling Ridge project site is located in very important northern spotted owl habitat; and, considering the continuing decline of the spotted owls, this argues strongly against citing the project. [LTR 280, CMT 2]*

Response: The Project has received a concurrence letter from USFWS which states that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls. Please also see response to Comment LTR 196, CMT 4 above.

Comment: *[In reference to DEIS Section 3.3.4, Unavoidable Adverse Impacts] - I am not an expert on the spotted owl issue, but wasn't there a lawsuit filed in Washington, D.C., by the American Forest Resource Council, in 2009, challenging the Department of Interior's (DoI) U.S. Fish and Wildlife Service (USFS) 2008 Northern Spotted Owl critical habitat designation? The U.S. DoI had made a court motion asking the court judge to remand and vacate the owl's critical habitat designation and to remand the recovery plan on which the designation was made. The government's action was basically seeking to set aside the 2008 critical habitat designation. It was DoI Secretary of Interior Ken Salazar who announced the withdrawal of the Western Oregon Plan Revisions (WOPR) Records of Decision (RODs) on July 16 2009; at this same time he also announced the government would also seek to have the critical habitat designation vacated. What is the status of this lawsuit as it regards to the spotted own critical habitat in this region? BPA must do cumulative impact analyses on the effects of its regional infrastructure and energy production facilities on the critical habitats of the spotted owl (and other species). The DEIS, as far as I was able to see, does not address BPA's impacts on critical spotted habitat. This needs to be remedied. [LTR 286, CMT 33]*

Response: The May 13, 2008, Final Recovery Plan for the Northern Spotted Owl has been remanded by the courts. On September 15, 2010, a Draft Revised Recovery Plan for the Northern Spotted Owl was made available for review and public comment until December 15th, 2010. It is possible that the August 13, 2008, Revised Designation of Critical Habitat for the Northern Spotted Owl, also will be remanded. Although the recovery plan and critical habitat designation are undergoing review and revision, the proposed Project has received a concurrence letter from the USFWS which states that the Project "*may affect, but is not likely to adversely*

affect" the northern spotted owl. The service reviewed the 2010 observations of a single owl and based its determination on owl behavior as well as the proposed Project's location and habitat.

Comment: *[In reference to DEIS Section 3.4.1.5, Special Status Wildlife Species] - So, bald eagles and golden eagles, both under protection from the Federal government, were observed in the project area. They could be subject to lethal harm from the whirling blades of the turbines. Where is the de minimis analysis of any "taking" that would result from this project? There is a troubling attitude among some of the public and among some officials that it's okay if birds get killed because energy is being produced and we humans need energy. Well, it's not okay if birds get killed. There are cumulative impacts to the entire food chain when predators are killed off. Trophic cascade effect anyone? We humans do not exist on this planet in a vacuum. Everything and all life and life's processes are interconnected. [LTR 286, CMT 38]*

Response: No bald eagle has been documented as a mortality from any wind facility in the U.S. There were very few golden eagle observations, and very little suitable hunting or scavenging habitat will be present in the proposed Project Area following construction.

Comment: *[In reference to DEIS Section 3.4.1.5, Special Status Wildlife Species] - This is inadequate data and analysis and should be redone using the best available science techniques to gather enough data on this particular species so that a thorough analysis of its habitat and numbers can be made. [LTR 286, CMT 39]*

Response: The pre-construction bat surveys rely on standard monitoring procedures, which are limited because species identification is not possible for the Townsend's big-eared bat. Post-construction mortality monitoring for bats is planned to occur for at least two years following construction. To date, no Townsend's big-eared bats have been documented as fatalities at any wind developments in the U.S.

Comment: *In addition, the project is proposed in a forest zone where three special-status wildlife species are documented presently including the northern spotted owl, western gray, and northern goshawk. Please do not allow this project to continue. [LTR 296, CMT 2]*

Response: Wildlife effects were analyzed in detail during the EIS development process, and include specific species discussions in Section 3.4. The Project has received a concurrence letter from USFWS which states that the Project "*may affect, but is not likely to adversely affect*" northern spotted owls. No effect from construction or operation of the wind development on western gray squirrel is likely to occur because of the paucity of suitable habitat in the proposed Project Area. Northern goshawk had very low presence and mortality is not likely because suitable habitat will not be present in the area of the turbines during operation.

Comment: *By forcing barred owl into other locations through loss of their current foothold habitats in this area and creating environments more suitable for barred owl encroachment will create unsuitable spotted owl habitat and force spotted owls out of current occupied territory. By failing to analyze this effect of loss of forest habitat the DEIS fails to properly assess the true effects of this project on spotted owl. [LTR 302, CMT 4]*

Response: The habitat present on the ridges and high plateau where the proposed turbine strings would be located does not currently contain high quality nesting or roosting habitat for spotted or barred owls, although 2 barred owls were heard during pre-construction surveys within 0.25 miles of the proposed turbine locations. Please also see response to Comment LTR 196, CMT 78 above.

Comment: *The DEIS does measure the risk to Bald and Golden Eagles as relatively low (DEIS, 3-77) however wind facilities have notoriously killed more birds then predicted in their DEIS. Siting turbines in canyons and on ridge lines increases the risk of fatalities for migrating birds. Studies done in Montana and California have found greater increases in bird fatalities along migratory passways when siting occurred at low and high points. (Harmata et. al (2000), Smallwood and Thelander (2005), and Thayer (2007). The siting of turbines in the locations as planned are likely to have a higher impact then what is estimated in the DEIS. [LTR 302, CMT 9]*

Response: Pre-construction avian use surveys currently provide an accurate representation of species and density of bird presence by season, and have provided a general correlation with post-construction mortality in areas where there is not high avian use (as in migratory corridors). The use data suggests the Whistling Ridge Project Area has low bird use, and that it is not in a migratory corridor.

Comment: *Two observations. 1. Wind turbines and transmission lines are incompatible with forests. Maintenance requires roads, clear cutting and ongoing brush removal. [LTR 17, CMT 1]*

Response: Comment acknowledged.

Comment: *One comment. It is not the highest use of our forested environment in the Cascade mountain range to dedicate land to energy production if that means it will never have the potential again to produce a forest. [LTR 17, CMT 4]*

Response: Comment acknowledged.

Comment: *Fire dangers will increase in this forest area. [LTR 26, CMT 6]*

Response: The Applicant will be required to have a fire prevention plan in place prior to operation.

Comment: *The ecology of this area is typical of a highly altered timber management property. Timber management operations will continue in this area for decades to come which is also evidence that the area is not currently or will it every evolve to a significant ecological resource area. It is a timber management area for industrial forest practices. [LTR 28, CMT 3]*

Response: Comment acknowledged.

Comment: *We are asking that you don't make the Whistling Ridge Energy Project in Skamania County WA a testing ground for impacts on coniferous forests. The potential for devastating impacts to this area are real. This is not an appropriate site for a large scale wind project. [LTR 30, CMT 1]*

Response: Comment acknowledged.

Comment: *The project would cause minimal or NO disturbance to areas of forested habitat. [LTR 44, CMT 2]*

Response: Comment acknowledged.

Comment: *Impacts on timber production and wildlife are major concerns related to the proposal. SDS intends to reduce all vegetation to no more than 15 feet high within 150 feet of each turbine. Within the next 350 feet, vegetation would be kept less than 50 feet high. Nearly all timber harvest would thus be permanently eliminated for approximately 18 acres around each turbine. For a 100 turbine field, his would total 1,800 acres, or nearly 3 square miles, of lost timber production. [LTR 79, CMT 15]*

Response: The effects of the proposed Project were analyzed and the results presented in DEIS Section 3.4. While there will be some loss of forest habitat in areas proposed for new project related facilities, the impacted areas have been minimized to reduce lost of forest habitat. The Project area is within a managed forest system, which has many cleared areas and will continue to have cleared areas despite the approval or disapproval of this proposed Project.

Comment: *Turbine access roads and appurtenant facilities would multiply this loss several fold. [LTR 79, CMT 16]*

Response: Please see response to Comment LTR 79, CMT 15 above.

Comment: *We are aware of efforts by officials from the Washington Department of Natural Resources to develop procedures for wind power leasing on forestlands? However, as the State has yet to adopt procedures or criteria specific to forested land, or to permit a forestland-based project, review of the Whistling Ridge Energy Project must be conducted with the highest standards for science and due process in mind. [LTR 95, CMT 5]*

Response: Comment acknowledged.

Comment: *Plant Species and Communities Issues: The EIS appears to adequately address 'Special Status Plant Species.' They appear to have queried appropriate sources of information and to have done on-the-ground surveys at the appropriate times. Thank you for this consideration. On [DEIS] page 3-43, there is mention of the Oregon white oak/Idaho fescue plant community. However, there is no subsequent mention of it. Was it surveyed for and not found? Was it not surveyed for, because there was no requirement to do so? Request: Add a statement (s?) about the Oregon white oak/Idaho fescue plant community on [DEIS] page 3-74 where the impacts to special status plant species are discussed. [LTR 172, CMT 5]*

Response: The WNHP data shows the nearest Oregon white oak/Idaho fescue community as over 1 mile south of the Project Area near the banks of the Columbia River. No Oregon white oak/Idaho fescue communities were observed within the Project Area boundaries during field investigations.

Comment: *Comments, concerns and potential mitigation that would be required (for specific DEIS page numbers): [DEIS pages] 2-9, 2-15. Harvesting trees in areas that are not already cleared. This would require an approved Forest Practices Application prior to harvest. Need for Forest Practices Application is already listed in required permits on page 4-3. [LTR 172, CMT 13]*

Response: Comment acknowledged.

Comment: *[Referring to DEIS page] 3-28. Approximately 22 acres of the site will be converted from timber management to non forestry use around the wind turbine sites. All of the Forest Practices Applications that were applied for in the area 4 indicated that the sites would be kept in forestry, not converted to a non-forestry use. This appears to be a violation of the*

Forest Practices Rules. Potential conversion impacts were not considered. Any future FPAs to harvest trees near wind tower locations will require a conversion FPA (Class IV - General) and any current timber harvesting under Current FPAs may be in violation as well. State law (RCW 76.09.460) allows that Skamania County may deny any conversion permits for up to six years on any sites where FPAs were not submitted as conversion FPAs. Under Forest Practices Rules and Regulations (WAC 222-34) DNR requires reforestation to occur on all harvested acres that will remain in forestry. Request: All applicable FPAs should be amended or reapplied for to reflect conversion activities (RCW 76.09.470). Any new Class IV-General FPAs must await completion of the final EIS before they can be approved for harvest by DNR. [LTR 172, CMT 16]

Response: The permanently disturbed, cleared areas would be considered a "forest conversion" under the Washington Forest Practices Act because they would be implemented for the purposes of the Whistling Ridge Energy Project. At the time the FPAs were applied for, the Whistling Ridge Energy Project had not been approved, and therefore the forest conversion has not been approved. If the Governor of the State of Washington approves the Project, new FPA permits will likely be required.

Comment: *[In reference to] FOREST LAND UNDER G.M.A. In addition, this section of the DEIS fails to discuss or describe the impact of the Growth Management Act, RCW ch. 36.70A and its regulations on the subject proposal. Though Skamania County is not a county required to plan under GMA, it is required by GMA to designate natural resource land, including: (b) Forest lands that are not already characterized by urban growth and that have long-term significance for the commercial production of timber[.] RCW 36.70A.170. The purpose of such designation is to assure that forest lands of long term commercial significance will be protected by appropriate land use regulation. It is apparent from the discussion in the EIS that the project site meets the definition of forest lands of long term commercial significance. As the DEIS indicates: ["]This site has been in commercial forestry use for the last century, during which the site has been logged over a series of approximately 50 year rotations.["] DEIS at page 2-18. See also DEIS at page 1-9, "the site has a long history of commercial logging ..." The reason that forest lands are required to be identified is that such lands are intended to be protected and preserved from nonforestry uses. In the present case, industrial wind turbines are intended to cover significant portions of this commercial forest land, contrary to GMA's directives. Further, this proposal is the first, or one of the first, to be sited in the timbered forest lands near the Columbia Gorge. Under these circumstances, the FEIS must consider whether this project will serve as a precedent for other or future projects impacting the scenic values of the Gorge and forested areas. Finally, the DEIS at page 3-151 says that there will be no "changes to existing land uses, land use activities or development patterns." This conclusionary statement is unsupported by any objective evidence and is incorrect. It is well known that the placement of industrial wind turbines has a significant adverse impact on residential uses and tourism activities. This is true for most wind turbine locations, but is especially true in areas highly valued for scenic resources, including the Columbia Gorge, which are prized for their aesthetic surroundings. Much more detailed analysis is required for adequate consideration of these issues. [LTR 175, CMT 6]*

Response: As described in the Section 3.8 Land Use and Recreation, Skamania County has found the Project to be consistent with the Skamania County Comprehensive Plan and Maps. It should be noted that Skamania County is not a Growth Management Act County. The County plans under Washington's Planning Enabling Act. Under the applicable authority, a comprehensive plan is considered "policy guide" only. RCW 36.70.020(6). Skamania County, in its 2007 Comprehensive Plan, has designated the Project Area as "Conservancy." Among the uses identified by the 2007 Comprehensive Plan as appropriate in the Conservancy designation are: public facilities, utilities, utility substations, forest management, and surface mining. The Project would convert approximately 54 acres (approximately 5%) of the 1,152 acres of commercial forest land into utility use, both of which are permitted within the Conservancy designation. As the County has determined in its Land Use Consistency certification, the Project is within the area designated "conservancy" in the County's 2007 Plan. Public utilities and facilities and utility substations are allowed uses. In accordance with the County's determination, the Project is an allowed use, subject to applicable zoning requirements. As described in Section 3.13.2, Socioeconomics Impacts, (beginning on DEIS page 3-259), there have been a number of recent studies performed to determine the impact of wind power projects on property values, including views of turbines from residential uses. In summary, the results of these studies and literature reviews are that no statistical evidence exists that wind development has a harmful effect on residential property values within the viewshed. Nor has any statistical evidence been found of significant adverse impacts on tourism from the presence of wind turbines.

Comment: *[In Section] 3.4 BIOLOGICAL RESOURCES, [DEIS Section] 3.4.1.2, Habitats Conifer Forests - p.3-37. The second to the last sentence in this section states that "[the majority of coniferous forests within the project site is managed for commercial timber production, and is replanted following harvest." "Majority" could mean anywhere from 51 percent to 100 percent. A more quantitative disclosure is needed here. [LTR 177, CMT 29]*

Response: The text in Section 3.4.1.2 (DEIS page 3-37 under Conifer Forest) has been modified to read: "The conifer forest within the Project Area is managed for commercial timber production and is replanted following harvest."

Comment: *[In reference to DEIS] Section 3.4.1.2, [f]ive vegetation communities…… Two of the first five vegetation communities do not naturally occur in the area and are only present following logging and only for a few years. This is not an accurate representation. [LTR 178, CMT 84]*

Response: The vegetation communities described in the DEIS represented the conditions present at the time the DEIS was prepared.

Comment: *[In reference to DEIS] Section 3.4.1.7, [f]rom 150 feet to 500 feet from the base of the turbine towers, tree height would be limited to 50 feet above the turbine base within an area formed by a 90 degree arc centered on the ordinary downwind direction ([F]igure 2-4 in Chapter 2). DEIS fails to state exactly what locations and affected acres will be within an area formed by a 90 degree arc….. DEIS fails to reveal how many turbines are proposed in a topographical area that does not meet the 90 degree arc requirement. The DEIS fails to provide an analysis of acres will affected and to what degree in topographical areas that do not meet the area formed by a 90 degree arc requirement. This significant deficiency does not allow agencies or the public to assess what the impacts to forestry and forest habitat from siting wind turbines in forested areas will be. During scoping, a comment requesting this information was submitted. Reference - Topographical maps show little, if any, areas meet the condition of "an area formed by a 90 degree arc centered on the ordinary downwind direction." Remedy - Rewrite section of DEIS with a complete analysis, in light of the expanded information. A map of the project area and the all area around it that could be impacted to create and maintain airflow needs to be included. Include a table of the affected habitat types and display the expected length of time for the forest to be fully renewed for viable timber harvest. If harvest will not be allowed to renewed to an age of 50-80 years for any reason, then show age it will attain. Any sections on forest, animals, and habitats that would be affected in light of this information needs to be updated and resubmitted for public comment through a completely updated DEIS or a supplemental DEIS. [LTR 178, CMT 107]*

Response: The numbers of acres that will be temporarily and permanently affected is listed in Table 2-1 (on DEIS page 2-4). See Table 2-1, Footnote C of the DEIS for information on how impact areas were calculated. Also refer to Table 2-1 for a listing of permanent and temporary impacts by project component (DEIS page 2-4). The Project elements are mapped on Figure 2-1, Proposed Project Elements, on DEIS page 2-3. The current forest types are shown on Figure 2-2, on page 2-11 of the DEIS. The harvesting schedule is graphically depicted on Figure 2-3, following page 2-15 of the DEIS. As described in Section 2, on DEIS page 2-15, "Harvests have typically occurred approximately every 50 years; however the harvest periods vary depending on the market and the demand for the type of timber. As a result, some harvests have occurred as frequently as every 40 years, and some have been up to every 65 to 70 years. Additional harvests are planned; subject to requirements of a Forest Practice Application." As shown on Table 2-1, the Project Area encompasses 1,152 acres, of which 56.13 acres would be permanently converted to the wind project. The remaining 1,095.87 acres would remain in commercial forest use.

Comment: *[In reference to DEIS] Section 3.4.1.7, [c]onstruction of the proposed project would result in the permanent loss of 21.86 acres of managed coniferous or mixed deciduous-coniferous forest. Here it state that the loss of forest will be permanent, yet prior arguments stated "for the life of the project estimated to be 30 years." Remedy - Show actual permanent loss of forest from construction and operation of the project. Rewrite this section of DEIS with a complete analysis, in light of the expanded information. Include a map of the entire forest area that could be impacted to improve airflow. Include a table of the affected habitat types and display the expected length of time for the forest to be fully renewed for viable timber harvest. If harvest will not be allowed to renewed to an age of 50-80 years for any reason, then show age it*

will be allowed to attain and the differential in board feet at harvest. Any sections on forest, animals, and habitats that would be affected in light of this information needs to be updated and resubmitted for public comment through a completely updated DEIS or a supplemental DEIS. [LTR 177, CMT 111]

Response: A wind facility project life expectancy is typically assumed to be 30 years. However, with equipment maintenance and replacement, the project life for Whistling Ridge could be much longer. Therefore, the project impacts were identified as permanent. Furthermore, this EIS deals with the siting of the proposed Project as well as the interconnection request to connect to the Federal Columbia River Power System (FCRPS). Routine commercial forest management practices that the Applicant would normally engage in are outside the scope of this EIS.

Comment: *[In reference to DEIS] Section 3.4.1.7, [o]peration of the project would result in no further impacts to habitats on the project site. Operation of the project would result in the LONG TERM and perhaps permanent removal of functional forest in the airflow area. Trees in the airflow area may never be allowed to regrow to a size that could prove needed habitat. Remedy - Remove this statement and others like it. [LTR 178, CMT 112]*

Response: The text in Section 3.4.2.1 (DEIS page 3-77 Operation, Habitats) has been revised to read: "Table 3.4-10 shows the permanent impacts of the Project to the habitat types found on the site. Operation of the Project would result in the permanent removal of 60.69 acres of habitat."

Comment: *Unknowns. The analysis in the DEIS leaves some unanswered questions in addition to the ones already raised. First, what will be the extent of short-term and permanent forest clearings around the turbines? Typically wind turbines need a lot of free space around them to reduce turbulence and blade interference. How far will this clearing extend from each turbine? Has this forest clearing been incorporated into the photomontages? It does not appear to have been.. [LTR 180, CMT 25]*

Response: Please refer to Figure 2-4, Turbine Timber Buffer, in the DEIS. The need for free space around the turbines was included in the impact area calculations.

Comment: *It would affect the vegetation in the area and reduce the food supply in the long term. [LTR 208, CMT 4]*

Response: Please see response to Comment LTR 79, CMT 15 above.

Comment: *Wind power promoters like to denigrate the sites of their proposed projects, and the Whistling Ridge proposal is no different. The DEIS states the site is commercial forest lacking native plants. [See Page 1.9] Perhaps SDS shipped those trees in from some other bio-region, but we doubt it. In fact, it is likely that just about all the plants on the site are native, and that they serve as habitat for animals and birds. [LTR 256, CMT 9]*

Response: Please see response to Comment LTR 177, CMT 4 above.

Comment: *It is not in a natural or native coniferous forest condition. [LTR 260, CMT 2]*

Response: Comment acknowledged.

Comment: *The concept of ridge line deforestation and industrial development is also faulty in its failure to address additional factors such as the earthquake prone conditions of this area, the impact of blasting and construction on known water resources, including springs and aquifers. The steepness of the proposed site, once deforested further, will result in unacceptable water run off, erosion and extreme habitat loss. The concept of clear cutting thousands of acres of old growth forest for industrial development in favor of select harvesting is ecologically and economically unsound for this region. [LTR 283, CMT 4]*

Response: Comment acknowledged.

Comment: *Most of the area that is involved is not pristine, it is planted third growth forest. It is a working managed forest. [LTR 317, CMT 5]*

Response: Comment acknowledged.

Comment: *We need to thin the forest so wind can get though and trees can grow tall. [LTR 318, CMT 63]*

Response: Comment acknowledged.

Comment: *All sections in the proposal are within the Bull Trout overlay delineated in state FP rules (WAC- 222). [T3N-Rl0E-S5] There is an F type stream with possible Bull Trout required protections. There are potential unstable slopes indicated. [LTR 172, CMT 7]*

Response: As stated on page 3-69 of the DEIS, in the first paragraph under "Fish", no fish have been documented within the Project Area. Surface water is described in Section 3.3.1.1 on page 3-24 of the DEIS. The drainages within the Project Area boundaries are seasonal non-fish habitat streams or perennial, non-fish habitat streams.

Comment: *[Within] T3N-R10E-S6, [t]here is an F type stream with possible Bull Trout required protections. There are potential unstable slopes indicated. There is a Spotted Owl circle. [LTR 172, CMT 8]*

Response: Please see response to Comment LTR 172, CMT 7 above regarding fish. Northern spotted owls were discussed in Section 3.4. As stated on page 3-49 of the DEIS, the Project is not located within habitat designated as critical or identified as essential to northern spotted owl recovery. There are a total of 9 turbines proposed within the 1.8 mile provincial range of two NSO activity centers. There are no proposed turbines located within the 500 acre core areas of these activity centers. The two spotted owl site centers are no longer considered to be occupied by USFW endorsed protocols but have not been decertified by WDFW or USFW and are still considered occupied by state and federal law. USFWS has concurred with BPA's conclusion that the Project "*may affect, but is not likely to affect*" northern spotted owls or their habitat.

Comment: *[In reference to DEIS] Section 3.2.1, [t]he Skamania Fish Hatchery……. Average temps taken from fish hatchery that cannot be googled for address? Precipitation is higher and snowfall is significantly lower as elevation decreases and one proceeds west. Underwood receives approx 40 inches of rainfall a year and snowfall is measured in feet. WRE location can expect 4-5 feet of snow on the ground during winter and over 10 feet annual snowfall. [LTR 178, CMT 81]*

Response: Comment acknowledged.

Comment: *Additionally, the site includes the fish-bearing Silva Creek, a tributary to the Klickitat River. [LTR 183, CMT 8]*

Response: As stated in Section 3.4.1.6 (on page 3-69 of the DEIS), in the first paragraph under "Fish", no fish have been documented within the Project Area. Surface water is described in Section 3.3.1.1 (on page 3-24 of the DEIS). The drainages within the Project Area boundaries are seasonal non-fish habitat streams or perennial, non-fish habitat streams.

Comment: *["T]he interconnection of existing and proposed wind-powered generation projects in the region to the BPA transmission system does poses the potential for cumulative*

impacts to listed Columbia River fish species through a somewhat complex relationship among the wind projects, general Columbia River hydrosystem operations (see map below), and operation of the hydrosystem to meet Clean Water Act (CWA) and Endangered Species Act (ESA) requirements for listed fish species." (my bold emphasis) So, there is a cumulative impacts issue for fish. This is not adequately addressed in the Whistling Ridge DEIS, and it is apparent from this document that BPA has knowledge about the issue and could have addressed it in the DEIS. [LTR 311, CMT 10]

Response: Cumulative impacts to fish are discussed in Section 3.14.3.5 (beginning on page 3-276 of the DEIS). The EIS includes a discussion of the potential indirect cumulative impacts that can occur through the relationship among wind projects interconnected to the BPA transmission system, the Columbia River hydro-operations, and operation of the hydroelectric generation system to meet Clean Water Act and ESA requirements for listed fish species.

G.3.5 ENERGY AND NATURAL RESOURCES

Comment: *Remote areas that are not connected to the electricity power grid can use wind turbines to produce their own supply. [LTR 1, CMT 7]*

Response: Comment acknowledged.

Comment: *In a diverse world this ability to not see eye to eye on everything is what makes us so unique. Unlike fuels that must be drilled for and then processed and eventuality depleted, wind power is naturally created and to one degree or another is always being produced. Therefore there is an unlimited supply of this source of power and the environment does not suffer from the use of the energy. [LTR 1, CMT 10]*

Response: Comment acknowledged.

Comment: *If we learn one thing from the current problems with peak oil and climate change, it is that we should consider the impacts of energy decisions and all the implications before engaging in the energy projects. If we do anything for energy without considering the ill consequences, we blunder forward no smarter than our erroneous actions with fossil fuels. For this reason please consider the following. I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. [LTR 6, CMT 1]*

Response: Comment acknowledged.

Comment: *In the meantime, we can look at something proven to meet our growing demand for energy that doesn't have any negative impacts. It's called conservation. Few of us realize the rapid pace of this change. [LTR 12, CMT 7]*

Response: Comment acknowledged.

Comment: *Solar is an alternative, abundant, clean, renewable source of energy that does not require large transmission lines. [LTR 17, CMT 2]*

Response: It is correct that residential installation of solar energy may not require additional transmission infrastructure, however, utility scale photo-voltaic generation would require adequate transmission line capacity just as other major renewable generation sources.

Comment: *The same will be true when it is understood that this power conveyance is not needed in the future. Until the country puts a sincere effort into energy conservation, which it has not done, I am opposed to sacrificing an irreplaceable treasure for expediency. [LTR 19, CMT 5]*

Response: BPA is committed to energy efficiency and considers energy conservation and efficiency as a power resource. More information about energy conservation can be found at: http://www.bpa.gov/Energy/N/.

Comment: *Wind energy is a clean, quiet source which uses the natural winds of the Gorge. [LTR 21, CMT 3]*

Response: Comment acknowledged.

Comment: *Wind power is undergoing much research and development. To jump on the band wagon with the existing technology of HUGE turbines in populated areas is a mistake. In the future, we're sure there will be sleeker, smaller, more efficient turbines that will be more "user friendly" to local populations. On a recent drive through the mid section of our country (Kansas, Colorado, Wyoming) we saw ONE wind farm the whole way - and it looked smaller than the ones already existing in eastern Oregon and Washington. [LTR 26, CMT 4]*

Response: Comment acknowledged.

Comment: *The Norwest has done its part – we're given up our rivers to power production – we've given up land for thousands of wind turbines in the eastern parts of our states. The power produced by Whistling Ridge will be controlled by a power company located in Europe and the power will be exported to other parts of the country. We'll be left with the headaches and the hundreds of acres denuded to make space for these wind behemoths. [LTR 26, CMT 5]*

Response: Comment acknowledged.

Comment: *This project will create much needed green, renewable energy [LTR 45, CMT 2]*

Response: Comment acknowledged.

Comment: *Regarding "future developments", the "Middle Mountain Wind Project" should be updated to indicate that the Hood River County Commissioners have determined the project to be not feasible due to local discontent and the results of an independent study concluding the project would be financially unacceptable, contrary to the financial payback reported by their applicant. You might also consider adding the decision regarding the Seven Mile project; impacts to the local community and the scenic area also could not be justified. [LTR 60, CMT 11]*

Response: The "Middle Mountain Project" status has been updated throughout the EIS to reflect Hood River County's decision to cease development of the Project.

Comment: *Global climate change is a reality, and renewable energy is part of the solution. As a society, we want to have our cake and eat it too: we want to reduce our carbon footprint, but we often oppose new sources of energy necessary to achieve that goal. We cannot conserve our way out of the climate change crisis. If we are to maintain our current standard of living, we will need radically different alternatives to fossil fuels on a grand scale, whether this means nuclear power, wind, solar, geothermal, tidal, wave energy, or most likely a combination of all of the above in concert with energy-efficient design. As we build out wind energy in more remote locations, we will inevitably face the need to develop wind power closer to places where people already live. While some may object to the visual appearance of wind turbines, I submit that these are far more attractive than strip-mining coal and tar shales, and drilling for deep-water oil in places like the Gulf of Mexico or Arctic National Wildlife Refuge. Wind energy is clean energy, and for that reason alone we should welcome the project before us. [LTR 68, CMT 2]*

Response: Comment acknowledged.

Comment: *America is a great country – and a fortunate one, but we are at a crossroads regarding future energy sources. I am glad to see Skamania County taking a leadership role in wind power and the green technologies of the future. Someday, future Skamanians will look back in pride and say we were among the first to recognize the new energy world, put aside our personal differences, and went with what is best for the great good. Thanks you. [LTR 69, CMT 2]*

Response: Comment acknowledged.

Comment: *I wish to state my support for the Whistling Ridge Energy Project. This project will help reach the goal mandated by the voters of our state to make renewable energy a greater part of the state's energy consumption. It will help Skamania County continue to provide the services that we, the residents, demand and expect. [LTR 70, CMT 1]*

Response: Comment acknowledged.

Comment: *I believe that we must, as citizens of this planet, accept our responsibility to find ways to utilize clean, renewable resources to meet our energy demands. As a nation we may have to make some sacrifices that will enable us to exploit the renewable energy resources that are available to us. We can no longer expect the rest of the world to provide us with cheap energy. We can no longer accept the damages to our planet caused by continued use of fossil fuels. We must move forward to develop new technologies that reduce our impact on the environment. In my view, the potential benefits of this project outweigh any detrimental impact on the region. [LTR 70, CMT 3]*

Response: Comment acknowledged.

Comment: *Renewable energy has strong foundation in Americas future energy needs. Never more so than today considering our fossil fuel crisis in the Gulf and over seas. [LTR 71, CMT 2]*

Response: Comment acknowledged.

Comment: *Washington Voter[s] have spoken, utilities are required to provide renewable energy to their customers. Here it is! [LTR 72, CMT 4]*

Response: Comment acknowledged.

Comment: *There is no mention of the requirement for providing alternative power sources for specific megawatt-production wind facilities. These are usually natural gas facilities. In what nearby communities would these be built? They should also be considered part of the cost of a wind facility. [LTR 76, CMT 10]*

Response: BPA does not build nor own any power generation facilities whatsoever. However, BPA is committed to finding innovative solutions to meet the renewable resource objectives of the Pacific Northwest by reliably and cost-effectively extending the integration capability of the BPA Balancing Authority while honoring our statutory obligations to our preference customers and the operational limitations on the Federal hydroelectric system. Currently, BPA uses the hydro-system to balance wind generation and cannot speculate whether increased wind generation will require the construction of other facilities in the reasonably foreseeable future. See *http://www.bpa.gov/corporate/WindPower/* for more information on balancing loads in the region.

Comment: *I also have some questions for BPA: Questions for BPA: 1) Even if there are multiple wind farms integrated into your system, do you have to operate the grid as if there were NO wind farms connected to the grid, since wind can be unpredictable and inconsistent? [LTR 82, CMT 2]*

Response: No. BPA has several procedures in place to operate with wind facilities interconnected to BPA's transmission grid. BPA allocates some balancing capacity to wind facilities under the BPA Balancing Authority*. Wind Facility Developers pay for this capacity through BPA transmission rates. In addition to BPA transmission rates, generators are subject to Generation Imbalance which is also used to balance the wind output. BPA currently manages imbalances using the Federal Columbia River Power System (through the use of federally-managed dams on the Columbia River). For the long term, BPA is also evaluating other possible alternatives including self supply. More information regarding BPA's Customer Supplied Generation Imbalance, please visit *http://transmission.bpa.gov/wind/gen_imbalance/*. For more information regarding BPA's Wind Integration Team, please visit *http://www.bpa.gov/corporate/WindPower/WIT.cfm*. Lastly, for more information regarding BPA's Wind Power initiatives, please visit *http://www.bpa.gov/corporate/windpower/index.cfm*.

* Balancing Authority is defined as BPA's responsibility to schedule generation on transmission paths ahead of time, to maintain load-interchange-generation balance within a Balancing Authority Area, and to support interconnection frequency in real time. The Balancing Authority Area is defined as the collection of generation, transmission, and loads within the metered boundaries of the balancing Authority. The balancing authority maintains load-resource balance within this area.

Comment: *If there is no wind and the dams cannot let water through because of other issues (i.e., fish protections), do you have to have backup natural gas plants to produce the added electricity that the wind turbines would be providing? (I am assuming that if the wind farms*

provide X amount of energy to the grid, BPA will sell X amount of energy to make more money, and the people to whom this X amount of energy is sold would not be happy if they were not getting their X amount of energy, so if the wind is not blowing and the water is not flowing, the energy would have to come from somewhere, wouldn't it?) [LTR 82, CMT 3]

Response: The wind facilities are allocated a limited amount of balancing reserves through Transmission Business Line (TBL) rates. If they exceed these values the wind facilities have to reduce their output. Additionally, please see response to Comment LTR 82, CMT 2 above for more information related to BPA's Balancing Authority.

Comment: *Does BPA have any plans to build or partner in any natural gas plant projects? [LTR 82, CMT 4]*

Response: No, BPA does not build nor own any power generation facilities. For a more detailed explanation as to how BPA handles the intermittent-to-varied power output created by wind facilities, please see response to Comment LTR 82, CMT 2 above.

Comment: *How big would these natural gas plants have to be?[LTR 82, CMT 5]*

Response: Please see response to Comment LTR 82, CMT 4 above.

Comment: *How is BPA going to back up the real and potential wind energy production from all of these wind farms? [LTR 82, CMT 6]*

Response: BPA allocates some balancing capacity to wind facilities within BPA's Balancing Authority. Developers pay for this capacity through BPA transmission rates. In addition through BPA transmission rates, generators are subject to Generation Imbalance which is also used to balance the wind output. This is currently done only through the use of the hydro-system (the collection of dams located on the Columbia River). For the long term, BPA is also evaluating other possible alternatives including self supply. See *http://www.bpa.gov/corporate/WindPower/* for more information.

Comment: *Transmission lines: Is BPA going to have to build more transmission lines? Where would these lines have to be built, if they are needed? What kind of lines would have to be built to accommodate all the increased wind energy production? [LTR 82, CMT 7]*

Response: BPA is already in the process of constructing new transmission lines that were identified in BPA's network Open Season Process in 2008 (this effort is in part to support wind interconnection requests). BPA's current and proposed transmission line projects are in response

to generation requests throughout BPA's Balancing Authority. Please note that BPA is not constructing new transmission lines in direct response to the proposed generation request from the Whistling Ridge Energy Project other than a "tap" to existing transmission lines that are in the vicinity of the proposed Project. The location of any new BPA transmission lines depends on several factors, one of which is the location of wind facilities requesting interconnection onto BPA's transmission grid. BPA is already in the process of constructing new transmission lines (the 500-kilovolt (kV) McNary- John Day transmission line is a current example that was identified in BPA's Network Open Season 2008). The types of transmission lines in BPA's system are typically 500-kv or 230-kilovolt lattice-steel tower supported lines, or 115-kV lattice-steel or double wood-pole tower transmission lines.

Comment: *I would also like to submit the following articles into the record: "Swollen Columbia River churns so much electricity BPA is giving some away," by Ted Sickinger - BPA generating power 144 percent of normal Spring generation - so what to do with all this "extra" power [LTR 82, CMT 8]*

Response: Comment acknowledged.

Comment: "*Increased Costs are Blowin' in the Wind," by Todd Wynn and Eric Low, Cascade Commentary, from Cascade Policy organization, February 17, 2010 – "Wind energy on the Pacific Northwest's electricity grid has increased substantially. Often overlooked are the impacts of increasing wind generation on the reliability and affordability of electricity that very-well might outweigh any of the promised environmental benefits." Thank you for this opportunity to submit my comments. I will be making more comments on the entire DEIS at a future date. [LTR 82, CMT 10]*

Response: Comment acknowledged.

Comment: *RNP does not, as a practice, advocate for particular renewable energy projects. But we have commented, and will continue to comment, on renewable energy projects that we believe have significant policy ramifications for the development of renewable energy in the Northwest. In our view, the Whistling Ridge Energy Project has significant policy ramifications for the development of renewable energy in forested areas of the Northwest, thereby establishing precedent for forestland projects in other regions of the state. Among the many lessons taught by the recent Gulf Coast oil disaster, one of the clearest is the need for comprehensive clean energy policy. Reliable, renewable energy will play a key role in overall effort to reduce our reliance upon fossil fuel, and pave the way towards a more robust economy. [LTR 95, CMT 2]*

Response: Comment acknowledged.

Comment: *Reliable, cost-competitive renewable energy benefits from diverse geographic locations of renewable energy projects. Geographic diversity helps integrate variable renewable energy resources into the system at low cost as resources with different daily or seasonal operating characteristics can help support each other. While the State of Washington is endowed by an abundant supply of wind resource potential, to date these resources have been harvested primarily in Washington's dry, shrub-steppe eco-system that peaks in the spring and summer months. West-side resources may help supply wind during other seasons of the year and blunt the effects rapid wind ramping events. The Whistling Ridge Energy Project provides Washington with an important opportunity to diversify the supply of wind energy to include resources harvested from forest eco-systems. [LTR 95, CMT 4]*

Response: Interconnecting more geographically-diverse wind resources to the FCRTS may be complementary to the current renewable generation portfolio and could help reduce the variability of wind generation and alleviate some of the need for firming. Thank you for your comment.

Comment: *All persons giving testimony about the Whistling Ridge project seem to agree the time is right for a turbine project. Utilities are being mandated to use larger & larger percentages of wind power. The market is here and now, and the time is perfect. Progress takes change and change can be good for the world as a whole. [LTR 96, CMT 2]*

Response: Comment acknowledged.

Comment: *I have been told that 750 gallons of oil a year will be atomized in each of the turbines. That does not sound like clean energy. [LTR 102, CMT 7]*

Response: Oil is required to lubricate and cool many moving parts in the turbine nacelles and information can be found in Sections 3.5.2.1, Impacts, and 3.6.2.1, Operations, Turbine Fluids of the EIS. While the oil is not technically "atomized," it does breakdown through a variety of processes and needs to be changed regularly, just like an automobile. Typical oil drain intervals are between 8 and 12 months for gearbox oils, with cooling oils needing to be changed less frequently. More information can be found at: *http://www.machinerylubrication.com/Read/395/wind-turbine-lubrication*.

Comment: *Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. [LTR 105, CMT 2]*

Response: Comment acknowledged.

Comment: *Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. [LTR 107, CMT 2]*

Response: Comment acknowledged.

Comment: *The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. [LTR 114, CMT 4]*

Response: Comment acknowledged.

Comment: *The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. The choice is clear: support Whistling Ridge and Skamania County by approving this project. [LTR 132, CMT 4]*

Response: Comment acknowledged.

Comment: *It will also benefit the region in creating renewable energy that is clean and self sustaining. This is an excellent example of how we can balance environmental protection and economic development. [LTR 138, CMT 4]*

Response: Comment acknowledged.

Comment: *Washington voters passed Initiative 937 in 2006 requiring large utilities to obtain 15% of their electricity from new renewable resources such as solar and wind by 2020; Whistling Ridge Energy LLC has proposed a project to help meet the requirements of this initiative. [LTR 155, CMT 8]*

Response: Comment acknowledged.

Comment: *It is very unfortunate that environmentalists and others have chosen to oppose this project when our global environment is already experiencing the impacts of climate change.*

What good is a scenic area if our global environment is polluted with carbon-emitting energy sources? [LTR 156, CMT 2]

Response: Comment acknowledged.

Comment: *We simply cannot afford to pass up opportunities to create more renewable energy. Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. [LTR 156, CMT 4]*

Response: Comment acknowledged.

Comment: *As a retiree of Skamania Co. PUD, I see a great need for alternative sources of energy. [LTR 160, CMT 2]*

Response: Comment acknowledged.

Comment: *Regional need for new sources of renewable energy According to Paragraph 1.2.3.1 of the DEIS Summary, based on the findings of the Northwest Power and Conservation Council's (NPCC) Fifth Power Plan (May 2005) and draft Sixth Power Plan (September 2009), the regional population in Idaho, Montana, Oregon and Washington is expected to grow from 12.7 million in 2007 to 16.3 million by 2030. This 3.6 million population increase will increase the demand for electricity. The draft Six Plan concludes that "[t]he Pacific Northwest consumed 19,000 a/MW or 166 million MW-hours of electricity in 2007." That demand is expected to grow to 25,000 a/MW by 2030. Between 2007 and 2030, demand is expected to increase by a total of 6,500 a/MW, growing on average by 270 a/MW, or 1.2 percent, per year. [LTR 162, CMT 4]*

Response: Comment acknowledged.

Comment: *In additional to the normal, free-market increase in demand accompanied by such population growth, states like Oregon, California and Washington have adopted Renewable Portfolio Standards (RPS), which mandate that qualifying public and private utilities obtain a certain percentage of defined "renewable" energy, not including hydropower, by a date certain. In Washington, Initiative 937 requires qualifying utilities to obtain 15% defined "renewable" energy by 2020. The Summary concludes that "[t]he RPS, coupled with load growth in Washington's urban areas, has prompted investor-owned and public power utilities to seek new 3 sources, most often developed by independent power producers, to meet their resource goals." It is for this reason that adoption of the DEIS and, ultimately, approval of the applicant's project*

is so important. In the coming decades, Washington will need new sources of electricity to meet market demand, as well as the artificial demand created by the "renewable" standards imposed by 1-937. Furthermore, if utilities aren't able to meet the RPS established by 1-937, a $50/MW hour shortfall penalty will be imposed on the utility and passed on to the ratepayers – Washington's families and businesses. [LTR 162, CMT 5]

Response: Comment acknowledged.

Comment: *The DEIS paints a rosy picture as viewed from Olympia, but not on our road. WIND POWER The generation of electricity by wind powered systems has the potential to be a nonpolluting source of energy. In areas with steady wind velocities of 15 to 16 miles per hour, such as the great plains states of Texas, Oklahoma, Nevada, North and South Dakota, eastern Montana and Wyoming, and also eastern Washington and Oregon, it is possible to generate electricity from wind farms for as low as 3.5 to 4 cents per kilowatt hour (KWh). Current tax incentives of 1.5 to 1.7 cents per KWh makes the generation of electricity by wind farms very competitive with electricity generated from the burning of hydrocarbon fuels such as coal and natural gas. Wind turbine farms do not spew carbon dioxide, nitrogen oxide, and sulfur oxides into the atmosphere, the atmosphere so they meet the definition of green energy systems. An extensive systems analysis indicates that the price of wind generated electrical power is now less than electrical power generated from burning coal. The price of electricity derived from a new 500 megawatt coal-powered plant is about 5 cents per kilowatt hours (KWh), which is more than wind-powered generation. The carbon dioxide, nitrogen oxide, and sulfur oxide emission from coal-powered plants create acid rain, smog, degradation of visibility, carbon dioxide, which seem to be warming of the planet Some of these emissions increase the probability of cardiovascular diseases, asthma, respiratory problems, and human mortality. When the cost of all of these human health and environmental degradation are factored into the systems analysis, the cost of coal-powered electricity is approaching 8 cents per KWh. [LTR 170, CMT 4]*

Response: Comment acknowledged

Comment: *Wind-driven electrical power generation is environmentally and economically superior to any of the hydrocarbon electrical power generation. The hydro generation of electricity is still superior to the wind generation. The electrical power derived from the 11 dams on the Columbia River and the 4 on the Snake River generate electricity that is delivered to the PUD's at a price of about 2.5 to 2.75 cents per KWh. Expansion of the Northwest hydroelectric systems have already reached their maximum limit. Probably no more dams will be built on the Columbia and Snake River drainage areas because of environmental concerns. [LTR 170, CMT 6]*

Response: Comment acknowledged.

Comment: *In addition, the EIS should consider whether placing a VER like WR on line will simply require construction of other facilities to balance loads, such as gas turbines or other facilities. [LTR 176, CMT 12]*

Response: Please see response to Comment LTR 82, CMT 4 above.

Comment: *[In reference to DEIS] Section 3.2.1, [l]ike hydropower production of electricity from wind produces no direct emissions of greenhouse gases or other pollutants. The generation of wind also displaces generation from individual fossil fuel fired power plants or units thereby reducing fuel consumption and the resulting air emissions that would have otherwise occurred. Patently false, and rebutt by adding papers that actually state that greenhouse gas emissions will increase that we are displacing clean hydropower because most dams used water from run-of-the-river and storage as a result is limited, both in capacity and for fish. Include articles that demonstrate as more wind is integrated into the system, the more difficult it is for BPA to balance without harming fish. Include paper that shows that BPA desire that wind energy operators acquires its own balancing reserves and that means NG generation and increasing emissions. [LTR 178, CMT 76]*

Response: The challenges posed by the dramatic increase in wind generation connected to the FCRTS, the balancing issues faced by the hydro system, and the potential affects to fish populations are described in detail in the cumulative impacts - Section 3.14.3.5, Habitat and Wildlife, Fish Species, in the EIS.

Comment: *General Comment on DEIS - Need Met Tower data at proposed location on the Western (prevailing windward) slope. This data must include 3 dimensional wind direction, as well as wind speeds. At least one should be located South of the South BPA line, along the A1 7 string. This area topographically should result in the worst case scenario for turbulence and off axis wind direction. Turbine efficiency is based on laminar flow in the direction of the Turbine Axis. Turbines placed on a steep slope will suffer significantly reduced performance, which must be quantified in the EIS to ensure economic viability for the Applicant. Remedy - Applicant should demonstrate to EFSEC Council that the "wind power" resources at this proposed site meet or exceed that of existing or permitted WA Wind Turbine Facilities. "Wind Power" is defined as the aggregatized product of wind speed with time. The purpose would be to provide some basis to justify and offset the increased environmental impacts of this project, relative to those existing WA Wind Turbine Facilities. [LTR 178, CMT 132]*

Response: There were several criteria applied to determine whether the Whistling Ridge Energy Project or other alternatives were technically and economically feasible, and these criteria are discussed in Section 1.4.3 of the EIS. The criteria included the need for a "steady supply of robust wind power, and on a site on which construction can reasonably occur," that "the Project must be located on land the Applicant owns and controls…," and that "the Project must be located in proximity to existing high-voltage transmission lines." While both Washington EFSEC and BPA need to respond to the applicable Applicant requests for

authorizations and approvals regarding the proposed Project, neither have the jurisdictional authority to determine or require that the Applicant provide the information requested, some of which may be considered proprietary.

Comment: *Third, the BPA did not consider other potential renewable energy sources in the DEIS. A dismissal of renewable energy sources other than wind energy, such as distributed generation, does not comport with the agencies' stated goal of acting consistently with their environmental and social responsibilities. [LTR 179, CMT 25]*

Response: While there may be other potential renewable energy sources besides wind energy, these other sources are speculative and beyond the scope of this EIS which has the purpose of disclosing the potential impacts of the proposed Project. Section 1.4 includes a description of a range of alternatives, including the No Action alternative in Section 1.4.2 and alternatives to the proposed Project that were eliminated from detailed study in Section 1.4.3. Consideration of a reasonable range of alternatives is fundamental to the NEPA and SEPA review process, and these are included in the Whistling Ridge EIS.

Comment: *In response to the rapid development of wind energy in the region in recent years the BPA has proposed several new transmission projects. These projects are necessary to integrate the intermittent nature of wind energy and to ensure sufficient transmission capacity to transmit energy to the region and markets in other regions. BPA's own development plans demonstrate that the Whistling Ridge Energy Project would contribute to demand for transmission facilities and contribute to significant adverse impacts to the environment. The BPA's own documents, some of which are attached hereto as exhibits, explain that the McNary-John Day transmission project and the Big Eddy-Knight transmission project are needed to respond to the demands that new wind energy facilities place on the grid. To respond to the increased demand for interconnections to the grid, the BPA conducts annual Network Open Seasons where prospective energy producers can submit Transmission Service Requests (TSRs) to BPA. From these requests the BPA offers eligible producers Preferred Transmission Service Agreements (PTSAs). Based on these agreements the BPA calculates the demand for transmission services and the need for any new transmission facilities. As shown in the attached exhibits, in response to the 2008 Network Open Season, the BPA signed PTSAs securing 6,410 MW of transmission capacity. And in response to the 2009 Network Open Season the BPA signed PTSAs securing 1,553 MW of transmission capacity. In 2010 alone the BPA received TSRs for 4,456 MW of wind energy development that would be eligible to sign PTSAs. If all eligible PTSA are signed and completed, the total new services provided by BPA will total over 12,000 MW, generate the need for hundreds of miles of new transmission lines, and the expenditure of millions of dollars in public funds. The Whistling Ridge Energy Project Project would directly contribute to these impacts. The DEIS must acknowledge and evaluate these impacts and the further impacts that flow from them. The BPA must include actual data on the grid's capacity to accommodate new sources of intermittent wind energy. As stated above, the BPA has previously expressed concern about how it will reliably integrate over 6,000 MW of wind energy by 2013. Northwest Power and Conservation Council, Sixth Power Plan, at 12-11.*

The DEIS must include some analysis of how much wind energy the grid can accommodate over the long-term and whether wind integration capacity will limit the amount of wind energy development that can occur in the region. [LTR 179, CMT 59]

Response: The operation of the FCRTS requires BPA to consider the reliability of the transmission system and its ability to meet the demand for power of priority customers within BPA's Balancing Authority. According to BPA's Open Access Tariff, BPA offers transmission interconnections to the FCRTS to all eligible customers on a first-come, first-served basis. Requests for transmission service are separate from that process. The decision to offer transmission service requiring new transmission facilities is contingent on a review under NEPA and the satisfaction of any additional environmental laws and statutes, including SEPA. This NEPA study will be based on infrastructure needed for service to actual requests that are have made the commitment to take service. This is done to avoid the overbuilding that this comment raises concern over. Consistent with NEPA regulations, the Whistling Ridge EIS includes issues that are significant to the proposed Project and the direct and indirect effects of the alternatives and their significance. If in the future BPA identifies a need to build new transmission infrastructure due to generation requests and demand in BPA's Balancing Authority, any new projects would be subject to an independent NEPA review.

Comment: *If integration capacity will limit generation potential, then the DEIS must address why the Whistling Ridge Energy Project should take priority over potential development in other locations that would have reduced environmental impacts. Importantly, the BPA has failed to undertake comprehensive review of the impacts of its transmission system. The BPA's last comprehensive review of the transmission system was in 1995. BPA Business Plan Final Environmental Impact Statement (DOE/EIS-0183) (hereinafter "BPA BP EIS"). That review noted that wind energy could cause adverse impacts to wildlife and scenic resources, but did not undertake any detailed review of how providing access to the transmission system would lead to impacts from the explosion of wind energy development throughout the region. BPA BP EIS at 4-42, Section 4.3.1. The BPA BP EIS also does not address how much wind energy can be integrated into the grid. In 2007, the BPA undertook a supplemental analysis of the Business Plan EIS, but declined to undertake further environmental review. Supplemental Analysis of the Business Plan EIS (DOE/EIS-0183) (April 6, 2007). The supplement stated that "continued consideration of a comprehensive policy for BPA's transmission business is not in the best interests of the agency at this time." The supplemental analysis was based on four wind projects totaling 750 MW of wind energy that had been connected to the BPA grid at that time. Id. at 42. The analysis did not discuss impacts to wildlife from this development. Id. at 46. The analysis did not include a section on scenic impacts, much less how wind energy development enabled by the BPA has transformed scenic landscapes. The supplemental review also failed to acknowledge the ongoing impacts to cultural resources from the development that has been enabled by BPA transmission project. Id. at 48-49. [LTR 179, CMT 60]*

Response: The commenter's views concerning BPA's Business Plan EIS and a regional review of BPA's transmission system are noted. BPA does not believe that there are any requirements in which BPA would need to conduct a regional review of its current transmission system. Additionally, the analysis requested by the commenter is beyond the scope of the EIS,

which is being prepared to inform EFSEC's decision on whether to issue a Site Certificate for the proposed wind project and BPA's decision on whether to grant the requested interconnection of the proposed wind project. Furthermore, BPA believes it is reasonable to consider transmission needs on a location-specific basis, given the transmission path-specific nature of firm transmission service requests. BPA is committed to ensuring thorough NEPA evaluation of any proposed transmission projects arising from such considerations.

The commenter observations concerning BPA's 2007 Supplement Analysis (SA) to the Business Plan EIS are noted. However, the commenter appears to misunderstand the purpose of this SA. As discussed in the SA, the SA was prepared to determine whether there have been any changes in BPA's business practices or in environmental conditions since publication of the Business Plan EIS that could trigger the need for a supplemental or new EIS. The SA was not intended to provide for environmental review of wind projects that had been interconnected to BPA's transmission system since the Business Plan EIS; such review was accomplished through NEPA documentation prepared for each project. Furthermore, the SA was not "based" on four wind projects, as stated by the commenter; instead, these four projects are merely identified as examples of changes in the affected environment since publication of the Business Plan EIS. BPA believes it has adequately evaluated wind projects under NEPA as they have been proposed for interconnection to BPA's transmission system.

Comment: *Another type of impact not anticipated or reviewed in the EIS is the potential overloading of the energy grid as a result of the dramatic increase in wind energy in the region, which can in turn affect fish populations by requiring an excess spilling of water over the region's hydroelectric dams in order to balance out unexpected surges in wind energy production. This rapid expansion in wind energy has occurred without any programmatic review of the impacts of the generating sources, the existing transmission system, or the demands for new transmission lines. This has also occurred without an adequate understanding of how much wind energy development the grid can accommodate and how projects could be prioritized for grid access based on environmental impacts. [LTR 179, CMT 62]*

Response: The challenges posed by the dramatic increase in wind generation connected to the FCRTS, the balancing issues it creates on the grid, and the potential affects to fish populations is analyzed in detail in Section 3.14.3.5, Habitat and Wildlife, Fish Species. BPA has also performed numerous studies on the impacts of the generating sources on the existing transmission system, and identified the future demand for additional transmission capacity for new generation (NOS). As discussed in Section 1.2.2, BPA operates under an Open Access Transmission Tariff which offers transmission interconnection to the FCRTS to all eligible customers on a first-come, first-served basis, with the decision to make this offer subject to review under NEPA.

Comment: *Finally, reflecting as I do as a citizen of Washington State, I'm hopeful that the Council will, in its deliberations, take cognizance of existing state policies which promote renewable energy development. In other words, I trust that you will reflect in your decision, the*

policy priorities that the Governor and Legislature not to mention the electorate through I-937 have made law. [LTR 185, CMT 9]

Response: Comment acknowledged.

Comment: *EPA supports development of alternative and environmentally sustainable sources of energy such as wind power. [LTR 189, CMT 3]*

Response: Comment acknowledged

Comment: *I support renewable energy. I am the Vice Chairman of the Renewable Northwest Project and support BPA's involvement in developing wind resources. [LTR 191, CMT 5]*

Response: Comment acknowledged

Comment: *The Whistling Ridge resource will further diversify the BPA portfolio by including wind resources west of the transmission constraint areas. This site has significant positive impacts on the BPA system with regard to availability close to large load centers. [LTR 191, CMT 6]*

Response: Please see response to Comment LTR 95, CMT 4 above.

Comment: *We support development of wind, solar, biomass, geothermal, and other renewable energy projects in our region which are designed in a manner consistent with local regulations. MCEDD has supported the creation of the Columbia Gorge Bi-State Renewable Energy Zone as a means to engage in a cross-jurisdiction, inter-agency, bi-state collaborative approach to renewable energy development. In establishing the Columbia Gorge Bi-State Renewable Energy Zone, we took into consideration a variety of factors, all linked by the regional economy. These include the renewable energy resource itself (wind, solar, hydro, geothermal, biofuels, and biomass), financial investment in those resources by renewable energy industry, existing transportation networks {roads, rail, river and air), high-speed telecommunications networks, education and workforce training capacity, public utilities, resident workforce, transmission capacity, industrial lands base, and quality of life. [LTR 192, CMT 2]*

Response: Comment acknowledged.

Comment: *The Port of Vancouver is an active participant in regional and national associations promoting alternative energy, particularly wind energy. We support alternative energy credit programs and state and national alternative energy standards. In addition, the port advocates for the expansion of the wind energy grid in the Pacific Northwest and nationwide. [LTR 195, CMT 1]*

Response: Comment acknowledged.

Comment: *The Board finds: Interiors comments contradict both the Secretary's publicly stated policy as it pertains to renewable energy as well as contradicting the clear energy policy direction of the current Administration. [LTR 197, CMT 7]*

Response: Comment acknowledged.

Comment: *In looking at the map on the website for the EIS, it appears the interconnect won't affect us, but SDS's project appears to be in the area of our pipeline that runs east/west up the gorge through Skamania County. I need to be in contact with SDS or its developer, but want to be sure I get our information out there to all players and wasn't sure of BPA's involvement initially. Thank you for passing the information on and including us with notifications. [LTR 199, CMT 1]*

Response: Please note that the developer's contact information was forwarded on to NW Pipeline.

Comment: *Wind energy should be one of our priorities when considering new and green energy sources for our future. [LTR 209, CMT 2]*

Response: Comment acknowledged.

Comment: *We need to reduce consumption of power. No more power production should be initiated in the Columbia River Gorge. Power quotas should be enacted to reduce consumption of electricity. The environmental consequences are too great. [LTR 211, CMT 2]*

Response: Please see response to Comment LTR 19, CMT 5 above.

Comment: *Love the idea of a cleaner power source than coal. Not sure that it is fair for us to push the unsightly and dirty job of generating power with coal onto other communities when we have a chance to contribute our share locally. [LTR 211, CMT 2]*

Response: Comment acknowledged.

Comment: *WIND TURBULENCE, the whistling ridge is right in the wind venture of the crest of the Cascade Mountains and the Columbia River gorge. Making one of the windiest spots in North America with very gusty turbulent conditions. ..Bad for big turbine efficiency and longevity, [LTR 226, CMT 2]*

Response: The proposed Project has a projected useful life of at least 30 years and each turbine is equipped with mechanisms to adjust to wind conditions, including a wind vane that signals wind direction changes to the turbine's controller. The turbines would operate at wind speeds from 9 to 56 mph, and the blades would feather on their axis and the rotor would stop turning at speeds exceeding 56 mph. A description of the wind turbines can be found in Section 2.1.3.1 of the EIS.

Comment: *WIND SHEAR, the Steep complex varied terrain (especially to the west) from the whistling ridge site accompanied by the Gusty Nature of the westerly Gorge winds will impair the turbine balance. ..Bad for turbine safety [LTR 226, CMT 3]*

Response: The turbine design will be site specific, and a description of the potential impacts to Public Health and Safety from the proposed Project can be found in Section 3.6.2.1 of the EIS.

Comment: *Besides, these ignorant people are completely overlooking the fact that in forty years, we are going to be out of fossil fuel and are running out of time to generate alternative energy. Do they think this is going to happen without impacting anyone? They are all for cleaner, alternative energy--as long as it doesn't disturb the status quo, or cost them any money, but change for the better is always an adjustment, and we simply don't like to be disturbed. Alternative energy is here to stay, because we have no choice, we are running out of resources, so they might as well embrace these changes, they are here to stay! [LTR 229, CMT 2]*

Response: Comment acknowledged.

Comment: *The only way to reduce the impacts of this global catastrophe is to drastically reduce our emissions of CO2 and other Greenhouse Gasses (GHGs). Realistically, this means optimizing every feasible opportunity to generate energy from non-polluting renewable sources, and there is no source less polluting or more renewable than the wind. Unfortunately,*

commercially viable wind farm locations like Whistling Ridge are extremely rare. For these reasons, I have reviewed the Whistling Ridge DEIS hoping to evaluate for myself how a special place I cherish would be impacted by the demands of power production for our future, estimated by the Northwest Power and Conservation Council to grow 1.2% annually for the next 20 years. [LTR 231, CMT 2]

Response: Comment acknowledged.

Comment: *Nearly all the impacts addressed by most EISs that I've worked on or reviewed are adverse to the environment. What makes this DEIS notable is the section on Avoided Emissions on page 3-20. According to this section: "Project operation would avoid the use of fossil fuel to meet the energy needs of the region. The project's annual electricity production is estimated at 197,000-megawatt hours (MWh). This energy is equivalent to 114,000 barrels of crude oil or 654 million cubic feet of natural gas." According to the U.S. Energy Information Administration, 197,000 MWh is roughly equivalent to the annual energy consumption of close to 18,000 homes. That's a huge amount of energy to be generated entirely by renewable, non-polluting sources. Perhaps even more significant is the annual displacement of 131,466 tons of the GHG Carbon Dioxide and 155 tons of the pollutant Sulfur Dioxide (Table 3.2-1) that would typically result from generating this quantity of electricity, benefitting both the smog-threatened Scenic Area and the GHG threatened global climate. [LTR 231, CMT 3]*

Response: Comment acknowledged.

Comment: *The interconnection of this project (and other wind resources) is problematic. Bonneville has not analyzed the environmental and social impacts of integrating wind. It also has not considered the impacts of BPA operations on designated critical habitat for ESA. For this reason, the interconnection aspects of the project should be deferred until Bonneville complies with law. The facility siting aspects, however, should proceed. [LTR 236, CMT 2]*

Response: BPA's purpose and need can be found in Section 1.2.2 of the EIS, which describes how BPA reviews and makes decisions on customer request to interconnect to BPA's transmission system. Prior to making a decision to offer to interconnect new generation to the FCRTS, a decision for which each request is subject to an environmental review under NEPA. BPA analyzes the impacts of agency actions, as well as the indirect impacts that may occur as a result of that action. There are challenges presented by a somewhat complex relationship between wind generation interconnected to BPA's Balancing Authority, the Columbia River hydro operations, and operation of the hydro system to meet Clean Water Act (CWA) and Endangered Species Act (ESA) requirements for listed fish species and their designated critical habitat. These complex relationships are discussed in Section 3.14.3.5, Fish Species, of the EIS. Additional information can be found at:
http://transmission.bpa.gov/wind/op_controls/default.cfm.

Comment: *Technology has given us a chance to use the sun and the wind supplied to us each and every day. Our family approves the project plan and we commend the people with the courage to fight for the Whistling Ridge project. [LTR 243, CMT 3]*

Response: Comment acknowledged.

Comment: *The history of NW wind power offers very little to be proud of. The first question regulators should be asking is why wind power is being developed in the NW when most or all of the power is being sold in the SW? The history of SW wind power would raise a lot of red flags for NW wind power development issues that are being ignored here. It seems we are doomed to repeat all of the mistakes that are now fairly well understood in the sw. When wind power burned too many bridges in the SW and they decided to move into our region, and the Federal government warned them that they would be facing arrest and jail if they killed federally protected birds, and that they had to solve the bird problem before they would be allowed to develop In the NW. They did solve it, but not in a way that would save even one bird. Instead they did an end run and solved the problem politically. Ever since then the regulatory agencies have been playing the "Go along to get along" song to protect their budgets from cuts from above. As a result, wind power has been allowed to develop projects Just about anywhere they want, no matter the consequences. [LTR 256, CMT 1]*

Response: Comment acknowledged.

Comment: *When new energy production is promoted you can take it as standard operating procedure that the need for energy will be over inflated. Studies are conducted to "prove" the inflated energy numbers. The nuclear industry did it when they promoted the infamous – "WHOOPS!" nuclear development, and we believe that the wind industry and their boosters are doing the same thing. Over the last few years the Columbia River aluminum industry has closed its doors and around one third of Oregon and Washington's electrical energy has become available for other uses. The recent recession only gets deeper and deeper and this is bound to cause a reduction in energy use, These major Impacts on NW energy use are virtually ignored. But they are real, and to a large extent this is why our transmission lines are flooded to capacity and most of the energy is going to the SW. This is why about a third of the wind machines are turned off at any one time, This is why many of them that are spinning are not even hooked up to transmission lines. All of this is ignored while you focus of hocus-pocus studies that inflate-create a huge imaginary need for power. VOI.I cannot serve the real interest of the people if you cannot keep your feet grounded in reality. [LTR 256, CMT 5]*

Response: Comment acknowledged.

Comment: *Wind energy is expensive. It costs about four times the cost of hydropower. The 100% back up will add to the costs. The new transmission lines necessary for transmitting wind power and the conversion to "smart" lines will add to the costs. Using wind power to pump water up behind huge earthen dams - as are planned on the Columbia Hills - so that it can be released and run through generators when transmission lines are open will add to the expenses of wind power. In the end, wind power will be so expensive that rate payers will not be able to afford it. The excessive expenses associated with wind power, combined with recent revelations of Wind power corruption, are opening the eyes of people all over the NW. What will happen to wind power, and the extensive infrastructure that is being built to support it, if the citizens of Oregon and Washington decide to vote out the requirement that energy providers must incorporate wind energy in their portfolio? You had better give a lot of thought to that question, because in all likelihood that is where we are headed. [LTR 256, CMT 7]*

Response: Please see response to Comment LTR 76, CMT 10 above.

Comment: *[In DEIS] Section 1.4.1, Pg 9, Proposed Action, [t]he project site is stated to have a "proven, robust wind resource." There is no material to supply this "proof in the EIS document. If "robust" is interpreted to mean "good", then this statement is doubly inaccurate. The web-based National Renewable Energy Lab regional wind power mapping resource states that the proposal area provides only "marginal to fair" averaged wind resources compared to other sites in the state. The good to excellent areas are farther east. A BPA (among others}-sponsored wind mapping project on the Internet shows the area to have not particularly good wind resources as well. The wind mapping data, referenced above, conflicts with the applicant's claim that the project site has a "proven, robust wind resource." No scientifically stringent data is presented that supplies this "proof." This "proven, robust" ("steady") terminology appears repeatedly throughout the document and is misleading. A credible document needs to show at least an attempt at accuracy and objectivity. There are other reasons as well, discussed on the following pages, that indicate the selected site may be a poor choice for a wind facility. Paramount to these, is the technical geologic study of the project site that has not yet, and must be been performed before suitability evaluations begin. One of the factors that the Applicant used to identify site suitability was stated to be the "associated lack of native habitat, reducing or eliminating the need to clear additional forest land." Section 3 discusses the initial "need to clear trees to prepare ridge top sites for construction of turbine base pads and of specially configured parts delivery roadways. Information is even provided regarding where the logs will be taken after being cut. The applicant needs to choose one statement or the other and ensure that references to the eliminated statement are removed from the document as well. Which will it be? A credible document displays consistency. A current aerial photograph of the steep (70% or more) southern side of the project area, in the vicinity of proposed turbine string A1- A7 shows standing trees that were restricted from being cut by Washington State DNR when the applicant applied for a Forest Practices Application permit in 2003. What were the constraints that prevented this harvest? Will project approval permit the cutting of these trees, in order to clear for turbine pads and access roads, overriding the earlier DNR prohibition? The Council would need to investigate the nature of the DNR constraint before the evaluation process proceeds. Again, mention of the alleged availability of nearby BPA transmission lines as a site selection factor: transmission lines that do not have the capacity to carry significant additional power.*

This issue needs to be clarified as discussed under "Interconnection" on pages one and two. Lastly, the site was stated to have been chosen because it is close to an SDS mill site (even though it was stated above that no additional trees would have to be cut for the project) and to SDS business offices I Surely this declaration could be deleted lest it be concluded that convenience has a higher value than environmental factors when choosing a suitable location for a wind power facility. Perhaps if the reasoning behind the statement was elucidated, it might seem an appropriate inclusion [LTR 272, CMT 5]

Response: There were several criteria used to determine whether the Whistling Ridge Project or other alternatives were technically and economically feasible, and these criteria are discussed in Section 1.4.3 of the EIS. The criteria included the need for a "steady supply of robust wind power, and on a site on which construction can reasonably occur," that "the Project must be located on land the Applicant owns and controls...," and that "the Project must be located in proximity to existing high-voltage transmission lines." While both Washington EFSEC and BPA need to respond to the applicable Applicant requests for authorizations and approvals regarding the proposed Project, neither have the jurisdictional authority to determine or require that the Applicant provide extensive "proof" of the wind resource, some of which may be considered proprietary. Geologic studies of the potential Project impacts have been completed on the site and the impacts are described in Section 3.1.1.3 of the EIS. The description of the site found in the site suitability criteria factors in Section 1.4.1 of the EIS for the proposed action represents a basic characterization of the site and is not intended to infer that no tree clearing would be needed for the proposed Project. Please also keep in mind that the proposed site (the Project Area) is already situated on lands that are managed for commercial forestry so it should be understood that tree harvesting is already taking place in conjunction with the Applicant's Forest Practices Permit.

Comment: *Inadequate Electrical Grid. An article published in the Oregonian Newspaper dated July 17,2010 written by Ted Sickenger titled, "Too Much of a Good Thing: Growth in wind power makes life difficult for grid managers" (http://www.oregonlive.com/business/index.ssf/2010/07/too_much_of_a_good_thing_growt.html) provides a great summary of the enormous limitations of the current grid system for handling the CURRENT number of wind turbines. It is a very complicated issue that needs to be rectified BEFORE we decide which green energy makes the most sense to invest government dollars in. Why are we spending huge amounts of subsidy money to build what will most likely be an obsolete technology by the time the electrical grid can handle the capacity of these giant wind turbines so they do not have to sit idle when the wind is blowing! There are promising new wind energy technologies under development right now that will very soon be economically viable without subsidies and have less visual and environmental impact. (See http://www.makanipower.com/for example.) [LTR 273, CMT 2]*

Response: Please see response to Comment LTR 76, CMT 10 above.

Comment: *I would like to further address the issue of wind power generation in the Pacific NW and the fact that "wind generation needs back-up, flexible sources to handle unexpected changed in its output." I have made comments in the memo entitled "Comments_DEIS_Chap. 3_Environment_Impacts_Mitigation_27Aug2010," but in this document I would like to go further in depth about my concerns that were not addressed in the Whistling Ridge DEIS, concerns that I feel BPA should have addressed in the DEIS and they did not. The document that helped to crystallize my concerns about the lack of information on wind power integration and the integration of wind power into the energy grid, is the Sixth Power Plan done by the NW Energy Council, and the document is located at http://www.nwcouncil.org/energy/powerplan/6/final/SixthPowerPlan_Overview.pdf. [LTR 279, CMT 1]*

Response: Please see response to Comment LTR 76, CMT 10 above.

Comment: *Wind power has "little capacity value and increases the need for flexibility reserves" which basically means that wind power needs backup sources, which means coal-power, gas plants, hydro power, or some other sources. Sources which probably contribute more CO2 to the environment. The DEIS does not address the issue of the unreliability of wind, the lack of storage capacity in wind power, and the need for backups to the power system to balance or leaven the production of wind energy. Why isn't this information in BPA's portion of the DEIS? Oh, I forgot. BPA didn't contribute very much pertinent energy production and infrastructure information to the DEIS so that's why we don't have all the information needed to make a thoughtful and studied decision about the feasibility or desirability of this wind farm proposal! How much flexibility and capacity will have to be added to BPA's energy production in order to balance wind power? [LTR 279, CMT 3]*

Response: Please see response to Comment LTR 76, CMT 10 above. Additionally, the challenges presented by the complex relationships between wind generation interconnected to BPA's Balancing Authority, the Columbia River hydro operations, and the operation of the hydro system to meet Clean Water Act (CWA) and Endangered Species Act (ESA) requirements for listed fish species and their designated critical habitat are all discussed in Section 3.14.3.5, Fish Species, of the EIS. More information on how BPA implements automated tools and operating protocols for variable generators to limit actual wind generation to schedule or curtail e-Tags to actual generation in response to the amount of balancing reserves deployed can be found at: *http://transmission.bpa.gov/wind/op_controls/default.cfm*.

Comment: *What are the metrics for measuring system flexibility? What are the methods to be used to quantify the flexibility of the region's existing resources? How will BPA improve forecasting of the region's future demand for flexible capacity? How will BPA and the wind industry improve wind forecasting and scheduling? How will BPA transition from current whole-hour scheduling to intra-hour scheduling? How will BPA increase the availability and use of dynamic scheduling? What is dynamic scheduling? Will it cost the rate payers more money to implement all of these efforts to integrate unreliable wind power into the existing*

power grid? If physical upgrades to transmission, communication, and control facilities will be required, what are the costs going to be? To the regional rate payers? Tax payers? [LTR 279, CMT 4]

Response: The answers to these questions are outside of the scope of this EIS. However, several of BPA initiatives that are not solely related to wind power but yet are still very important to wind power's development in the Northwest can be found on BPA's wind website at: *http://www.bpa.gov/corporate/WindPower/*. Under "Related BPA Efforts," you will be able to find how wind has factored into BPA's rate cases, as well as how conditional firm transmission service is offered.

Comment: *So Bonneville, which is BPA, sits on the Northwest Resource Adequacy Forum, and they have "devoted considerable effort…to reaching an understanding of the hydrosystem's sustainable capacity value." Care to share with the rest of us, BPA? What is the sustainable capacity value of our hydrosystem? How much sustainable capacity does BPA actually have? If there is too much capacity, from all these regional wind farms, does it become unsustainable? What happens to unsustainable capacity? Does too much capacity affect the BPA infrastructure? [LTR 279, CMT 7]*

Response: In 2005, the Northwest Power and Conservation Council (Council) and BPA created the Northwest Resource Adequacy Forum to aid the Council in developing a standard, and to annually assess the adequacy of the power supply. The forum, which is open to the public, includes utility planners, state utility commission staff, and other interested parties. After nearly three years of coordinated effort, it reached consensus on a proposed resource adequacy standard, which the Council subsequently adopted in April 2008.

The standard helps to assess whether the electricity supply is sufficient to meet the Region's needs now and in the near future. It provides a minimum threshold that serves as an early warning should resource adequacy development fall dangerously short. The GENESYS model, which performs a detailed simulation of the Northwest power system, is used to assess the ability of the system to meet these standards. One of its most important features is that it is a probabilistic model, that is, it incorporates future uncertainties into its analysis. Each simulation is performed using different values for uncertain future variables such as water (fuel supply for hydroelectric plants), temperature (which affects the demand for electricity), variability associated with wind generation (based on historical wind generation patterns), and forced outages of thermal units.

Historical water conditions are used in the model to determine the amount of energy that can be supplied by the hydroelectric system including both Federal and non-Federal plants. The hydroelectric system is further constrained by non-power constraints such as fish spill and by the amount of hydroelectric peaking capability the system can provide over the 2, 4, and 10 hour period (which is also known as sustained peaking).

More information on the forum including the standards, assessments, presentations, and GENESYS can be found at: *http://www.nwcouncil.org/energy/resource/Default.asp*

With respect to this comment, BPA has done capacity analyses for the entire FCRPS hydrosystem. The results are published in The 2010 Resource Program, published September 2010, which can be found at the following web site: *http://www.bpa.gov/power/P/ResourceProgram/Index.shtml*.

This analysis for sustainable capacity, or "18-hour capacity," examines the maximum output of the hydrosystem when hydro-generation is shaped to provide generation for a 3-day heat wave or 3-day cold snap. Under more mild conditions, the hydrosystem would produce less power during a typical 3-day period. The 2010 Resource Program indicates that the BPA system can produce a surplus of about 1600 MW capacity during a 1-in-10-year cold-snap in winter of 2013, and is roughly adequate (only 200 MW surplus) during a severe heat wave (1-in-10-year heat wave).

Lastly, too much "peak capacity" is not a problem for the hydrosystem, in that a capacity assessment measures the most amount of water that could go through the generators when needed.

Comment: *If wind generation is not controllable, why is the Federal government subsidizing the wind industry? Why aren't we using our monies to work on conservation and raising efficiencies in the ways that we now use energy? [LTR 279, CMT 9]*

Response: The growing need for new sources of renewable energy is described in Section 1.2.3.1 of the EIS. BPA is committed to energy efficiency and considers energy conservation and efficiency as a power resource. More information about energy conservation can be found at: *http://www.bpa.gov/Energy/N/*.

Comment: *If "the output level is relatively unpredictable and, in the Northwest, is unlikely to be available at times of extreme peak load…a winter cold spell or a summer hot spell" why are all these wind farms being built? Probably because they are highly subsidized by taxpayer money, and the producers get tax credits which they use for God knows what, but they are tax credits. Why are we spending so much money and effort on wind if it won't be available to cool us in summer and warm us in winter because wind is uncontrollable, variable, and unpredictable? These questions should be answered in the DEIS. [LTR 279, CMT 10]*

Response: Wind is an intermittent, variable renewable energy resource and as such, maximum nameplate capacity generation does not always correspond with the maximum load in the Region. While this may be the case, the Regional need for new sources of renewable energy is described in Section 1.2.3.1 of the EIS. As the Nation seeks new sources of clean electricity, wind has emerged as the most mature and promising new resource. It is free of CO_2 emissions, relatively cost effective compared to other new generating resources and is, thus far, the most viable non-hydro renewable resource available on a large scale.

Comment: *So, analysis done by Bonneville and the Resource Adequacy Forum "…suggests that, for the wind area at the east end of the Columbia Gorge, where much of the region's current wind generation is located [as is the Whistling Ridge proposal] there is an inverse relationship between wind generation and extreme temperatures, both in winter and summer." Well, gosh darn, does this mean that when it's really hot, like in the summer time, there is less wind and therefore there is less wind power generation and therefore less energy is available for cooling? Summer time also means less water in the Columbia River and that means less water available to BPA for power generation. And, in the winter time, when it is really cold there is less wind power generation available to heat our homes and businesses? Why aren't these issues and concerns addressed in the DEIS? When we most need energy is when it is not being produced. Hmm, that does not make sense. Common sense, that is. Why are we even subsidizing more wind farms? [LTR 279, CMT 12]*

Response: Please see response to Comment LTR 279, CMT 7 above. Additionally, it is true that wind generation is less likely to be available during extremely hot or extremely cold periods. That is an unfortunate reality. However, the value of wind generation lies in the average generation that wind produces and its ability to assist in the reduction greenhouse gas emissions that would normally be produced by fossil-fuel-powered generation.

Comment: *Further, "the Resource Adequacy Forum has adopted a provisional peak contribution for wind of 5 percent of installed capacity." Does this mean that all the wind farms that litter the landscape only produce, and WILL ONLY PRODUCE and are ONLY CAPABLE OF PRODUCING, "5 percent of installed capacity"? This is a stunning statement. Whole ecosystems are being destroyed by wind turbines, pads, and impermeable maintenance roads that crisis-cross our environments and ecosystems, and these wind farms will ONLY PRODUCE "5 percent of installed capacity"?!? Well, I would be speechless if this didn't make me so angry. This stunning analysis MUST be part of the DEIS and must be addressed in the future. A deep fatal flaw in this very inadequate, and getting more inadequate by the minute, DEIS. [LTR 279, CMT 13]*

Response: Wind generation facilities generate approximately 25-35 percent of project nameplate capacity on average. However, because wind generation varies with meteorological conditions, wind generation ranges from full name-plate capacity to zero. Therefore, it is prudent to measure not only the average amount of wind power that may be generated but also an amount of energy that may be generated with high certainty, namely how much wind power can be counted on to contribute to power generation during peak demand. It is for this latter quantity that the Resource Adequacy Forum has chosen to adopt 5%. As discussed in Comment LTR 279, CMT 12 above, wind generation's value is less from power generation during specific periods and more from average generation that can displace fossil-fuel-powered generation.

Comment: *If I recall correctly, pumped-storage hydro plants are really reservoirs at high elevations to which water is pumped uphill, stored, and then released to go downhill and produce power through turbines. What are utility demand response programs? What are the*

cumulative regional impacts of these backup systems? These questions and issues should be addressed in the DEIS and are not. The DEIS is supposed to be a document that contains information so that we can all make reasoned, objective decisions about the proposed project and its regional cumulative effects. This DEIS is by no means that type of document. [LTR 279, CMT 15]

Response: Utility demand response programs are programs designed reduce end use loads via control systems that respond to a signal from a utility or the system operator. Demand response is typically employed to manage peak loads and mitigate transmission congestion, but could also be employed to respond to variable energy resource under performance. Dynamic transfer is one of the most important techniques to reliably and cost-effectively integrate large amounts of variable renewable generation resources. This technique would allow a dispatcher in one balancing authority to control and take responsibility for supplying balancing reserves for a generator located in another balancing authority. Dynamic transfer allows for a greater diversity of response resources and minimizes the duplication of reserves when the generation and load are in more than one balancing authority area. A study identifying available dynamic transfer capacity on 11 key transmission paths, completed in February 2010, found moderate amounts of available dynamic transfer capability. BPA is making this capability available to its customers on a pilot basis. As part of a comprehensive review of wind project interconnections and their effects conducted in winter 2008, BPA has established transmission operation protocols to maintain system reliability and ESA or CWA compliance. Under these protocols BPA's dispatch system automatically instructs wind project operators to reduce their generation to specified levels when too much generation is occurring on the system. Similarly BPA's dispatch system reduces export schedules to balance loads and generation when variable energy resource output falls significantly below their planned generation levels. BPA has issued Dispatcher Standing Order (DSO) 216 to document these protocols, and is continuing to refine and clarify this DSO as more is learned about wind project operations relative to BPA's transmission system (See *http://www.transmission.bpa.gov/wind/op_controls/default.cfm* for more information). Long term, when wind generation and hydro generation exceeds load and cannot be dispatched out of the region, alternative energy storage solutions are being explored such as hydro pump storage. Pump storage is where water is pumped into a reservoir during periods of surplus generation then power is generated from the stored water when additional generation is needed. Pumped storage facilities can be dedicated closed loop systems or multipurpose projects, typically used for irrigation pumping as well as storage and generation. Pumped storage operations must account for physical constraints of the upper and lower reservoirs, any irrigation requirements and the round trip energy loss associated with the pump/generation cycle. The reasonably foreseeable future cumulative impact of excess generation is considered in Section 3.14.3 of the EIS. Find more information on wind power and utility demand response programs at *http://www.bpa.gov/corporate/WindPower/*.

Comment: *These "two good candidates for flexibility augmentation" sound good. But what is their carbon footprint? How do they affect the environment? Do they cause air pollution? Could we achieve better energy-saving results through conservation and increasing our efficiencies capabilities? [LTR 279, CMT 16]*

Response: A speculative discussion of impacts, either qualitative or quantitative, is outside the scope of this EIS and does not meet the purpose and need of this document. If BPA receives a request to interconnect new generation to the transmission system, back-up or otherwise, each request will be reviewed on a case by case basis and subject to review under NEPA. BPA is committed to exploring energy efficiency and considers energy conservation and efficiency as a power resource in the Northwest. More information about energy conservation can be found at: *http://www.bpa.gov/Energy/N/*.

Comment: *The DEIS should have included a section on other ways and means of conserving and producing energy, as a contrast to wind power generation. BPA should more fully explain how our Pacific NW energy demands can be met by means other than wind power. [LTR 279, CMT 19]*

Response: The regional need for new sources of renewable energy is described in Sections 1.2.3.1 and 3.5 of the EIS, which also includes a brief description of the Northwest Power and Conservation Council (NPCC) projections for energy demand growth in the Northwest. As the nation seeks new sources of clean electricity, wind energy has emerged as the most mature and promising new resource. Wind energy is free of CO_2 emissions, is relatively cost effective compared to other new generating resources and is, thus far, the most viable non-hydro renewable resource available on a large scale. Additionally, BPA is also committed to energy efficiency and considers energy conservation and efficiency as a power resource. More information about energy conservation and the NPCC projections for Northwest energy demands can be found at the following websites*: http://www.bpa.gov/Energy/N/*, and *http://www.nwcouncil.org/*.

Comment: *The operation of the proposed industrial facility raises unanswered questions regarding the use of the power generated and the ownership of the facility. It is common knowledge that 80% of the wind power generated in the northwest is sold outside of Washington, principally to California, and thus not contributing to Washington's mandated green energy requirements. [LTR 283, CMT 16]*

Response: The proposed Project will be owned and operated by the Applicant. A proposed collector substation will be required to gather any power that is generated by the proposed Project wind turbines and this collector substation will also be owned and operated by the Applicant. However, BPA will also need to build a proposed substation and tap facilities which would also be owned and operated by BPA. A list of these facilities required for this proposed Project and their ownership is described fully in Section 2.1.2. Furthermore, BPA is a federal agency that owns and operates the majority of the high-voltage electric transmission system in the Pacific Northwest. This system is known as the FCRTS. BPA has adopted an Open Access Transmission Tariff (Tariff) for the FCRTS, consistent with the Federal Energy Regulatory Commission's (FERC) *pro forma* open access tariff.[NOTE] Under BPA's Tariff, BPA offers transmission interconnection to the FCRTS to all eligible customers on a first-come, first-served basis, with this offer subject to an environmental review under the NEPA. For all requests for

interconnection of generating facilities that exceed 20 MW, BPA chooses to act consistently with FERC's Order No. 2003, Standardization of Large Generator Interconnection Agreement and Procedures, and Order 661, Interconnection for Wind Energy, as adopted by BPA and incorporated, with FERC approval, into BPA's Tariff. Order No. 2003 established the Large Generator Interconnection Procedures (LGIP) and Large Generator Interconnection Agreement (LGIA), which provide a uniform process for offering interconnection to any generating facilities exceeding 20 MW. Order 661 contains additional standardized processes and technical requirements specific to interconnection of wind generators. BPA has adopted its LGIP and LGIA as Attachment L to its Tariff. In its Order 2003 Tariff filing, BPA included provisions in its LGIP to reflect BPA's obligation to complete an environmental review under NEPA of a proposed large generator interconnection before deciding whether to offer a final LGIA to the party requesting interconnection.

NOTE: Although BPA is generally not subject to FERC's jurisdiction, BPA follows the open access tariff as a matter of national policy set forth by the Department of Energy. This course of action demonstrates BPA's commitment to non-discriminatory access to its transmission system and ensures that BPA will receive reciprocal and non-discriminatory access to the transmission systems of utilities that are subject to FERC's jurisdiction. This non-discriminatory access to transmission requires BPA to provide service to any customer requesting it, subject to NEPA review and not impacting reliability standards, without regard to where the load is that the request is serving.

Comment: *I think this article makes it quite clear that too much wind power is not good for the power grid—which brings up the question of why are so many subsidized wind farms being built if the power they produce can't actually be used on the electric power grid? And, why are we concentrating all our energy eggs in the wind power basket? [LTR 285, CMT 2]*

Response: The regional need for new sources of renewable energy is described in Sections 1.2.3.1 and 3.5 of the EIS. As the Nation seeks new sources of clean electricity, wind has emerged as the most mature and promising new resource. It is free of CO_2 emissions, relatively cost effective compared to other new generating resources and is, thus far, the most viable non-hydro renewable resource available on a large scale.

Comment: *In conclusion, it appears that wind may not be the end all answer to our concerns about carbon footprints and going green. More wind farms will mean more cries for more and bigger transmission lines. [LTR 285, CMT 4]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.2.1 Affected Environment;] The DEIS should have addressed the issue of Wind Integration into the power system and the aforementioned Wind*

Integration Forum. The statement "Large swings ill wind output have sometimes adversely affected hydropower and fish operations" should be further explained in the DEIS. How large are these swings in output? Just how big is the issue of wind integration into the power grid? How much wind is too much wind? Does wind inconsistency mean more gas plant buck-ups (or other types of back-ups) being used by BPA? Frankly, just because then are now some state and federal requirements to meet some made up greenhouse gas emissions number does not mean that new technologies or other methods (energy efficiencies and conservation, for example) might not change these requirements. In the rush to go "green" perhaps common sense has fallen by the wayside. Wind energy production is subsidized by taxpayer monies. It is not cheap green energy. The full cost of wind energy production should be added up and should be included in the DEIS. [LTR 286, CMT 14]

Response: BPA currently has over 3,000 MW of wind generation nameplate capacity interconnected to the FCRTS, and the transmission system has experienced unscheduled wind generation swings of up to 1,100 MW in less than an hour. Bringing a variable and difficult to predict energy resource, such as wind, onto the power grid in large amounts is one of the great engineering and economic challenges in the power industry today. BPA is maintaining a remarkable pace of connecting wind power onto its transmission system and has among the highest levels of wind power of any grid balancing authority in the country. The challenges posed by the dramatic increase in wind generation connected to the FCRTS, the balancing issues faced by the hydro system, and the potential affects to fish populations is described in detail in the cumulative impacts Section 3.14.3.5, Habitat and Wildlife, Fish Species. Additional information can be found on BPA's wind website at: *http://www.bpa.gov/corporate/WindPower/*.

Comment: *[In reference to Section 3.2.2 Impacts; PDF pg. 34-35], If Whistling Ridge is NOT built, this does not necessarily mean that gas plants will take its place. Conservation and energy efficiencies in our homes, businesses, and infrastructure could fill the energy gap. Whistling Ridge and other wind farms are not necessarily the best way to meet our energy needs. What must be addressed, and it is NOT addressed in the DEIS, is that most of the energy produced in the NW is sucked down to California and parts South and they will continue to demand more and more energy and we will never be able to satisfy their energy thirst because they will want more and more. With global climate change upon us and temperatures rising, people will want more energy for air conditioning. Why should our environment and ecosystems be degraded just to satisfy this insatiable energy thirst? If California wants more energy let them put wind turbines on their beaches. Like that's going to happen any time soon!! [LTR 286, CMT 14]*

Response: If Washington EFSEC grants siting approval through its Site Certification process and if BPA decides to offer transmission interconnection for the proposed Project, the additional generation would be added to BPA's Balancing Authority. A Balancing Authority is responsible for maintaining a constant balance between power load and power generation in a geographic area. As described in Sections 1.2.2 and 3.5 of the EIS, BPA's tariff requires BPA to consider transmission interconnection requests on a first-come, first-serve basis, independent of what customer load that energy may ultimately serve. The statement that "most of the energy produced in the Northwest is sucked to California and parts south" is not an accurate one. Most

of the energy produced and interconnected to the FCRTS serves the load within BPA's Balancing Authority. Furthermore, BPA is mandated and has a statutory obligation under the Northwest Power Act of 1980 to provide energy to customers of the northwest. However, due to state mandates for renewable energy, BPA does estimate that approximately 47 percent of the wind generation capacity connected to BPA's system will be under contract to California utilities at the end of 2010. As of May 2010, only about 400 MW of the 2,800 MW of wind on the BPA system served the loads of preference customers located within the BPA Balancing Authority.

Comment: *[In reference to Section 3.6.2.1 Impacts-Proposed Action], I did not see any wind studies, long-term wind direction distribution curves, data on maximum and minimum temperatures onsite, the different altitude locations for the wind turbines (altitude above sea level affects wind production? Where are the air density tables for the proposed location, etc. Where are the wind studies for this area? What are the environmental issues associated with micro-siting? [LTR 286, CMT 52]*

Response: Please see response to Comment LTR 178, CMT 132 above.

Comment: *[In reference to Section 3.14.3 Cumulative Impacts], Although BPA states that it does not own any gas plants, it will need to rely on backups, perhaps even natural gas-powered plants, to back up its energy production. The more energy BPA is asked to produce the more power plants (or other types of machinery that will produce on-demand, quick backup) will have to be online to ensure flexibility and capability in the power grid. This is NOT a "positive cumulative impact" that would "combat air quality deterioration and climate change"! Cumulative impacts are not done on a project by project basis. They must be on a regional basis, especially when there is a regional energy producer, BPA, involved. Also, BPA is in the process of trying to build bigger and bigger transmission lines in order to produce and carry more energy production. These transmission lines have environmental effects and cumulative effects. There is nothing in the DEIS that addresses the environmental impacts and effects of past, present, and future transmission lines. [LTR 286, CMT 78]*

Response: BPA is a transmission authority that owns and operates the transmission system but does not produce generation or own electrical generation. The hydrosystem that BPA relies upon to balance wind generation comes primarily from the FCRPS, with much of the power generated at federal hydro projects owned and operated by the US Army Corps of Engineers or the Bureau of Reclamation. It is correct that cumulative impacts need to be considered in the correct spatial context, whether that be locally, regionally, or globally, as well as the full spectrum of direct and indirect impacts on resources. The cumulative impacts Section 3.14.3 reflects the most recent knowledge in regards to the cumulative impacts from wind generation, which is generally believed to displace power generated by carbon dioxide-emitting sources and replace it with generation that does not have a significant contribution to air quality or greenhouse gases. While there are ongoing discussions about the potential future impacts that a continued increase in renewable energy may have in the region, there is no evidence that wind generation will have a cumulative negative impact to air quality or climate change. Analysis of

past, present and future impacts related to transmission line infrastructure is incorporated into the cumulative impacts section as part of the "Proposed Action," which is defined in Chapter 2 of the EIS. Potential cumulative impacts from the proposed Project interconnection to BPA's transmission system are discussed in a few sections where direct cumulative impacts can be discerned from the overall Project (examples are in Sections 3.14.3.5 and 3.14.3.7).

Comment: *Energy planning would include (1) energy demand projections over time and space and (2) capacity estimates for acceptable sites, in order to understand how much environmental compromise might be needed over time. Planning should be regional rather than state-by-state, simply because demand for electricity generated anywhere in this area is distributed across at least two states. Planning also should test scenarios for the maturation of large-scale photovoltaic electricity generation. [LTR 315, CMT 27]*

Response: The regional need for new sources of renewable energy is described in Sections 1.2.3.1 and 3.5 of the EIS, which includes a brief description of the Northwest Power and Conservation Council (NPCC) and its projections for energy demand growth in the Northwest. The NPCC is a regional planning council, created by the Northwest Power Act in 1980, which develops and maintains a regional power plan and a fish and wildlife program to balance the Northwest's environment and energy needs. Additional information about regional energy demand planning and projections can be found at: *http://www.nwcouncil.org/*. Additional information related to BPA's Resource Program can be found at: *http://www.bpa.gov/power/P/ResourceProgram/Index.shtml*.

Comment: *I am greatly concerned that there is not a section in the DEIS that give us information on transmission lines and how they are susceptible to solar storms. There is enough literature and data widely available, see my References #1 and #2, below [for attachments see PDF starting at page 3] that could have been used to fill this information gap in the DEIS....More transmission lines equal more vulnerable to solar storms put us all at risk of blackouts… The DEIS does not contain this information. Therefore, the DEIS is incomplete. [LTR 316, CMT 1]*

Response: The Purpose and Need for Action is described in Section 1.2 of the EIS. While this comment has been noted, a theoretical relationship between more transmission lines contributing to a higher vulnerability to transmission system reliability from solar storms is beyond the scope of this EIS.

Comment: *The real clean energy is solar. [LTR 317, CMT 10]*

Response: Comment acknowledged.

Comment: *Will that power generated be kept local or sold to the highest bidder? [LTR 317, CMT 80]*

Response: BPA follows the open access tariff as a matter of national policy set forth by the Department of Energy. This course of action demonstrates BPA's commitment to non-discriminatory access to its transmission system and ensures that BPA will receive reciprocal and non-discriminatory access to the transmission systems of utilities that are subject to FERC's jurisdiction. This non-discriminatory access to transmission requires BPA to provide service to any customer requesting it, subject to NEPA review and not impacting reliability standards, without regard to where the load is that the request is serving.

Comment: *I suggest that you bifurcate the interconnection aspect from the siting facility aspect so that the project can go forward there and not get hung up in questions about how we're going to integrate wind. [LTR 318, CMT 55]*

Response: A joint EIS was prepared to satisfy the purpose and need of both lead agencies, which is discussed in Section 1.3 of the EIS. Washington EFSEC has to make a decision on whether or not to grant siting approval through its Site Certification process for the proposed Project and BPA has to decide whether or not to interconnect the new generation onto the FCRTS. Both processes are independent actions being considered by Washington EFSEC and BPA, respectively. Both agency decisions need to be made prior to the decision to proceed with the proposed Project. As discussed in Section 1.3.3, preparing a joint SEPA/NEPA EIS is encouraged by both the State of Washington and the federal governments since it avoids duplication between NEPA and comparable state requirements and also results in more clarity during the public involvement processes.

Comment: *Overlooked are the impact of increasing wind generation on the reliability and affordability of the electricity that very well might outweigh any of the promised environmental benefits. [LTR 318, CMT 61]*

Response: BPA is a not-for-profit federal agency that is dedicated to providing high system reliability, low rates consistent with sound business principles, environmental stewardship and accountability. The impacts of the increasingly larger share of wind power on the operation of the FCRTS do present a number of challenges within BPA's Balancing Area. BPA is working closely with wind developers and operators to incorporate necessary measures to ensure that the increase of wind power does not have an impact on the reliability of the FCRTS. The affordability of electricity in the region is influenced by a variety of factors, with the interconnection of additional generation sources being just one factor. Developers of new generation are responsible for all of the costs associated with interconnection to the FCRTS, including all of the necessary system studies and improvements to BPA's system.

BONNEVILLE POWER ADMINISTRATION



Fact Sheet

October 2010

BPA's wind power pilots launched, working well

In June 2009, the Bonneville Power Administration committed to starting five pilot projects by October 2010 on new tools and techniques to support wind power in the transmission grid.

Today, all the tasks promised — and more — are done. As a result, BPA expects to support thousands more megawatts of wind power reliably in its transmission grid, and the robust growth of the Northwest wind fleet continues.

BPA is proud of the work its Wind Integration Team has accomplished in a very short time to increase the agency's ability to support large amounts of wind power integrated with the Northwest federal power system. We look forward to the next steps on an exciting journey to adapt the power grid to new, variable renewable power sources.

Wind power is changing the way the grid works

BPA's primary role in supporting wind power is to provide transmission from remote wind farms to the utilities purchasing the wind power. Most Northwest wind power clusters east of the Columbia River Gorge in the heart of BPA's high-voltage transmission grid. Most — 80 percent — of the wind power connected to BPA's grid is exported to other utilities' systems, and half is exported from the Pacific Northwest. To support this growth, BPA has developed and implemented new approaches to prioritizing new transmission line construction, providing access to transmission for more than 7,000 megawatts of additional wind generation



in the Northwest.[1] For more on BPA's broader efforts related to wind power, go to *www.bpa.gov/go/wind*.

BPA manages wind energy as it is transmitted over BPA's grid to receiving utilities. Utilities traditionally schedule power output by the hour and control how much electricity each generator produces, but wind generation is controlled largely by nature and can vary widely and unexpectedly within an hour. BPA provides generation balancing reserve services to correct for differences between wind's scheduled and actual output inside each hour.

WIT projects advance the state of the art

The Wind Integration Team was designed to help stretch the federal hydro system's ability to support wind power in BPA's transmission grid. The WIT projects include:

Putting a limit on hydro reserves: BPA built a dispatchers' tool that limits the amount of federal hydropower BPA must set aside to back wind while maintaining reliable power service. The level reflects wind projects' desire to keep costs low. When wind projects have consumed all the generation imbalance reserves they have purchased from BPA, BPA dispatch now automatically sends an electronic signal to wind plants to reduce their generation to scheduled levels. Similarly, when large decreases in scheduled wind generation deplete BPA's ability to provide balancing energy, BPA revises the wind schedules downward, and receiving utilities must make up the difference with their own resources. In the year since it went into automatic operation, this tool, Dispatchers Order 216 or DSO 216, has maintained system reliability while actually triggering less often than expected. DSO 216 has become BPA's bedrock tool for maintaining grid reliability while the wind fleet grows.

[1] For an overview of BPA's broader wind power efforts, see: "BPA's wind power efforts surge forward." For BPA's transmission initiatives, including its Network Open Season approach to prioritizing new transmission line construction, see "Network Open Season nets robust response" on the open season concept, and "Network Open Season 2010" for this year's results. Look for these documents on *www.bpa.gov*.



BPA's anemometer fleet lets dispatchers see where the wind is coming from, and how fast.

Improving wind forecasting: BPA and the wind power community are working to improve the accuracy wind generation scheduling. Forecasting when the wind will rise or subside, by how much and how quickly is notoriously difficult, particularly in an area like the Columbia River Gorge where wind patterns are driven variously by coastal, Arctic and inland storm fronts. BPA installed a fleet of 14 anemometers from the Oregon and Washington coast to the inland Columbia Basin and has developed (and is patenting) displays so system dispatchers can literally see wind fronts coming toward and blowing through the wind power area. We are sharing these tools with wind power operators so they can see the information on their own plants. BPA has developed its own in-house wind forecasting system and, for the next year, is also purchasing two commercial wind generation forecasts. Data from all three forecasts will be used to help determine the most accurate forecasting approach.

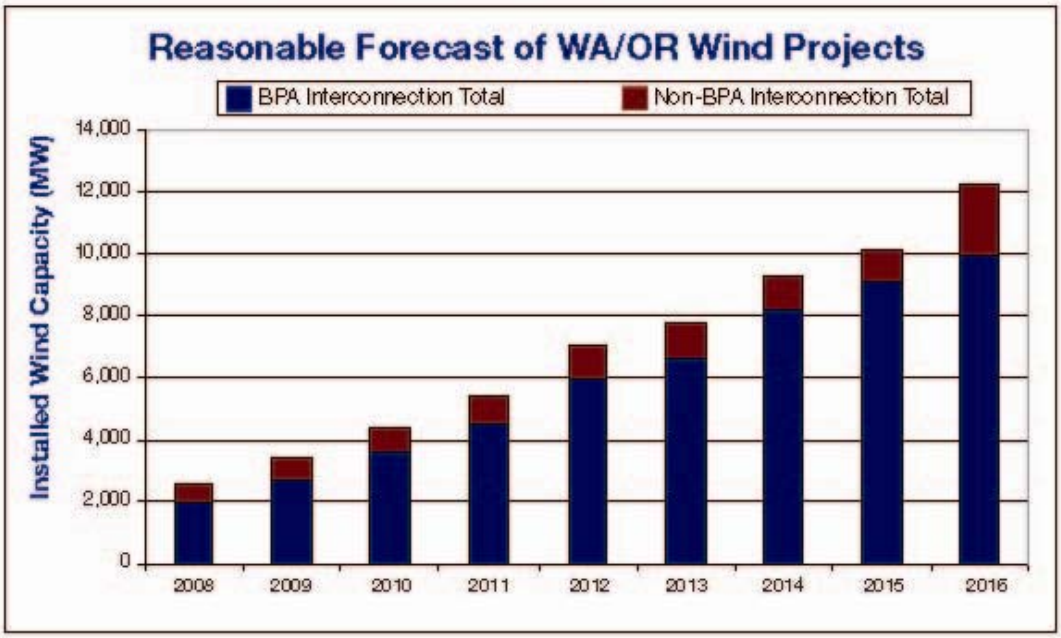
Giving customers a choice of reserve suppliers: Until September 2010, wind projects located in BPA's transmission grid purchased all their generation reserves from BPA. Today, the largest wind project owner in the Columbia Basin, Iberdrola Renewables, is supplying its own generation imbalance reserves for its 1,100 megawatts of wind turbines in the basin. Iberdrola has purchased reserves from nonfederal hydropower and coal plants in Washington and is also supplying reserves from its own natural gas fired plant in southern Oregon. Offering wind power

owners the opportunity to supply their own reserves from nonfederal sources reduces the amount of reserves the federal hydro system must supply, in this case, by roughly 300 megawatts.

This effort took two pilot projects. First, BPA identified transmission capability available to deliver reserve power to wind power consumers (dynamic transfer capability) and offered that capability to prospective users, including Iberdrola. This was accomplished by July 2010. Second, BPA worked with Iberdrola and its partners to develop, install and test the requisite communications and control equipment so dispatchers for all parties always know what's happening. This was completed by Sept. 1, 2010. So far, this pilot is going smoothly.

Selling power within the hour: Another way to reduce the difference between hourly power scheduled and actual output is to change the schedules more often. This isn't as easy as it sounds. Utilities have scheduled power by the hour since the grid was built, and decades of automated systems are founded on that premise. By December 2009, BPA had systems in place to allow sales of wind power on the half-hour where wind overgeneration would otherwise trigger DSO-216, the reliability protocol. BPA is working with other utilities to develop common business practices for within-hour power sales and to expand use of this technique.

Purchasing nonfederal reserves: A sixth WIT pilot project also has been accomplished. BPA has purchased 75 megawatts of generation imbalance reserves from a Calpine Corporation natural gas fired plant in Hermiston, Ore. When wind generators overgenerate, BPA can ask Calpine to reduce its natural gas-fired generation. Calpine will then buy the excess power on BPA's system to fulfill its existing obligations to customers. The arrangement optimizes use of renewable hydro and wind power resources that do not emit carbon dioxide while conserving natural gas supplies and maintaining power system reliability.



While the amount of wind power that will actually be developed in the Northwest remains uncertain, wind project requests for integration to BPA's transmission grid continue to grow.

This is just the beginning

When BPA launched its WIT work plan in June 2009, the agency had just come out of a period in which it had temporarily suspended signing contracts to integrate more wind projects in its transmission grid because it had no assurance it could support more wind power and maintain transmission system reliability.

Today, based on interconnection requests, regional experts foresee up to 12,000 megawatts of wind power operating in the Northwest transmission grid by 2016, with about 80 percent integrated to BPA transmission. The work of the Wind Integration Team over the last 16 months, in concert with utilities and the wind power community, has made it possible to begin to look forward to realizing this possibility. While this work will not alone suffice, it has gone a long way toward making this potential feasible.

Much more necessary innovation lies ahead.

BPA is now working with utilities and the wind power community across the Northwest and the broader interconnected transmission grid of the western United States, British Columbia and Alberta on consistent, effective and mutually beneficial utility practices to support variable power sources. BPA's principles in this effort are to:

- Support renewable resource development.
- Assure reliable operations.
- Avoid cost shifts — cost recovery must follow cost causation.
- Meet hydro system fish obligations.

This is a challenging and exciting time to be in the electric utility business. BPA has experienced significant success as we've delivered on the WIT initiatives to date. These initiatives have allowed us to integrate more wind onto our system quickly and reliably.

With the WIT projects of June 2009 well launched, BPA is reflecting on its next set of objectives to further the art of wind integration. In the weeks and months to come, we will lay out our round of wind integration activities, objectives and projects.

To keep abreast of BPA's ongoing wind integration initiatives, sign up for the WIT mail list. Go to *www.bpa.gov/corporate/WindPower/WIT-Contact.cfm.* Send an e-mail to *BPAwindintegration@bpa.gov* or call Eric King, WIT projects manager, at 503-230-5236.

For general information on BPA's wind integration efforts, see *www.bpa.gov/corporate/WindPower/.*

BONNEVILLE POWER ADMINISTRATION
DOE/BP-4207 • OCTOBER 2010

G.3.6 PUBLIC HEALTH AND SAFETY

Comment: T*he project improves fire access roads in the farm areas making it safer and easier for our firemen in case of a major fire. [LTR 37, CMT 4]*

Response: Comment acknowledged.

Comment: *There was very little discussion on the flashing red lights. My understanding is that these are fairly bright and regular flashes, which besides being disturbing to local residents could also trigger health issues. Please add this consideration to your study. [LTR 60, CMT 4]*

Response: After consideration of comments received during the EIS scoping period, information regarding lighting and the potential impacts has been added to the "Other Potential Impacts" in Section 3.6 of the EIS.

Comment: *More research data on human health in connection with wind turbine arrays is available than has ever been in the past, from both Europe and the United States. Unfortunately, it has not been common knowledge and therefore has not been reflected in public policy regulations. There has been testimony dealing with this subject in detail and this body of yet unrecognized information should be a major determinant in wind farm siting decisions. Please acquaint yourselves with the data before moving ahead. [LTR 76, CMT 5]*

Response: Comment acknowledged.

Comment: *The day we signed the papers on our house we found out about the proposed Industrial Wind Turbine Project. After doing some research on my computer my heart sank as I read all the reports from families living within 2 miles of the Industrial monsters. People like us who had sold their big family homes and wanted to scale down, simplify their lives and live a simple life in the country, gardening, working and enjoying nature. Many of these people now live with insomnia, headaches, irritability, decreased concentration, anxiety, and more. This was very disturbing indeed as I read this information. These are real people, not whiners. They have had to leave their homes to get well. Some have returned only to have the symptoms return. The wind industry disputes these claims dismissing them (without any intelligent responses on why they don't believe it) as whiners, angry etc. Well I would be angry if I had to spend thousands of dollars on medical bills, leave my beloved home and suffer health consequences. People would never do this just to spite the wind industry. These are people just like you and me, and they are sick. It is obvious that there is a problem with placing these large industrial*

wind turbines too close to residential communities. Why are we continuing to site these projects so close to human habitation? [LTR 98, CMT 1]

Response: Comment acknowledged.

Comment: *I am very nervous about the installation of these turbines on the ridges of our beautiful community. There are many people who will be living within 2 miles of the project. How can we risk sacrificing the health of our neighbors? Not everyone is affected by the low frequency vibration. It would be simple if everyone was, but because of this it makes the ones who are look like liars or crackpots. They are not. [LTR 98, CMT 4]*

Response: The potential immediate and long-term impacts to health and safety from both construction and operation of the proposed Project are described in Section 3.6, Public Health and Safety of the EIS. Health concerns have been raised regarding shadow flicker, low-frequency noise, lighting, and electromagnetic fields from wind turbines and facilities. The potential impacts of each of these phenomena and others, including possible mitigation measures, are disclosed and analyzed in the EIS.

Comment: *What are the long term health effects? [LTR 102, CMT 6]*

Response: The potential immediate and long-term impacts to health and safety from the proposed Project are described in Section 3.6, Public Health and Safety, and Section 3.7, Noise, in the EIS. Long-term health concerns have been raised regarding shadow flicker, noise, and electromagnetic fields from wind turbines and facilities. The potential impacts of each of these phenomena and possible mitigation measures are described in the EIS.

Comment: *So my biggest concerns are for the health of the people in this community. It's not fair to put them at risk. Pay attention to the new studies coming out. Carl Phillips says it would be easy to prove that these turbines are causing health problems, but the money isn't being spent on the studies. The industry doesn't want this type of thing "getting in their way". If you knowingly OK this project with reliable information about causing humans physical harm, you will be liable for their health problems and could be liable in lawsuits down the road. I beg you to look further into this information. Don't be responsible for harming our community. It just isn't right. [LTR 98, CMT 8]*

Response: Please see response to Comment LTR 102, CMT 6 above.

Comment: *Health hazard from the droning, [LTR 118, CMT 4]*

Response: A description of the potential health hazards from the noise generated during construction and operation of the proposed Project can be found in Section 3.7, Noise, of the EIS.

Comment: *[It is requested that] the "How to" Guide to Siting Wind Turbines to Prevent Health Risks (or minimally, the EPA guidelines) be used in determining projected impact and that any predicted decibel increases over 10 be mitigated up front by effective set-backs or the outright elimination of selected wind turbines. [LTR 139, CMT 28]*

Response: The EPA guidance was considered in determining the significance of impacts from noise, as described under the "Regulatory Overview" heading in Section 3.7.1.2 of the EIS. If the proposed Project was to be constructed and was to exceed state or county ambient noise thresholds, the Project would be subject to enforcement intervention and mitigation measures as determined by the regulatory entities. Furthermore, EFSEC would require that the Certificate Holder submit, for EFSEC review, modeling of noise impacts from the Project reflecting its final layout and selected turbine components, prior to the beginning of site preparation.

Comment: *[For issues regarding TOXICS CLEANUP], If contamination is currently known or suspected during construction, testing of the potentially contaminated media must be conducted. If contamination of soil or groundwater is readily visible, or is revealed by testing, Ecology must be notified. [LTR 171, CMT 3]*

Response: In consideration of these comments, additional information has been added to Section 3.6, Public Health and Safety, Releases of Hazardous Materials, to reflect the appropriate notification protocol in the event contaminated media is encountered during construction.

Comment: *[Regarding] Fire Hazard[s], DNR has fire protection responsibility on a significant portion of the land within the project area. After review of the DEIS, we believe that implementation of the fire related mitigation measures listed in Chapter 3, [S]ection 3.6.3 of the DEIS (5/1/2010) would adequately address fire prevention responsibility and response on those lands. Thank you for this consideration. Contact: Darrel Johnston Phone: (360) 902-2112 darrel.johnston@dnr.wa.gov [LTR 172, CMT 4]*

Response: Comment acknowledged.

Comment: *[In reference to Section] 3.6, PUBLIC HEALTH AND SAFETY, [Section] 3.6.2.1, Proposed Action, Construction, Fire and Explosion, p. 3-97: The wind turbine nacelles will be at a height of 262 feet. This section should discuss the technical challenges that are posed by responding to a fire, explosion or medical emergency at such a height, the types of emergency*

equipment necessary to respond to emergency events, and who (local fire departments, DNR or the Applicant) will be responsible for supplying and operating this equipment. Operation, Fire and Explosion, p. 3-99: This section acknowledges that turbine malfunctions resulting in fires have been known to occur. Given that the turbines nacelle are located hundreds of feet in the air in a windy area surrounded by land being managed for timber production, it would appear that a fire could pose a serious threat to the project site and surrounding property. This section should be expanded to discuss the potential environmental impacts that may arise from a turbine fire and the actions that would be taken to minimize those impacts. This section should discuss whether equipping the turbines with fire suppression equipment is advisable. [LTR 177, CMT 48]

Response: Section 3.6 of the EIS states that "DNR would likely respond to a structure fire in the woods, as would Underwood Fire District #3 and Mill A volunteers." Additionally, as seen above in Comment LTR 172, CMT 4, DNR states that they "believe that implementation of the fire related mitigation measures listed in Chapter 3, [S]ection 3.6.3 of the DEIS (5/1/2010) would adequately address fire prevention responsibility and response on those lands." There are numerous precautions that will be included in the Fire Protection and Prevention Plan that would be developed by the Applicant for EFSEC approval, as mentioned in Section 3.6.3. The fire protection plan and implementation of additional fire precautions will also be coordinated with the Skamania County Fire Marshall and DNR in response to fire conditions in the Project Area.

Comment: *EFSEC and BPA must ensure that the DEIS includes adequate review of the likely impacts on neighboring properties. Recent studies have shown a potential for wind energy facilities to cause adverse impacts to human health. Adverse health impacts could occur. [LTR 179, CMT 91]*

Response: Comment acknowledged.

Comment: *[Regarding] WASTE RESOURCES, [Please contact] Mike Drumright, (360) 407-6397, [for any questions that relate to a]ll grading and filling of land must utilize only clean fill, i.e., dirt or gravel. All other materials, including waste concrete and asphalt, are considered to be solid waste and permit approval must be obtained through the local jurisdictional health department prior to filling. Standards apply as defined by Washington Administrative Code (WAC) 173-350-990, Criteria for Inert Waste. Property owners, developers, and contractors are encouraged to recycle all possible leftover construction, demolition, and land clearing (CDL) materials and reduce waste generated. Recycling construction debris is often less expensive than landfill disposal. Please visit http://1800recycle.wa.gov or call the 1-800-RECYCLE hotline to find facilities that that will accept your CDL materials for reuse or recycling. [LTR 187, CMT 2]*

Response: This information has been included in the EIS and as part of the mitigation action plan that will be released with the FEIS and Record of Decision.

Comment: *What are the long term health effects? [LTR 225, CMT 3]*

Response: Please see response to Comment LTR 102, CMT 6 above.

Comment: *The DEIS summary emphasizes that no hazardous waste would be produced by the project. Actually there is a significant release of hazardous wastes my each machine. Lubricants run down the blades and are flung for quite a distance. Solvents and other cleaning materials are used to de-grease the tower and blades, and these hazardous wastes go right into the ground. When the first wind machines (the MOD-II's) were built on the Goodnoe Hills section of the Columbia Hilts (and later removed due to engineering failure) Natives reported that they could no longer gather traditional herbs and roots on the site due to pollution by lubricants and solvents. While we have no authority to speak for Natives (nor would we attempt to do so), we do believe that we can report on what is public knowledge. [LTR 256, CMT 14]*

Response: The summary of hazardous materials production described in Section 3.6 of the DEIS is accurate, and the precautions and control measures to prevent hazardous waste releases will be implemented per the mitigation measures in Section 3.6.3.

Comment: *How is the infrastructure affected if capacity reaches unsustainable levels? Are there inherent dangers in unsustainable capacity? Dangers to the BPA infrastructure? Dangers to the general public and energy users? These questions, and many more relevant ones, should be addressed in the DEIS, by BPA. They are not. A fatal flaw. [LTR 279, CMT 8]*

Response: Within BPA's Balancing Authority, the generation needs to match the load at all times. BPA operates the transmission system to ensure that capacity is maintained at sustainable levels, and would employ any measures required to maintain system reliability regardless of infrastructure capacity. FERC requires that BPA perform electrical studies (a interconnection request feasibility study, the interconnection system impact study, and the facilities study) which help identify all necessary infrastructure that would be necessary for this particular interconnection request as well as analyzing the current transmission system's capacity for this new interconnection request (which could include upgrades to the transmission system). The information identified from these three studies is related to the electrical system and its capacity. The information from the electrical studies is never included in BPA's environmental documents other than what facilities will need to be upgraded and/or added as the facilities study identifies what new facilities may be needed as part of the interconnection request. In this case, a new BPA substation will be required as well as a tap into BPA's existing North Bonneville-Midway 230-kV transmission line. NEPA requirements focus on the potential of a proposed Project to impact the environment, and thus the possible construction of a new BPA substation and the associated tap would have that effect.

Comment: *How would people be evacuated if a wind turbine's weight causes a mass wasting event or other types of erosion? What are the evacuation routes? [LTR 281, CMT 23]*

Response: The analysis of geologic hazards and soils in the proposed Project Area can be found in Section 3.1, Earth, of the EIS. As stated in Section 3.1.3, Mitigation Measures, "If detailed geotechnical investigations indicate potential for slope instability...," the developer would ensure "proper engineering to account for this risk or relocate the facilities on-site to avoid this risk." The landslide hazard report include in Appendix D of geotechnical report referenced in the DEIS (URS 2009) concluded that the proposed Project facilities could be constructed and operated without danger to human life or the surrounding environment (due to landslide hazards). Therefore, the need for evacuation routes in response to a mass wasting event were not developed.

Comment: *The location of the proposed project is also fatally flawed for many of the reasons discussed previously and for additional reasons. The proposed location will severely impact local Underwood residents. You are aware of the numerous non wind industry sponsored studies detailing both physical and mental health impacts on both adults and children, so I will not reiterate those findings. Please do not discount the life altering effect that an industrial energy facility will impose on local residents. Please do not credit the wind industry sponsored studies that such a facility would not negatively impact home values severely. Really, would any of you chose a residence within close proximity to 425 foot loud twirling lighted structures if given the choice of an equally pleasing quiet rural residence unencumbered by such structures? I think not. [LTR 283, CMT 7]*

Response: Comment acknowledged.

Comment: *The proposed location of the project also discounts the very real threat of fire in what is now a strictly no burn tinder box. This location is not a flat insured wheat field. This location is a forested steeply graded terrain which is home to a wide variety of wildlife, domesticated livestock and people and their homes. Both construction and operation of an industrial facility poses an unacceptable threat to the aforementioned as well as to travelers and the very scenic vistas that make up the Gorge. The location of the proposed facility by its very nature would be difficult or impossible to adequately access with fire fighting equipment. The helicopter water drops so instrumental in fighting the Underwood fire of the summer of 2008 which destroyed trees, vegetation, wildlife and homes, would not be available for use in and around the proposed structures because of the proximity prohibition for helicopters and turbines or towers. [LTR 283, CMT 8]*

Response: Please see response to Comment LTR 177, CMT 48 above.

Comment: *Is Whistling Ridge proposing to use herbicides over the life of the proposed wind farm to control vegetation? What kind of herbicides and/or pesticides is SDS proposing to use? What is the chemical makeup of any proposed chemicals that might be used on this project? Are there any potential health hazards to human beings and wildlife? [LTR 286, CMT 30]*

Response: As stated in Section 3.4.3, the Applicant would implement a noxious weed control program, in coordination with the Skamania County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weed species. The exact type of herbicide that might be used has not been determined. For more information on Skamania County's program, please visit their website at: *http://skamania.wsu.edu/noxiousweeds/index.html*.

Comment: *What are these chemicals that are in storage? What is their chemical makeup? Are they hazardous? Are they dangerous to humans and wildlife? [LTR 286, CMT 31]*

Response: A description of the hazardous materials that may be stored on site and the corresponding control and preventative measures can be found in Section 3.6, Public Health and Safety, of the EIS. Specific information can be found under the headings "Releases of Hazardous Materials" and "Releases to the Environment" in the Impacts analysis found in Section 3.6.2.

Comment: *In section 3.17, there is this statement about snow: average of 9 inches of snow per year. Footnote 4. Which is the true statement "…snow, which may accumulate one to three meters during the winter season" or "average of 9 inches of snow per year"?? This does not compute. Three to nine feet of snow is a lot different than 9 inches of snow. Meters of snow mean more water erosion. Meters of snow mean more snow removal traffic. Meters of snow could also mean lack of access to the wind turbines when they have to be tied down due to high winds. What happens if the technicians can't get to the wind turbines and the blades are subjected to high winds? Will they rip off? Will they go flying into neighboring properties? What happens during high winds and snow season? What's the standard operating procedure to be followed? The DEIS should answer these questions and address the issue of snow. [LTR 286, CMT 34]*

Response: There is an average snowfall of 9 inches in the Project Area, but there have been times when the surrounding region has received significantly more snow. Snow can accumulate into snowdrifts from the wind, so this information is included in the description of the "Regional Environment" in Section 3.4.1.1. The potentially significant issues posed by inclement weather, including high winds and snow, are the same as discussed in Section 3.6, Public Health and Safety, and include turbine structure failure, blade throw, and ice throw. To minimize the risk of these events occurring, the wind turbines automatically feather into the wind and stop operating in winds exceeding 56 mph as described in Section 2.1.3 of the EIS.

Comment: *How dangerous is mineral oil to the environment, in case of leaks? Is there combustion danger? How much of the mineral oil is stored onsite for use? Over the life of each turbine transformer, how much mineral oil is used? How much mineral oil is used over the lifetime of the BPA substations? What is the chemical makeup of the mineral oil? [LTR 286, CMT 48]*

Response: Mineral oil is used in a variety of industrial/mechanical capacities as a non-conductive coolant or thermal fluid in electric components as it does not conduct electricity, while simultaneously functioning to displace air and water. Some examples in which mineral oils are used are transformers (where it is known as transformer oil) and in high voltage switchgear (where mineral oil is used as an insulator and as a coolant to disperse switching arcs). If a small spill were to occur, it is suggested that the mineral oil be covered with inert material such as sand or clay, so that it can absorb to the inert material and then be disposed of properly. Large spills may be picked up using vacuum pumps, shovels, buckets, or other means and placed in drums or other suitable containers for appropriate disposal. Transformers do not operate at temperatures that would be great enough to ignite the mineral oil. The designs for small new substations usually do not include on-site bulk oil storage; and, oil in electrical equipment is not considered bulk storage under the Clean Water Act. The environmental or public health and safety risk from mineral oil is very low considering the preventive design and operation measures designed to prevent discharges to the environment, as discussed under the heading "Releases to the Environment" in Section 3.6.2.1 of the EIS.

Comment: *Duh. "Shadow flicker would not be a risk during construction because turbines would not be operational." I really dislike it when people think I'm stupid… SO, what happens after the turbines are constructed? How much shadow flicker is there? How are people and wildlife affected by shadow flicker? Shadow flicker is VERY ANNOYING, as anyone who has had light flickering on their peripheral vision can attest! This is not an analysis of shadow flicker, its effects on humans and wildlife, and its location relative to human habitation in the area. [LTR 286, CMT 49]*

Response: Please see response to Comment LTR 98, CMT 4 above.

Comment: *SO, what happens after construction. What strength electrical and magnetic fields would be generated? What effects do electromagnetic fields have on humans and wildlife? Are there any genetic effects? Cancer-causing effects? [LTR 286, CMT 50]*

Response: Please see responses to Comment LTR 98, CMT 4 and Comment LTR 178, CMT 54 above.

Comment: *This is the Gorge. There are strong winds in the Gorge. There is extreme weather in the Gorge. Why is SDS proposing to build huge, dangerous propellers in an area known for gusting, strong, winds? [LTR 286, CMT 51]*

Response: As described in Section 2.1.3 of the EIS, the wind turbines would be engineered to withstand wind gusts and would automatically feather into the wind and stop operating in winds exceeding 56 mph.

Comment: *So this wind farm would be operating in an area that gets up to 3 meters of snow in the Winter? There would be hail, high winds, thunderstorms, and extreme cold weather? Personnel would have operate in this environment? What does OSHA have to say about this?* [*LTR 286, CMT 53]*

Response: A list of some of the personnel safety standards, measures and regulations that the proposed Project would comply with can be found in Section 3.6.3 of the EIS.

Comment: *Other areas not addressed in the Whistling Ridge DEIS are electric and magnetic fields from transmission lines. Why didn't BPA address this issue in the DEIS? Are there health effects for humans and wildlife from transmission lines? If bigger and taller transmission lines are built are there bigger electric and magnetic fields?* [*LTR 311, CMT 11]*

Response: Please see response to Comment LTR 178, CMT 54 above.

Comment: *Can transmission lines cause forest fires? [LTR 311, CMT 12]*

Response: There is some risk of fire caused by transmission infrastructure if a line collapses and remains energized, or in the event that there is a failure or explosion at associated transmission facilities like substations. These events are rare. However, a discussion regarding these types of issues can be found in Section 3.6, Public Health and Safety, of the EIS.

Comment: *How much pesticide is used on an annual basis to keep the transmission area free of vegetation and pests? What are the environmental effects of this pesticide use? [LTR 311, CMT 15]*

Response: Vegetation management and control measures for the proposed Project will be developed according to local, county and state regulations, as described in Section 3.4 of the EIS.

Comment: *There is certainly no "full range of potential effects of the proposed action on human health and the environment" analysis in the DEIS. Health effects that might or would occur - audio, visual, environmental - are downplayed in the EIS and information that is contradictory is not included. What are the benefits and detriments of siting hundreds if not thousands of wind farms in rural environments? What are the impacts to the rural communities and their way of life? What are the impacts to water resources? To air quality? [LTR 314, CMT 6]*

Response: Impacts to these various concerns can be found within Section 3.0, Affected Environment, Impacts and Mitigation, within the EIS. Washington EFSEC and BPA believe that the description of the environment and any potential impacts that have been described within Section 3.0, as well as throughout the entire EIS, are comprehensive and objectively consider the potential impacts of the proposed Project to the local residents and the surrounding area.

Comment: *There is very little discussion on the flashing red lights. My understanding is these are fairly bright and regular flashes. I read that this may trigger some health issues so I'd like to see more consideration for that in a study. [LTR 317, CMT 25]*

Response: Please see response to Comment LTR 60, CMT 4 above.

Comment: *I do not understand how there will be no impact to emergency services. There will be 200+ trucks coming through at rush hour and the day. What happens if a house is burning?* [*LTR 317, CMT 87]*

Response: An analysis of traffic patterns in the local area can be found within Section 3.11, Transportation. Emergency service availability within the local area can be found in Section 3.6, Public Health and Safety, and Section 3.11, Transportation, of the EIS.

G.3.7 NOISE

Comment: *They also create noise pollution that aggravates nearby residents as well as jams the communication calls birds and other creatures use for breeding, finding food, and predator avoidance. [LTR 12, CMT 5]*

Response: Comment acknowledged.

Comment: *Noise – The noise impact will be detrimental to the rural environment. [LTR 33, CMT 3]*

Response: Comment acknowledged.

Comment: *Audible annoyance/deleterious health effects on humans and their domesticated animals. [LTR 49, CMT 3]*

Response: Comment acknowledged.

Comment: *There is no reference to Dr. Pierpont's studies on the health effects of wind turbine sounds, and a response to this new science by the applicant. It is not sufficient to say "not a problem", when current scientific studies indicate the need for larger setbacks to avoid these issues. All of the "noise" documentation is generally positive, educational, and/or based on county defined noise ordinances, all of which do not comprehend continuous operation of noise producing machinery. It is also interesting to me the shear amount of documentation in the DEIS on noise, causing me to believe that this can be a problem and really needs more than an academic dissertation on sound. The most recent science should be considered in the study. [LTR 60, CMT 5]*

Response: Dr. Pierpont's studies were not referenced in the DEIS due to concerns about the scientific methods used in the studies as discussed in critiques of Dr. Pierponts's work by prominent acousticians such as Geoff Leventhall. For example, Section 4.3.2 of "Wind Turbine Sound and Health Effects – An Expert Panel Review" (Colby et al, 2009), for which Mr. Leventhall was one of seven preparers that included three medical doctors, offers the following remarks on "Wind Turbine Syndrome": "Wind turbine syndrome," not a recognized medical diagnosis, is essentially reflective of symptoms associated with noise annoyance and is an unnecessary and confusing addition to the vocabulary on noise. This syndrome is not a recognized diagnosis in the medical community. There are no unique symptoms or combinations of symptoms that would lead to a specific pattern of this hypothesized disorder. The collective symptoms in some people exposed to wind turbines are more likely associated with annoyance to low sound levels." While Dr. Pierpont's self-published book has garnered some attention, it may not be appropriate to characterize her work as "new science". However, Leventhall (Leventhall, 2009) does appear to acknowledge the following regarding Dr. Pierponts work: "Pierpont may have made one contribution to the science of environmental noise, by showing that a proportion of those affected have underlying medical conditions, which act to increase their susceptibility. That is, a number of those affected, had pre-existing problems, which increased their susceptibility to noise. That is, they exhibit a negative response when the majority would not do. This discovery is the only original contribution, which she has made."

Comment: *The study did not use the noise levels defined by the manufacturer of the proposed towers and the generating station, which are larger and noisier than those discussed. It is unacceptable and reckless to conclude the noise would be within EFSEC limits, if this group does not assess the actual towers and the generator facility to be used. Please update your report for the maximum anticipated noise levels, cumulative effects of multiple towers coupled with power generation/transfer and their impact to the surrounding community. [LTR 60, CMT 6]*

Response: Technical specifications (vendor data) about candidate wind turbine systems, including noise data, have been compiled and application-specific data have been used in new noise modeling runs. Table 3.7-7 lists and compares overall reference sound power level (Lw, dBA) for a variety of different manufacturers and models, with power capacity being a primary differentiator. The overall sound level of the sample "industry-leading" manufacturer model used by the Applicant for noise prediction analysis purposes for the DEIS was within the range shown by this small set of samples. The Applicant has therefore exercised appropriate conservatism in its selection of a representative wind turbine as the input noise source for its Cadna/A model. Note: Reference values are taken proximate to wind turbine generators at a distance of 50 feet (15 meters) from the tower base in order to account for nacelle (gearbox, generator, yaw drive, etc.) noise. Since the Applicant has not yet issued requests for proposals (RFPs) to wind turbine manufacturers, the sound level of the actual wind turbine model to be installed has not yet been determined. However, as shown in Table 3.7-7, the average range of sound levels is within about 3 to 4 dBA of the typical value of 106 dBA, with noisier models tending to be larger in power capacity, as would be expected. Thus, the actual model ultimately selected could reasonably be expected to be in this range.

Comment: *We have examined previously submitted and forthcoming testimony from Keith Brown PhD regarding public health implications of this proposal. Based upon his solid review of pertinent research, we conclude the EIS cannot assure that health of residents living in the Whistling Ridge vicinity would not be adversely affected by turbine noise. Can the developers of the EIS draft provide such assurance? If not, noise concerns should alone exclude approval of this project. And human health concerns from expected turbine noise should be added to the draft's growing list of "Adverse Effects that Cannot be Avoided." [LTR 79, CMT 11]*

Response: The following conclusions from "Wind Turbine Sound and Health Effects – An Expert Panel Review" (Colby et al, 2009) substantiate the assertion that the health of residents living in the Whistling Ridge vicinity would not be adversely affected by turbine noise. Sound from wind turbines does not pose a risk of hearing loss or any other adverse health effect in humans. Sub-audible, low frequency sound and infrasound from wind turbines do not present a risk to human health. Some people may be annoyed at the presence of sound from wind turbines. Annoyance is not a pathological entity. A major cause of concern about wind turbine sound is its fluctuating nature. Some may find this sound annoying, a reaction that depends primarily on personal characteristics as opposed to the intensity of the sound level.

Comment: *On June 30th 2010 Carl B. Phillips an epidemiologist and health policy researcher with a PHD from Harvard testified at wind siting hearings held at the Wisconsin Public Service Commission in Madison Wisconsin. He stated that there was ample evidence of a problem of some magnitude with siting the Industrial wind turbines near homes. He had studied the subject in depth and submitted a 5 minute verbal testimony and handed in a lengthy written testimony. Dr. Nina Pierpont has done extensive work with persons who live with "wind turbine syndrome" and has written a book called "Wind Turbine Syndrome" A Natural Experiment. I am a nurse and a massage therapist. I am also a sound healer and work with sound. [LTR 98, CMT 2]*

Response: Please see response to Comment LTR 60, CMT 5 above.

Comment: *I am aware of the positive and negative effects of sound. Sound vibrations can harm. Sound vibrations destroyed the Tacoma Narrows Bridge. Low frequency sound vibrations were used as torture in WW2. [LTR 98, CMT 3]*

Response: Comment acknowledged. Please note the referenced Tacoma Narrows Bridge opened to traffic on July 1, 1940. Its main span collapsed four months later on November 7 due to a phenomenon known as aeroelastic flutter caused by 42 mph (67 kph) winds, not sound vibrations. In many undergraduate physics and engineering courses, the event is presented as an example of elementary forced resonance with the wind providing an external periodic frequency that matched the natural structural frequency of the span, about 1 cycle every 4 seconds (0.25 Hz), which is virtually inaudible (see also see response to Comment LTR 139, CMT 5 below).

Comment: *I have also heard that one cannot predict what will happen with the sound when turbines are placed on ridges. [LTR 98, CMT 6]*

Response: Comment acknowledged.

Comment: *Putting these turbines on mountain tops has not been studied thoroughly so we really don't know what the impact will be. Many people are affected by the vibration and sound of the turbines. [LTR 102, CMT 8]*

Response: Comment acknowledged.

Comment: *My husband and I live approximately 1 mile from the proposed site and are extremely fearful of the noise, vibration, [LTR 118, CMT 2]*

Response: Comment acknowledged.

Comment: *The dominant concern expressed by our Members has been fear that noise from the Project will be a constant nuisance whenever our windows are open, or when we are outside our homes. Although we are located two miles from the Project, we are concerned that this distance will not protect us due to our geography and wind patterns. The Project will be located at the head of the Little Buck Creek watershed. We are concerned that sound from the Project will echo off valley walls and have an amplified effect on us. In addition, the prevailing winds in the summer (when we are outside most) blow from the Project straight to our homes. So we are also concerned that the wind will carry more noise from the Project to us. SDS's application has a sound map suggesting that our area will receive 20+ dB of sound from the Project. It is not at all clear to us how this map was produced or whether it is reliable. Perhaps more important, based on reports we have read from residents located near active wind farms, specific decibel measurements might not be the best way to determine whether noise from wind turbines will have an adverse effect. Some of the strongest complaints about wind turbine noise are due to the low-frequency sounds - a constant "whumping" similar to the bass beat that can be heard (and felt) from certain car stereos even from a great distance, and even with the windows rolled up. We have heard that these low frequency sounds can sometimes have much greater impact at a distance than they do at the point of creation. We are therefore very worried about how such sounds might affect us. It is our understanding that few if any wind projects have been built in terrain with valleys and ridges like ours. So it seems there is very little track record for predicting how noise from the Project might affect us. We therefore request that the EIS make very extensive studies of how sound from the Project will affect us and other residents. In particular, we think tests should be conducted that reproduce, at the Project site, the noise from a project of this size as accurately as technologically possible. Measurements of the noise should be taken not only with instruments, but more importantly, with surveys of the subjective impressions of all affected residents. Unless such surveys are taken, we do not believe an accurate prediction can be made regarding noise effects of the Project. Lastly, in evaluating whether such noise effects (or any other effects to people) are considered "adverse", we request that EFSEC and BPA rely not on statutory definitions based on decibel levels. Rather, a conclusion that an effect will be "adverse" should be determined by whether the effect will unreasonably diminish the enjoyment of day-to-day life. [LTR 119, CMT 4]*

Response: The World Health Organization (WHO) "Guidelines for Community Noise" (WHO, 1999) indicates the following on "annoyance" in its Executive Summary: "The capacity of a noise to induce annoyance depends upon its physical characteristics, including the sound pressure level, spectral characteristics and variations of these properties with time. During daytime, few people are highly annoyed at LA_{eq} levels below 55 dB(A), and few are moderately annoyed at LA_{eq} levels below 50 dB(A). Sound levels during the evening and night should be 5-10 dB lower than during the day. Noise with low-frequency components requires lower guideline values. For intermittent noise, it is emphasized that it is necessary to take into account both the maximum sound pressure level and the number of noise events. Guidelines or noise abatement measures should also take into account residential outdoor activities." The above citation suggests a range of 50-55 dBA L_{eq} for daytime outdoors, or 45 dBA L_{eq} for outdoors at night. (In fact, 45 dBA is the level indicated for "outside bedrooms" in Table 1 of the Executive Summary.) Table 3.7-12 shows the results of a refined predictive noise analyses using the same Cadna/A modeling program as used for the DEIS, but applying or adding new parameters, as shown. Previously, the potential for a "worst case" of a receiver being subject to a "downwind" condition was discussed only qualitatively. Note that the predicted levels for the "worst case"

Scenario "D" for the two representative receiver locations to the southeast of the Project Area, R1 and R3, are almost 5 dBA higher than that of the original "wind neutral" analysis (i.e., no wind direction was favored or indicated in the model). However, under this same condition of wind approximately blowing from the West, which meteorological data cited in the DEIS suggests would be the most likely or prevalent to occur, the predicted noise at R2 would be about 9 dBA lower. Three additional Scenarios (A, B, C) show how the predicted aggregate operating wind turbine noise may vary at the three representative receiver locations based on changes in temperature, relative humidity, and whether all wind turbines are operating at the same time. Please note that the commenter may have misinterpreted the "20+ dB" noise isopleth (contour). The figure referred to in the comment shows only the predicted absolute project operational noise effect (i.e., wind turbines running), not the sum of operational noise plus ambient background, nor the ambient background itself. Thus, while operational noise at a particular location might be 20 dB, when this is logarithmically added to the ambient background for that location, the increase will depend on what the ambient level is. For example, if ambient background noise is 30 dB, adding 20 dB of project noise would not be perceivable (i.e., 30.4 dB combined effect), as shown: 10 log [10(20/10) + 10(30/10)] = 30.4 dB Put another way, a doubling of equivalent sound sources (e.g., 30 dB + 30dB) is a 3 dB increase, which is generally regarded as just perceivable to adults with normal hearing: 10 log [10(30/10) + 10(30/10)] = 33 dB Also, the inverse square law (1/r2) applies when the receiver distance from a sound source is doubled, i.e., doubling the distance lowers sound intensity by a factor of four, or 6 dB: 10 log [{ 10(30/10) } / 4] = 24 dB.

Comment: *The noise would be tolerable as the turbines are now more than 1 mile away from the nearest home. Eliminating the A1-A7 turbines would bring the Whistling Ridge project in line compliance with current scientific studies indicate the need for larger setbacks to avoid these issues. It is interesting to note the shear amount of documentation in the DEIS on noise, causing me to believe that this can be a problem and really needs to be addressed. [LTR 124, CMT 4]*

Response: Please see response to Comment LTR 119, CMT 4 above. Please note that all predicted noise levels remain below the 50 dBA nighttime threshold per Washington EFSEC guidelines; the maximum combined effect would be about 46 dBA.

Comment: *The study did not use the noise levels defined by the manufacturer of the proposed towers and the generating station, which are larger and noisier than those discussed. Eliminating the A1-A7 turbines puts the noise levels within EFSEC limits even when using the actual towers and the generator facility that will be used in the Whistling Ridge project are used for noise calculations. It also would make the noise within EFSEC limits when computing the maximum anticipated noise levels, cumulative effects of multiple towers coupled with power generation/transfer and their impact to the surrounding community. [LTR 124, CMT 5]*

Response: Please see response to Comments LTR 60, CMT 6 and LTR 119, CMT 4 above. Note that all predicted noise levels remain below the 50 dBA nighttime threshold per WEFSEC guidelines; the maximum combined effect would be about 46 dBA.

Comment: *The draft EIS offers no assurance that Whistling Ridge wind turbine siting will preserve a resident's right to enjoy the current peace and tranquility of his/her homesite. [LTR 139, CMT 3]*

Response: Comment acknowledged.

Comment: *Mr. Richard James, an acoustical engineer, provided credible testimony (source provided you in May 2009 material) that wind turbines generate a type of noise that is not adequately measured by the dBA scale used in the Washington state noise standards. The dBA scale is designed to detect noises audible to humans. Wind turbines generate low-frequency noise (20Hz or lower) that might cause the body to resonate even if it is not audible. Such effects are measurable on the C-weighted scale (dBC). Your draft EIS dismisses the C-rated scale as insignificant and we quote: "The turbine sound power level manufacturing ratings show C-weighted levels are within 2dB of A-weighted levels. Therefore, low-frequency noise is not anticipated to be an issue for this project" (page 3-130 draft EIS). If this is factual (which cannot be verified given that the data below 31.6 Hz was not provided in the draft EIS) it would only measure 2 decibels difference at the source (wind turbine). The problem with this rationale has been scientifically proven. The difference at the affected homesites would be substantial, as the lower-frequency vibrations (dBC) travel greater distances than the higher dBA frequencies, attenuating at approximately half the rate of the higher frequencies. Thus, when you reach the homesites, the dBC values will be roughly 20 dB higher than the dBA values (see page 7, Kamperman and James). Further, the lower-frequency noise easily penetrates home structure, while the higher frequencies are somewhat attenuated by home structure, thus inside the home the difference between the dBA and dBC scales will be even greater (see page 11-12, Kamperman and James). This is why it is necessary to use the C-weighted scale in addition to the A-weighted scale. [LTR 139, CMT 5]*

Response: Low-frequency noise is generally characterized as ranging between 20 and 200 Hz, while the term "infrasound" is used to describe sound having frequencies lower than 20 Hz. Table 3.7-13 shows differences in dBA and dBC predicted at the three representative receivers R1, R2, and R3 – not at the source, the wind turbines. The table in Attachment C shows dBC vs. dBA for the five scenarios. As can be seen, only one result, Scenario A at R2, results in greater than a 10 dB difference between dBA and dBC (i.e., 13 dBA). This is not significant since the sound levels are relatively low and nevertheless below Washington EFSEC thresholds, as shown in Table 3.7-12. It is important to note that the C-weighted level is calculated from the component values at nine octave-band center frequencies (31.5 through 8kHz), not just the lower frequencies, which is conservative since it yields upwardly-biased results. However, the wind turbine manufacturer's data used as input to the model did not extend below 31.5 Hz, therefore, the difference between levels at 125 Hz and 63 Hz were used to estimate levels below 31.5 Hz

by extrapolation (the octave band sound levels provided by the manufacturer are not "warranted" per se – only the overall dBA level is). In conclusion, the differences between dBC and dBA are significantly less than the 20 dB difference claimed by Kamperman and James. Per Leventhall (2006), Figure 3.7-2 illustrates the thresholds of human hearing at low frequencies. At 200 HZ, the threshold is about 16 dB for most persons, while at 20 Hz the threshold is about 80 dB, and at 5 Hz (infrasound) the threshold is on the order of 110 dB. While low frequencies and infrasound are audible, the sound power (pressure) needed to make them so increases exponentially as the frequency decreases. Thus, low frequencies at low power, such as those produced by distant wind turbines, are virtually inaudible, particularly if the sound level at any given frequency is more than 20 dB below threshold.

Comment: *Even your cited expert G. Leventhal questions current measurement techniques in "Low Frequency Noise. What we know, what we do not know and what we would like to know", Journal of Low Frequency Noise, Vibration and Active Control, Vol. 28, Number 2,2009: "Does the way in which we measure low frequency noise hide some of its disturbing characteristics?" (p. 98) "Unfortunately, conventional methods of dealing with environmental noise stressors are A-weighted, which means that the presence of disturbing low frequency noise may not be detected ... chronic psychophysiological damage may result from long-term exposure to an audible low-level low frequency noise, which is left uncontrolled, despite complaints." (p. 95) Earlier in the draft EIS, before dismissing the need to use the C-rated scale you state, "C-weighting is often used to assess potential annoyance due to low-frequency noise that may excite vibration in structures" (p. 3-115). This is exactly what happens! Quoting yet another of your cited experts G.P. van den Berg from Do wind turbines produce significant low frequency sound levels?, presentation at 11th International Meeting on Low Frequency Noise and Vibration and its Control, Maastricht, The Netherlands, 30 August to 1 September 2004: "Although infrasound levels from large turbines at frequencies below 20 Hz are too low to be audible, they may cause structural elements of buildings to vibrate ... Perceptible vibrations of windows may occur at frequencies from I to 10 Hz ... sound pressure levels above 60 dB at frequencies below 10 Hz occur close to a turbine as well as at 750 m distance and further." (p. 7) This has been validated by the research of S.S. lung, W. Cheung, C. Cheong and S. Shin, Experimental Identification of Acoustic Emission Characteristics of Large Wind Turbines with Emphasis on Infrasound and Low-Frequency Noise, Journal of the Korean Physical Society, Vol. 53, No.4, October 2008. "...we found that the low-frequency noise of the 1.5 MW ... wind turbines in the frequency range over 30 Hz would very likely lead to psychological complaints from ordinary adults and that the infrasound in the frequency range from 5 Hz to 8 Hz would very likely lead to complaints about rattling house fittings, such as doors and windows." [LTR 139, CMT 6]*

Response: The selected quotations from the cited Leventhall paper and the mention of C-weighting in the comment appear to imply that dBC might be a better indicator of noise impacts. If this is the comment intent, please see the response to Comment LTR 139, CMT 5 above.

Comment: *We strongly feel the 0.38-mile setback from the nearest residence is woefully insufficient. This is especially true in this area of canyons, bowls, and mountains, as the terrain*

will contain, reflect and transmit the sound from the wind turbines greater distances than in typically used flatter terrain. The simplistic sound modeling and the limited collected data used in this draft EIS result in an inaccurate depiction of likely impact. (Decibel levels exceeding predictions has been documented by M.A. Nissenbaum at Mars Hill, 2010 and G.B. van den Berg 2006 in his work at the Rhede Wind Farm). [LTR 139, CMT 7]

Response: The Applicant offers the following with respect to concerns about wind turbine noise and the nearby terrain. The modeled elevated hub heights tend to be distant from what might be sources of terrain feature reflection (e.g., a sheer, smooth cliffside). In other words, sound has to travel considerable distance before reflecting off of a qualifying surface, by which time it will have attenuated and thus have less influence on the aggregate sound at the given distant receiver. Furthermore, the wind turbines are not near the ground nor are they backed by a wall or some other nearby reflective surface. They are mounted high above these features, so that the turbine rotors can take full advantage of the wind resource at these upper elevations. Also, much in the same way a concert hall or interior performance space can be found to feature hard, irregular shapes and surfaces that diffuse incoming sound by reflecting it in many different directions, the irregular shapes and facets of rocks, boulders and cliffs would be expected to generally diffuse wind turbine generator noise, rather than concentrate or amplify it as the mention of mountainous "bowls" and "steep terrain" might suggest in this comment. Regarding treatment of terrain features, the prediction analysis in the DEIS and Application did include detailed "contour lines" to represent the actual Project Area and vicinity terrain features. Cadna/A handles this terrain presence in a manner as described from the software reference manual: "The topographical conditions or uneven terrain may cause shielding effects and affect ground attenuation in the propagation calculation. Furthermore, the absolute height of objects whose height has been given as a relative value is determined by taking into account the height of the terrain at the base of the object as resulting from contour lines and fault lines. For the calculation of shielding effects of elevated terrain, contour lines are treated like the top edges of barriers." The Applicant's documents have acknowledged that, under the right conditions, predicted aggregate wind turbine generator operation noise levels may exceed what is presented. Please see the response to Comment LTR 119, CMT 4 above, which shows quantification of variance from these predicted levels based on receiver position being "upwind" or "downwind" of the wind turbine layout in the presence of wind blowing at 12 m/s.

Comment: *Again, we request that potential noise (dBA) and low-frequency (dBC) impacts be thoroughly investigated through valid baseline measurements and cutting edge computer simulations that will accurately depict for this mountainous area the sound emissions produced in worst case conditions, such as recommended by Kamperman and James, 2008. This would include ambient sound monitoring on all residential properties within and up to 2 miles of the project property boundary. [LTR 139, CMT 8]*

Response: Please see the response to Comment LTR 139, CMT 5 above, which describes a comparison between dBC and dBA at representative receivers and low frequency thresholds, and the response to Comment LTR 119, CMT 4 also above, which describes the additive properties of sound. Ambient sound monitoring on all residential properties within and up to 2 miles of the Project property boundary is inconsistent with reasonable acoustical practice, which seeks to

measure noise at representative and/or nearest identified noise-sensitive receivers under practical considerations including – but not limited to – available budget, schedule, cooperative climate conditions, property access permission, and safety considerations.

Comment: *Prospathopoulos, J. M. and Voutsinas, S. G.'s work (Application of a ray theory model to the prediction of noise emissions from isolated wind turbines and wind parks ... in Wind Energy. Volume 10 Issue 2, Pages 103 - 119, published online: 6 Dec 2006, john Wiley & Sons, Ltd.) proves that the simple computer model employed in this draft EIS prediction is inadequate. "In cases of complex terrain ... simple projection models are no longer valid." The need for using more complex computational models than the ones employed for this draft EIS is well-documented by the U.S. Department of Energy Workshop Report: Research Needs for Wind Resource Characterization, Technical Report NREL/TP-600-43621 , June 2008 (Jointly sponsored by DOE Office of Science, Office of Biological and Environmental Research and DOE Office of Energy Efficiency and Renewable Energy, Wind & Hydropower Technologies Program). "Models routinely under-predict power performance likely due to; a misrepresentation of the vertical wind speed and turbulence profile, a lack of understanding of the impact of complex terrain on flow, fundamental errors in modeling of ray effects/wind turbine wakes and/or a combination of these effects" (page 38). "The utility in models ... that are based upon linear formation ... falls off rapidly when applied in relatively steep terrain or if the weather fluctuates much. Several non-linear formations have been developed... that allow for turbulence prediction in steeper terrain" (page 47). [LTR 139, CMT 9]*

Response: The Cadna/A noise model used for sound propagation prediction in the Application and DEIS, represents one of the leading tools among a class of popular, currently adopted, industry-vetted, commercially-available, and affordable software programs that are based on internationally-accepted algorithms and numerical techniques (e.g., ISO 9613-2). The Prospathopoulos work cited in the comment is an example the ongoing research and development of newer and/or more sophisticated noise prediction techniques by academia and industry. For an explanation of how the Cadna/A modeling program handles the effects of terrain on sound propagation, please see the response to Comment LTR 139, CMT 7 above.

Comment: *In studying your draft EIS, we determined it does not demonstrate that any additional sound measurements were even conducted. It appears the limited data originally gathered by the SDS consultant was the only information utilized. An Independent Qualified Acoustical Consultant (unbiased third party with no financial or other connection to SDS or related companies) should have performed (not just reviewed what was provided) all sound monitoring, simulations and projections. It appears that no actual sound monitoring was conducted at any of the three closest residences. It is not depicted in the draft EIS and we must necessarily assume it was not done. "Measurement Location 2" sound monitoring appears to have been measured almost 2 miles distant from the affected residence. "Measurement Location I" sound monitoring appears to have been measured approximately at 1/2 mile distant beyond both the planned and the current residence closest to the wind turbines. No dBC scale measurements were conducted at all. Applying Kamperman and James methodology to even the*

current SDS application noise data for receiver ID3 (the closest residential property), shows that the noise level would increase from 26 dBA (using Kamperman and James recommended L_{90}, rather than the L_{eq} depicted in draft EIS Table 3.7-4) to 42-plus dBA during nighttime operation (draft EIS Table 3.7-9) ... an increase in excess of 16 dBA. This considerably exceeds (by more than 3 times) the 5 dBA recommended by Kamperman and James, as well as the Government of South Australia EPA Protection Authority Environmental Noise Guidelines, in preventing health risks! Further, it exceeds the 10 decibel EPA guidelines and is thereby considered "serious and warranting close attention". A 10 dB increase almost always causes adverse community response (page 14 of the "How To" guide). This is a more accurate depiction of what people will be subjected to at 2 a.m. (when attempting to sleep) than what is presented in this draft EIS. The need for the draft EIS to more accurately represent nighttime ambient background noise level is further supported by the U.S. Department of Transportation "Transit Noise and Vibration Impact Assessment", May 2006 (Chapter 5: General Noise Assessment, pages 5-14 & 15) ... "In areas away from major roadways, noise from local streets or in neighborhoods is estimated using a relationship determined during a research program by the U.S. EPA.(2) EPA determined that ambient noise can be related to population density in locations away from transportation corridors, such as airports, major roads and railroad tracks, according to the following relation: Ldn =22+ 10log(p) (in dBA) where P = population density in people per square mile." In the USDOT document Table 5-7, Estimating Existing Noise Exposure for General Assessment, it shows that the estimated L_{eq} for nighttime is 25 decibels for a population density of 1-100 per square mile. The closest homesites certainly fall within this category. Given that the draft EIS did not include measurements at the closest residences, a figure of 25 dB as estimated by EPA must be used, rather than the convoluted and inaccurate estimate of 34-35 dB depicted in the draft EIS (Table 3.7-9, page 3-128). The draft EIS computer prediction model (Cadna/A) depicts on Table 3-7.7 that wind turbines were treated as "point" source with no information provided to suggest that the computer simulation treats each array as a "line" source - even though they are arrayed in a line. "Point" sources attenuate (drop) at a rate of 6 dB per doubling of distance. "Line" sources attenuate (drop) at a rate of 3 dB per doubling of distance. There is ample scientifically proven evidence both from: NASA studies (Prediction of the Far Field Noise from Wind Energy Farms. Shepherd, K. P. and Hubbard, H.H 1986, NASA-CR-177956) "At intermediate distances the array acts like a line source for which the theoretical decay rate is 3 dB per doubling of distance or 10 dB per decade. Only at the extreme distances, greater than one row length or 900 m, does the decay rate approach the single source value of 6 dB per doubling of distance or 20 dB per decade"; (page 4) and van den Berg's 2006 thesis (The sound of high winds: the effect of atmospheric stability on wind turbine sound and microphone noise. Rijksuniversiteit Groningen), cited in your draft EIS, that demonstrates wind turbines arrayed in a line, as they are projected to be at the Whistling Ridge site, may operate as a "line" source. This phenomenon is a well-documented fact by the US Department of Transportation (May 2006 - Transit Noise and Vibration Impact Assessment) that individual cars traveling on a highway can be treated as a "point" source, while multiple cars traveling in a line have to be treated as a "line" source. The same is true of railcar transportation. (That is why sound barriers are erected on heavily traveled highways - to protect nearby residents.) [LTR 139, CMT 10]

Response: Please see the response to Comment LTR 139, CMT 5 above, which describes a comparison between dBC and dBA at representative receivers. Ambient sound monitoring was conducted at locations considered, at the time of the field study, representative of western and

southeastern areas of the Project vicinity populated with noise-sensitive receivers, as explained in the response to Comment LTR 139, CMT 8 above. Additionally, please see response to Comment LTR 119, CMT 4 above.

Comment: *The draft EIS leads people to believe that the sound from the line of wind turbines will drop at a rate of 6 dB. "As a general rule, at distances greater than 50 feet from a noise generator such as a wind turbine, SPL drops at a rate of 6dB with each doubling of distance." (Page 3-114). This, in our opinion, is inaccurate for wind turbines arrayed in a line on a ridge in mountainous, bowled and irregular terrain. We feel the negative sound impact to be experienced by this community's residents is grossly underestimated. The only way to mitigate this impact is to set the wind turbines back further from the closest non-participating properties. The "How To" Guide referenced above clearly articulates how to go about setting such standards. Simple reliance on the Washington State Environmental Noise Levels, Chapter 173-60 WAC (enacted 35 years ago, before large industrial wind turbines were even developed), is not enough. The acoustical experts' "How To" Guide approach is to locate a wind turbine so as to not increase preconstruction/operation background sound levels by more than 5 dBA along the property lines of the receiving non-participating property. And, such that it would not exceed a total of 35 dBA within 100 feet of any occupied structure. (Page 15) Additionally, we refer you to the low-frequency sound limits also depicted on page 15. NOTE: In previously provided expert testimony, Mr. James recommended a minimum distance of 1.2 miles between turbines and residences. [LTR 139, CMT 11]*

Response: Consistent with typical industry-accepted practice, wind turbines are modeled as point sources in the Cadna/A modeling program, as they are individual sources of continuous noise and treated as such. While a "string" of turbines near a receiver will expose that receiver to multiple wind turbine generators and thus the likely additive effect of 3 dB per doubling of identical source quantity (please see response to Comment LTR 119, CMT 4 above), this is not the same as a "line" source that Cadna/A and other programs use to model rail and highway segments involving many mobile and intermittent sources of noise constrained to the geometry of a distinct line, segment or pathway. In the absence of statutory noise limits, such as regulations and ordinances, for a project vicinity or jurisdiction, it is the expectation of the acoustical expert would draw from practical experience, refer to appropriate standards, and use professional judgment or opinion to develop appropriate acoustical guidance criteria that may be used to assess noise impacts. The cited "How to" siting guide by Kamperman and James is one example of such offered guidance. However, for this project vicinity, there are existing State and County regulations regarding acceptable noise levels, and they are clearly defined as absolute criteria, by law. Were relative criteria such as the +5 dB over pre-project ambient offered by Kamperman and James the law of the land – which it is not – complications for determining impact assessment arise due to the nature of ambient environmental noise: it is subject to variance from a number of factors including seasonal presence of noisy wildlife (frogs, insects, migratory birds, etc.), climate (temperature, humidity), ground wind speed, levels of outdoor human activities (within a community or at an individual property), surface traffic, aviation over-flights, seasonal HVAC usage (air conditioners during the summer months) and precipitation (rainfall on roofs, road surfaces, etc.). The results of environmental impact analyses, noise or

otherwise, can only be legally evaluated against enacted statutes and promulgated regulations, not recommendations published in academic papers.

Comment: *If industrial wind turbines are as "quiet" as represented, setting enhanced noise standards or requiring the meeting of standards used just across the river in Oregon should provide no difficulty for developers to meet. You now have an opportunity to make a strong statement illustrating BPA's and EFSEC's commitment to safeguarding the health of Washington's residents. We formerly provided as part of our May 6, 2009 testimony, documentation of potential health risks from sound: "Deputation (by Dr. Robert McMurtry M.D., F.R.C.S (C). F.A.C.S) to the Standing Committee on General Government Regarding Bill C-160 April 22, 2009 www.wind-watch.org/documents/wp_content/uploads/mcmutry-deputation-to-standing-committee.pdf);); a news release (March 4, 2009 www.windaction.org/documents/20306) from the Medical Staff of Northern Maine Medical Center regarding "Health Concerns and the Need for Careful Siting of Wind Turbines"; "Wind Turbine Syndrome A Report on a Natural Experiment" published by K-Selected Books; and work of New York physician Nina Pierpont M.D., Ph.D. at www.windturbinesyndrome.com . In late February 2009 the Office of Energy Security (OES), [the equivalent to Washington's EFSEC], requested that the Minnesota Department of Health (MDH) evaluate the possible health effects associated with low frequency vibrations and sound arising from large wind energy conversion systems to assist them in guiding decision-malting for future wind energy projects. MDH produced a 26-page white paper "Public Health Impacts of Wind Turbines" on May 22, 2009 (attached). [LTR 139, CMT 12]*

Response: Please see response to Comment LTR 139, CMT 11 above.

Comment: *The following quotes are a summary (of the 26-page white paper) with excerpts of salient points especially applicable to the draft EIS. We feel you must give serious consideration and take appropriate action in adequately addressing the environmental and health issues of the proposed Whistling Ridge Energy Project. NOTE: Underlining that follows is our emphasis. Health Issues "Noise originates from mechanical equipment inside the nacelles of the turbines (gears, generators, etc.) and from interaction of turbine blades with wind. ... The most problematic wind turbine noise is a broadband "whooshing" sound produced by interaction of turbine blades with the wind." (Page 6) "The NRC (National Research Council of the National Academies) also notes that effects of low frequency (infrasound) vibration (less than 20 Hz) ... have been asserted to disturb some people." (Page 6) [LTR 139, CMT 13]*

Response: Please see response to Comments LTR 119, CMT 4 and LTR 139, CMT 5 above. Note that all predicted noise levels remain below the 50 dBA nighttime threshold per Washington EFSEC guidelines; the maximum combined effect would be about 46 dBA.

Comment: *Sound: ".. low frequencies are not effectively attenuated by walls and windows of most homes or vehicles. (For example, one can typically hear the bass, low frequency music from a neighboring car at a stoplight, but not the higher frequencies.)" (Page 9) "Rhythmic, low frequency pulsing of higher frequency noise (like the sound of an amplified heart beat) is one type of sound that can be caused by wind turbine blades under some conditions." (Page 9) "The World Health Organization (WHO, 1999) suggests that A-weighting noise that has a large low frequency component is not reliable assessment of loudness." (Page 11) [LTR 139, CMT 14]*

Response: Please see response to Comments LTR 119, CMT 4 and LTR 139, CMT 5 above. Note that all predicted noise levels remain below the 50 dBA nighttime threshold per Washington EFSEC guidelines; the maximum combined effect would be about 46 dBA.

Comment: *Noise from Wind Turbines: "Aerodynamic noise from a wind turbine may be underestimated during planning. One source of error is that most meteorological wind speed measurements noted in wind farm literature are taken at 10 meters above the ground. Wind speed above this elevation, in the area of the wind turbine rotor, is then calculated using established modeling relationships. In one study ... it was determined that the wind speeds at the hub at night were up to 2.6 times higher than modeled. Subsequently, it was found that noise levels were 15 dB higher than anticipated." (Pages 11-12) "Rhythmic modulation of noise, especially low frequency noise, has been found to be more annoying than steady noise." (Page 12) "Horizontal layers with different wind speeds or directions can form in the atmosphere ...called shear. If the winds at the top and bottom of the blade rotation are different, blade noise will vary between the top and bottom of blade rotation, causing modulation of aerodynamic noise. (Page 12) "...additional noise, or thumping, may occur as each blade passes through the transition between different wind speed (or wind direction) areas." (Page 13) "...in the nighttime the atmosphere can stabilize (vertically), and layers form. Consequently, blade noise would be greater at night." (Page 14) "A number of reports ... suggest that aerodynamic modulation is typically underestimated ... that detailed modeling of wind, terrain, land use and structures may be used to predict whether modulation of aerodynamic noise will be a problem at a proposed wind turbine site." (Page 14) "...noise from a wind turbine farm may be greater than noise from the nearest turbine due to synchrony between noise from more than one turbine..." (Page 14) [LTR 139, CMT 15]*

Response: The Applicant's documents have acknowledged that, under the right conditions, predicted aggregate wind turbine generator operation noise levels may exceed what is presented for the same reasons that are mentioned in the cited Herbrandson and Messing paper. Please see response to Comments LTR 119, CMT 4 and LTR 139, CMT 7 above, which show quantification of variance from these predicted levels based on receiver position being "upwind" or "downwind" of the wind turbine layout in the presence of 12 m/s wind and terrain effects, respectively.

Comment: *Impacts of Wind Turbine Noise: "Some people are more sensitive to low frequency noise. The difference, in dB, between soft (acceptable) and loud (annoying) noise is*

much less at low frequency ..." (Page 16) "Two studies in Sweden ... showed ... when noise measurements were greater than 40 dB(A), about 50% of the people surveyed (22 of 46 people) reported annoyance. When noise measurements were between 36 and 40 dB(A) about 24% reported annoyance (67 of 276 people). Noise annoyance was more likely in areas that were rated as quiet and in areas where turbines were visible. In one of the studies, 64% respondents who reported noise annoyance also reported sleep disturbance: 16% of respondents reported sleep disturbance without annoyance." (Page 17) " ... reports have catalogued complaints of annoyance and some more severe health impacts ... The most common complaint is decreased quality of life, followed by sleep loss and headache. Complaints seem to be either from individuals with homes quite close to turbines, or individuals who live in areas subject to aerodynamic modulation and, possibly, enhanced sound propagation which can occur in hilly or mountainous terrain." (Page 18) [LTR 139, CMT 16]

Response: Please see response to Comments LTR 60, CMT 5 and LTR 139, CMT 5 above.

Comment: *Noise Assessment and Regulation: "...lower noise levels (dB(A)) from wind turbines engenders annoyance similar to much higher levels of noise exposure from aircraft, road traffic and railroads." (Page 20) "The World Health Organization (WHO) recommends that if dB(C) is greater than 10 dB more than dB(A), the low frequency components of the noise may be important and should be evaluated separately. In addition, WHO says "[i]t should be noted that a large proportion of low-frequency components in noise may increase considerably the adverse effects on health." (Page 20) "... sound tends to propagate as if by spherical dispersion. This creates amplitude decay at a rate of about -6 dB per doubling of distance. However, low frequency noise from a wind turbine has been shown to follow more of a cylindrical decay at long distances, about -3 dB per doubling of distance in the downwind direction ..." (Page 23) "As one moves away from the noise source, loudness at higher frequencies decreases more rapidly (and extinguishes faster) than at lower frequencies. Measurement of A-weighted decibels ... obscures this finding." (Page 23) [LTR 139, CMT 17]*

Response: Please refer to the first paragraph of response to Comment LTR 139, CMT 11 above.

Comment: *"Wind turbines generate a broad spectrum of low-intensity noise. At typical setback distances higher frequencies are attenuated. In addition, walls and windows of homes attenuate high frequencies, but their effect on low frequencies is limited. Low frequency noise is primarily a problem that may affect some people in their homes, especially at night." (Page 25) [LTR 139, CMT 18]*

Response: Please see response to Comments LTR 119, CMT 4 and LTR 139, CMT 5 above.

Comment: *"The most common complaint in various studies of wind turbine effects on people is annoyance or an impact on quality of life. Sleeplessness and headache are the most common health complaints and are highly correlated (but not perfectly correlated) with annoyance complaints. Complaints are more likely when turbines are visible or when shadow flicker occurs. Most available evidence suggests that reported health effects are related to audible low frequency noise. Complaints appear to rise with increasing outside noise levels above 35 dB(A)." (Page 25) "The Minnesota nighttime standard of 50 dB(A) not to be exceeded more than 50% of the time in a given hour, appears to underweight penetration of low frequency noise into dwellings." (Page 25) NOTE: Washington State noise standards, which rely on dB(A), do not adequately take into account the low frequency noise generated by wind turbines. [LTR 139, CMT 19]*

Response: Please see response to Comment LTR 79, CMT 11 above, and the second and third paragraphs of response to Comment LTR 139, CMT 11 also above.

Comment: *"For some projects, wind velocity for a wind turbine project is measured at 10 m and then modeled to the height of the rotor. These models may under predict wind speed that will be encountered when the turbine is erected. Higher wind speed will result in noise exceeding model predictions." (Page 25) "...if a turbine is subject to aerodynamic modulation because of shear caused by terrain (mountains, trees, buildings) or different wind conditions through the rotor plane, turbine noise may be heard at greater distances." (Page 25) NOTE: the mountainous terrain and bowl topography of the Whistling Ridge Energy Project area will likely amplify the low frequency noise, more acutely impacting nearby residents than is suggested by the project's dB(A) modeling projections. [LTR 139, CMT 20]*

Response: Please see response to Comment LTR 139, CMT 7 above. Also, the individual L_w input for each wind turbine in the model is based on data reported by the manufacturer according to the IEC-61400-11 standard. Above a wind speed of about 8 m/s, the source L_w does not increase further because the rotor speed is limited. Wind speed at the hub may indeed be higher than that at 10 m, but above certain wind speeds the wind turbine is already at its power extraction peak and may even be shut off for safety or equipment life reasons.

Comment: *We feel this white paper is particularly relevant as it was produced by two Ph.D. Toxicologists for a public health state agency as requested by that state's agency equivalent to Washington's EFSEC. It depicts how low frequency noise generated by wind turbine farms may indeed, be more pronounced at night, exacerbating sleep problems and related health issues. It points out that the current methodology of most meteorological wind speed measurements and modeled projections can significantly underestimate the actual noise levels experienced. In our opinion, this paper and its findings, reinforces the need for quality independent sound measurement and modeling, as well as the wisdom of using the Kamperman and James "How To" Guide to Siting Wind Turbines to Prevent Health Risks from Sound. [LTR 139, CMT 21]*

Response: Please see response to Comment LTR 79, CMT 11 above regarding health effects. Please also see response to Comment LTR 317, CMT 15 below regarding concerns about the Kamperman & James "siting guidelines."

Comment: *We specifically request: New sound impact determinations/predictions be conducted (not simply review the current estimates) by an Independent Qualified Acoustical Consultant, preferably by Kamperman and James. [LTR 139, CMT 26]*

Response: Please see response to Comments LTR 119, CMT 4 and LTR 139, CMT 5 above, for additional modeling results.

Comment: *[We also request t]hat a proven complex, 3-dimensional computerized sound propagation model, using both dBA and dBC scales and based on the most current and best available science, be used to more accurately predict sound impacts in this mountainous terrain in an effort to protect people's sleep, health and quality of life. [LTR 139, CMT 27]*

Response: Please see response to Comments LTR 119, CMT 4 and LTR 139, CMT 5 above, for additional modeling results. The Cadna/A modeling program is an example of a 3-dimensional sound propagation analysis tool, like SoundPLAN and others offered in the marketplace for this application. These programs also represent the most current and best industry-vetted software available for this application, as described in the response to Comment LTR 139, CMT 9 above.

Comment: *The DEIS failed to evaluate the potential health effects of wind turbines on local residents. There is ample evidence that low-frequency noises, shadow flicker, and nighttime lighting associated with wind turbines can be injurious to the physical and mental health of people living in the vicinity of turbines. ("Summary of Recent Research on Adverse Health Effects of Wind Turbines," Compiled by Keith Stelling, October 20, 2009.) While many or even most people might not find noises, lights or flickers annoying or even noticeable, they can be severe-and in some cases life-changing-for a minority of the population. Regardless of whether these impacts affect everyone, they can affect some people, and must be evaluated in that light. [LTR 161, CMT 12]*

Response: Please see response to Comment LTR 79, CMT 11 above regarding health effects. Additionally, please also refer to Section 3.6, Public Health and Safety.

Comment: *Three blade wind turbine generators are not simple windmills since large variations in wind velocities subject the longest propeller blades ever made to constantly changing stresses and strains. Wind velocities may vary over time for periods of days, hours,*

minutes, and even seconds (micro wind bursts). These winds create a host of aerodynamic conditions such as laminar flow, turbulence, vortices, and variable angle of attack on the blades, flexing of the blades, tower wind-wake, and ground boundary layer effects. For 100 meter rotor diameter and revolution times of 1 per second, the rotor tips have the velocity of 700 mph, which exceed the local velocity of sound and as such produce audible shock waves. It is obvious that the servo mechanism must rapidly furl the blades to save the system from destruction. A practical operating regime of 3 seconds per revolution produces rotor tip velocities of 230 mph and noise levels of around 50 decibels. A wind turbine with an efficacy of 0.33 and a lifetime of 20 to 30 years may rotate 95 to 142 million times. These millions of propeller rotations produce flexings and stresses in the three blades which can lead to dislocations and stress fractures in the blades. Three-dimensional mathematical modeling of the aerodynamics and stresses associated with revolving turbine blades require the use of large parallel processing computers to solve the tensor Navier Stokes equations and the tensor stress strain equations covering the surface and volume of the turbine blades, rotor, and tower. The computer results are compared to the scaled-up data resulting from aerodynamic wind tunnel tests of smaller versions of the wind turbine which leads to more efficient designs. [LTR 170, CMT 5]

Response: Comment acknowledged. Please note that engineering analysis of wind turbine mechanics and aerodynamics is beyond the scope of this EIS for such devices.

Comment: *[In reference to DEIS] Section 3.7.1.3, Affected Environment: The Applicant intends to harvest trees in the vicinity of the project site prior to construction. This section should discuss whether the harvest of trees will affect the validity of the preconstruction sound study with a specific focus on the residential sites identified in the first paragraph of Section. [LTR 177, CMT 50]*

Response: Noise from tree harvesting is considered part of construction noise associated with the Project. These effects were assessed with spreadsheet-based noise calculations in the DEIS. The Project would use conventional construction techniques and equipment, including excavators, bulldozers, heavy trucks (e.g., water truck, dump truck), and similar heavy construction equipment. Specialized construction equipment for logging, foundation building and other tasks using special equipment (e.g., heavy duty cranes) may be needed. Since trees would be harvested mainly to clear wind turbine sites along the ridgeline, not the lower slopes of the ridge, no substantial difference in operational sound propagation below the ridgeline would be expected due to removal of trees only at the top of the ridge. Please see response to Comments LTR 119, CMT 4 and LTR 139, CMT 5 above for modeling results.

Comment: *[In reference to DEIS Section] 3.7.1.3, 3.7.2, Impacts, [t]his section should discuss on-site alternatives regarding the placement of wind turbine towers and potential noise impacts. [LTR 177, CMT 51]*

Response: The concerns over turbine corridor A1-A7 are noted. As discussed in the EIS, however, the Project has been proposed as an "integrated whole", meaning essentially as a single

power plant, not as a dissectible project where some turbines may be eliminated. An alternative that would eliminate turbine corridor A1-A7 therefore was considered and eliminated from further study. Nonetheless, in determining whether to issue a site certificate and enter a site certificate agreement for a proposed generation project, it is within authority of the State of Washington to condition approval of the proposed Project, consistent with RCW 80.50 and other applicable state statutes. In the draft certification agreement, EFSEC is empowered to include "conditions to protect state or local governmental or community interests affected by the construction or operation of the energy facility." See RCW 80.50.100. These conditions essentially serve to mitigate potential environmental or social impacts of the proposed Project. Accordingly, certain conditions, such as limiting the location of proposed turbine corridors, could be considered as a condition for project approval (i.e., as a form of mitigation related to the Project's potential impacts).

Comment: *[In reference to] Section 3.7.2.2, [regarding] Low Frequency Sound: This is an phenomenon that is still being studied, and as such needs to be treated with caution and concern, relating to the impacts to nearby residents. There is ample material to garner sufficient doubt to the claims made in the DEIS. Time to comment is not sufficient, so SOSA must incorporate by reference the comments by Keith Brown and Teresa Robbins. Reference - Exhibit 2E "Tuning and Sensitivity of the human vestibular system to low-frequency vibration," Todd, Rosengren, Colebatch: Neuroscience Letters 444 (2008) pgs 36-41. Remedy - Impose a C-Scale (dBC) requirement for noise emissions from EFSEC permitted projects, in addition to the proposed 35 max total dBA nighttime, and 45 max. total dBA daytime levels mentioned above. [LTR 178, CMT 68]*

Response: Please see response to Comment LTR 139, CMT 5 above.

Comment: *Many people are affected by the vibration and sound of the turbines. Again to put them so close to people and towns seems short sighted at best. [LTR 225, CMT 4]*

Response: Comment acknowledged.

Comment: *I am a summer resident of White Salmon, near Northwestern Lake. I have visited wind farm sites to the East, in the Gorge, and have listened to the sound levels at various distances. I have also visited the farms at night and noted the impact of the flashing lights.. [LTR 237, CMT 1]*

Response: Comment acknowledged.

Comment: *My observations lead me to believe that noise levels at distances of a mile or more will most likely not be noticeable. [LTR 237, CMT 2]*

Response: Comment acknowledged.

Comment: *Opponents, fearful of the turbine "noise" probably don't even notice the "rumble" of the trains at the bottom of Underwood Mountain. As with many daily sounds, it is something to which we can become accustom. [LTR 243, CMT 2]*

Response: Comment acknowledged.

Comment: *Proponents dismiss wind power noise, but we know that people do not like the noise. They may seem quiet to a casual listener passing by, but it is different if you live within the sound of the machines and must listen to them every day and every night. Sometimes they are noisier than other times, sometimes they can be very noisy, and as they age they can become extremely noisy. [I]ndustrial noise is significant in rural areas because people are used to hearing natural noises. When Industrial noise is introduced the human ear goes right to it and experiences it as an annoyance. When industrial noise is heard in the country, where it is mostly unexpected, it is experienced as a 100% Increase in noise. This fact is not reflected in noise studies that tend to dismiss wind power noise as insignificant, and also to dismiss the Impacts. It may be of interest to you that nearby Klickitat County had to raise the noise level allowed in rural areas twice before wind power was determined to be within allowed limits. To us, this suggests that noise is a genuine issue. [LTR 256, CMT 15]*

Response: As mentioned in the response to Comment LTR 119, CMT 4 above, the World Health Organization (WHO) "Guidelines for Community Noise" (WHO, 1999) indicates the following on "annoyance" in its Executive Summary: The capacity of a noise to induce annoyance depends upon its physical characteristics, including the sound pressure level, spectral characteristics and variations of these properties with time. During daytime, few people are highly annoyed at LA_{eq} levels below 55 dB(A), and few are moderately annoyed at LA_{eq} levels below 50 dB(A). Sound levels during the evening and night should be 5–10 dB lower than during the day. Noise with low-frequency components requires lower guideline values. For intermittent noise, it is emphasized that it is necessary to take into account both the maximum sound pressure level and the number of noise events. Guidelines or noise abatement measures should also take into account residential outdoor activities. The above suggests a range of 50-55 dBA L_{eq} for daytime outdoors, or 45 dBA L_{eq} for outdoors at night. (In fact, 45 dBA is the level indicated for "outside bedrooms" in Table 1 of the Executive Summary.) The levels of 55 dBA L_{eq} for daytime and 45 dBA L_{eq} for nighttime are only 5 dBA different from the WEFSEC regulated limits, and on this basis would suggest that the latter is arguably a reasonable noise impact assessment indicator with respect to minimizing potential annoyance as perceived by project neighbors.

Comment: *We appreciate that EFSEC and BPA recognized that more time was warranted in relation to public comment on the Whistling Ridge DEIS. We purposely limited our attention to the noise element portion of the DEIS and have continued to thoroughly review and research available information. Extensive and thorough perusal has deepened our concern and substantially confirmed the original deficiencies and suggestions we identified in our written and verbal testimonies dated June 16th and July 15th of 2010. We stand strongly by our original analysis. The DEIS is a poorly constructed house of smoke and mirrors ... 'don't look there, just over here', thus sadly misleading the public. It appears that rather than 'sleight of hand' it's 'sleight of facts'. We offer the following DEIS statements as some specific examples of additional deficiencies which are amply contradicted by current research. "Low frequency sound typically ranges from 100 Hz to 20 Hz ..." (DEIS p. 3-119) Multiple sources indicate the upper range of low frequency noise is 200 Hz: Leventhall (2004) Waye (2004) Kamperman and James (2008) Jung et al (2008) Thorne (2009) And even the DEIS cited British Wind Energy Association (2006) "These wind turbines are not a source of substantial low frequency noise." (DEIS p.3-115) "... low frequency noise is not anticipated to be an issue for this project." (DEIS p. 3-130) "... modern turbine designs have been modified to reduce or eliminate low frequency sound." (DEIS p. 3-131) These statements are thoroughly contradicted by the following current research, journal articles and expert opinion, demonstrating that there is significant low frequency noise emission by the upwind turbines slated for this project: Jung et al (2008) Thorne (2009 & 2010) Punch et al (2010) Kamperman and James (2008) James (2010) And even the DEIS cited van de berg (2006) "Research studies of low-frequency noise emissions from wind turbines have determined that low frequency noise is a function of the wind itself... low frequency modulation of audible sound does not imply the presence of actual low frequency sound or infrasound ..." (DEIS p. 3-130) The interaction of the blade with the wind creates low frequency noise. "... the BPF (blade passing frequency) noise of modern large wind turbines belongs to infrasound and low-frequency noise." "" ... the low-frequency noise of ... wind turbines in the frequency range over 30 Hz is found to be audible (or capable of being felt) by the average person and would probably lead to psychological complaints from ordinary adults." -Jung et al (2008) "The extremely low-frequency nature of wind-turbine noise, in combination with the fluctuating blade sounds, also means that the noise is not easily masked by other environmental sounds." -Punch et al (2010) "The blade passage frequency of this "swoosh" is only a temporal modulation of sound and should not be confused with low frequency sounds." (DEIS p. 3-130) "Sound generated by wind turbines has particular characteristics and it creates a different type of nuisance compared to usual urban, industrial, or commercial noise. The interaction of the blades with air turbulences around the towers creates low frequency and infrasound components, which modulate the broadband noise and create fluctuations of sound level." - Soysai and Soysai (2007) this "only temporal modulation of sound" (infra-sound, low-frequency, and higher frequencies) is the factor that makes wind turbine noise far more disruptive and intrusive than smooth noise. -Thorne (2009) Leventhall (2006) (your cited expert) states "A time varying sound is more annoying than a steady sound of the same average level" and should be "accounted for by reducing the permitted level of wind turbine noise." "... environmental noise effects are typically limited to subjective impacts (e.g., annoyance, nuisance, dissatisfaction) and activity interference (i.e., impacts to sleep, speech, and learning.). Despite attempts by prominent acousticians to quantify the association between measurable sounds levels and corresponding reactions of annoyance and dissatisfaction, there is no way to measure the subjective impacts of noise. Further, the aforementioned variability of individual human sensitivity and/or tolerance to noise defies creation of a common standard." (DEIS p. 3-115)*

"Scientific articles suggest that low frequency noise does not pose a health risk (Leventhall 2006). There may, however, be some correlation between an individual receptor's psychological sensitivity to the noise source (like or dislike for the noise source) and complaints regarding discomfort from that noise source. These are sometimes associated with complaints regarding sleep disturbance. Because sensitivity to noise can be influenced by such psychological factors and can subjectively be deemed significant by an affected individual, regardless of measurable frequency or amplitude level, it is difficult to quantify these impacts or to impose mitigation." (DElS p. 3-130) The cited article by Leventhall addresses primarily infrasound, noting the difference between infrasound and low frequency. It presents, however, no scientific evidence to prove that wind turbine low-frequency noise poses no health risk. Conversely ... " There is no medical doubt that audible noise such as emitted by modern upwind industrial wind turbines sited close to human residences causes significant adverse health effects ... This is settled medical science." "There are many peer-reviewed studies showing that infra and low frequency sound can cause adverse health effects, especially when dynamically modulated. Modern upwind industrial scale turbines of the types now being located in rural areas of North America require study. The extent to which infra and low frequency noise from wind turbines inside or outside homes causes direct adverse effects upon the human body remains an open question." - The Society for Wind Vigilance (2010) "There is ample scientific evidence to conclude that wind turbines cause serious health problems for some people living nearby." "The reported health effects, including insomnia, loss of concentration, anxiety, and general psychological distress are as real as physical ailments, and are part of accepted modern definitions of individual and public health." "The reports that claim that there is no evidence of health effects are based on a very simplistic understanding of epidemiology and self-serving definitions of what does not count as evidence. Though those reports probably seem convincing prima facie, they do not represent proper scientific reasoning and in some cases the conclusions of those reports do not even match their own analysis." -Phillips (2010) "In weighing the evidence, I find that, on the one hand there is a large number of reported cases of sleep disturbance and, in some cases, ill health, as a result of exposure to noise from wind turbines supported by a number of research reports that tend to confirm the validity of the anecdotal reports and provide a reasonable basis for the complaints. On the other, we have badly designed industry and government reports which seek to show that there is no problem. I find the latter unconvincing." (emphasis added) - Hanning (2009) Years of experience and the current research of Dr. Thorne (2010) compels his opinion that noise from wind turbine farms, if placed too close to a residence (within 2000 meters), does pose quantifiable risks for potential adverse health effects. "There is increasingly clear evidence that audible and low-frequency acoustic energy from these turbines is sufficiently intense to cause extreme annoyance and inability to sleep or disturbed sleep in individuals living near them." -Punch et al (2010). The DEIS statements that "there is no way to measure the subjective impacts of noise", and "it is difficult to quantify these impacts or to impose mitigation" lack credibility. The EPA standards were based upon measurements of the subjective impacts of noise. The European Union has invested considerable resources in investigating the impact of wind turbine noise. Current research by Pederson (2007) is devoted to determining subjective impact from various levels of wind turbine noise. The Thorne Ph.D. thesis 2009, Assessing Intrusive Noise and Low Amplitude Sound, specifically addresses this topic. While it may require effort to determine subjective impact and annoyance, to suggest that it is impossible to mitigate for this flies in the face of all the scientific work that has been and is currently being done to mitigate the impact of highway, rail, airline and now wind turbine noise. Need we state the obvious? To mitigate, increase the setback distances so that the most sensitive

individuals (typically young children and aging adults) are likely to be unaffected. To provide for the welfare, health and an adequate margin of safety for people, Horonjeff (2010) forwards a well-researched argument based upon current evidence of adverse impact in rural areas. Reduce allowable decibel levels in a rural environment by 15 dB from that allowed in urban and/or suburban areas. This would be considered as recommended practice in the current American National Standard (ANSI S12.0-2005/Part 4). Another approach he recommends to achieve an adequate margin of safety would be to establish set back distances of 1.5 to 2 miles. To determine necessary setbacks, the prediction models need to be based upon best available science and technology. The inadequacies of the prediction model used for the DEIS we identified in our earlier testimony are validated in Chapter 6 of Thorne's 2009 dissertation. It indicates that wind turbines need to be considered as a complex line source and further, that using the hub height in the prediction models (as done in the DEIS) can under predict by 7 decibels. He demonstrates that using broad lines for contours (rather than the fine line contours which are presented in the DEIS) presents a more complete picture of the probable impact. He also quantifies adjustments that must be made to account for other factors, such as 'in-phase beats', and fluctuations from two or more turbines (factors that significantly increase decibel levels experienced over and above the predicted levels). Such factors need to be built into the predictive calculations. These issues are also articulated in his Noise Impact Assessment Report Waubra Wind Farm. -Thorne 2010. A revised DEIS needs to be based on best available science ... not the same old template that obscures reality and significantly underestimates the adverse impact. Continuing to turn a blind eye to the growing and ample body of scientific and medical evidence would simply be unacceptable and potentially tragic. [LTR 261, CMT 1]

Response: Please see response to Comments LTR 139, CMT 5 and LTR 79, CMT 11 above.

Comment: *I am worried about the impact to human health due to turbine noise and light flicker. [LTR 270, CMT 6]*

Response: Comment acknowledged.

Comment: *Wind turbines are dangerous pieces of noisy machinery and they should not be put on top of ridges or on steep slopes. At least this is what I think. The lack of information on the environmental, cumulative impacts of wind turbines on lands and soils [LTR 281, CMT 21]*

Response: Comment acknowledged.

Comment: *I will see the turbines from our property, and most likely also hear them. And although I live up in the Little White Salmon River Canyon Valley I can hear the trains running along both sides of the Columbia River, I hear the barges as they go up and down [LTR 282, CMT 2]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.9.3.1, Proposed Action] [s]peaking of moving parts - these turbines are machines. Machines make noise. How much noise does each turbine make? [LTR 286, CMT 60]*

Response: Please see response to Comment LTR 60, CMT 6 above. The "machine" noise referred to by the commenter would be the noise from the gearbox, generator, yaw drive, cooling fans, and related systems inside the wind turbine nacelle. These sources of noise are not considered dominant when compared to the aerodynamic noises associated with the rotor blade turning in the oncoming wind, as they are elevated high above ground level. Section 3.7 of the EIS presents an evaluation of potential noise impacts.

Comment: *I fear that the beats from the turbines will have the "dripping faucet" effect. Sometimes, especially at night, our sensitivity to tiny sounds is enhanced [probable adaptive value: detection of predators creeping through the underbrush]... [LTR 315, CMT 14]*

Response: Please see response to Comments LTR 79, CMT 11, LTR 119, CMT 4, and LTR 139, CMT 5 above. Note that all predicted noise levels remain below the 50 dBA nighttime threshold per Washington EFSEC guidelines; the maximum combined effect would be about 46 dBA. Section 3.7 of the EIS presents an evaluation of potential noise effects.

Comment: *WEFSEC needs any more prompting to take sound pollution seriously, it should check out an article in the July 31, 2010 edition of the NY Times Online by William Yardley ("Turbines Too Loud for You? Here, Take $5000"). It describes the difficulty Oregon citizens near Ione, OR have had with wind-tower noise, aggravated by the absence of an effective enforcement mechanism for state noise laws. [LTR 315, CMT 15]*

Response: Comment acknowledged.

Comment: *New wind developments in Washington should be placed on hold until the nature of sound pollution is more fully understood and rules are established to protect the neighbors of wind farms. How should the WEFSEC react to this concern in a way which does not sink all wind-farm proposals? Start by avoiding sites close to communities and preference sites where there is no serious objection from the neighbors. [LTR 315, CMT 16]*

Response: Comment acknowledged.

Comment: *More technical evaluation of wind-turbine "beat" acoustics also is advisable, especially to determine for sure whether there is any reason for concern in the areas of Willard and Mill A with maximum population density, on the order of a mile distant from the wind farm. It also would be valuable to know how wind direction and velocity affect propagation of this kind of sound, as Willard and Mill A are upwind during the most common wind conditions. [LTR 315, CMT 17]*

Response: The DEIS mentioned the possibility of "beats" under the right conditions. Please see the response to Comment LTR 119, CMT 4 above, which shows refined Cadna/A model results that include prevalent wind direction.

Comment: *The noise portion of the Draft EIS should accurately predict and fully describe potential adverse impact of the probable and worst-case scenarios. This Draft EIS in our opinion fails to do this. This draft ignores the substantial work that has been done since 1996 in developing regulations and guidelines specific to appropriate and ecological siting of wind turbines. The EPA Region 10 Guidelines stat that an increase of 10 or more decibels over existing background noise will result in significant negative community reaction and would be considered serious warranting close attention. The DEIS proposes to allow 50 decibels. [LTR 317, CMT 14]*

Response: Please see response to Comment LTR 119, CMT 4 above, which shows refined Cadna/A model results that include prevalent wind direction; and, Comment LTR 256, CMT 15 above, which compares WHO guidelines with Washington EFSEC requirements. The response to Comment LTR 139, CMT 11 above also discusses regulatory topics. Regarding EPA guidelines, the commenter may be confusing advisable increases above background (effect) with combined levels (background + effect). Note that all predicted noise levels (background + effect) remain below the 50 dBA nighttime threshold per Washington EFSEC guidelines; the maximum combined effect would be about 46 dBA.

Comment: *We provided in May 2009 the extremely useful recent research and relevant Kamperman James, "How to site Wind Turbines to Prevent Health Risks from Sound" which appears to have been ignored in the preparation of this DEIS. [LTR 317, CMT 15]*

Response: The "Siting Guidelines" paper from Kamperman and James was not included due to concerns about its content and conclusions. For instance, Leventhall has recently prepared a technical critique (Leventhall, 25 August 2009) which concludes that "*Kamperman & James have: failed to show that there is a general problem from infrasound and low frequency noise from wind turbines, requiring control criteria; failed to show that a C-A difference of less than 20 dB would be an appropriate criterion limit at the low levels of wind turbine noise; failed to give any indication of what proportion of residents they believe to be adversely affected*." The noise analysis instead relies on work such as the recent paper (Colby et al, 2009) mentioned in the response to Comment LTR 79, CMT 11 above. Please also see the response to Comment LTR 139, CMT 11 above for an additional discussion of Kamperman and James.

Comment: *Wind turbines noise is annoying to 35% of people at 40 decibels. Zero percent report high annoyance to aircraft, road traffic and railway noise at the same level. Wind turbines are clearly in a different class of sound impact and require a different standard. [LTR 317, CMT 16]*

Response: Please see the response to Comment LTR 256, CMT 15 above. While this comment does not reference a citation, authors of statistical tools, such as Schultz and others, realize that attempts to quantify trends of "annoyance" or other human response or reaction are based solely on subjective data and should be used with appropriate caution.

Comment: *No additional measurements to the limited measurements taken during icy conditions originally provided by the SDS consultant. These were not even taken at the closest property lines or homes. Measurements need to be taken at the correct time and location for affected homes. [LTR 317, CMT 17]*

Response: Ambient measurements were conducted in winter, which, due to the absence of summertime seasonal noise sources (e.g., insects, birds, increased outdoor activity for recreation, etc.), was considered more likely to produce lower ambient noise levels and thus define a more conservative baseline condition. Measurements were made at representative locations for the two regions west and southeast of the Project Area that are populated with residential land uses.

Comment: *The DEIS analyzed wind speed measured at 10 m high, extensive research shows this will underestimate the wind speeds at the hub by a factor of as much as 2.6 and underestimate the wind turbine noise by as much as 15 decibels. [LTR 317, CMT 19]*

Response: Please see response to Comment LTR 139, CMT 20 above.

Comment: *The noise impacts is totally inadequate in the Draft EIS and needs to be redone. [LTR 317, CMT 20]*

Response: Please see response to Comment LTR 119, CMT 4 and LTR 139, CMT 5 above for a presentation of refined wind turbine noise prediction results.

Comment: *A study by Michael A. Nissembaum (medical dr.) states that there's absolutely no doubt that people living within 3,500 ft of a ridge line arrangement of turbines in a rural environment will suffer negative effects. [LTR 317, CMT 21]*

Response: Please see response to Comments LTR 79, CMT 11, LTR 119, CMT 4, and LTR 139, CMT 5 above. Note that all predicted noise levels remain below the 50 dBA nighttime

threshold per Washington EFSEC guidelines; the maximum combined effect would be about 46 dBA.

Comment: *Please read the entire 200-dissertation of Mr. Van den Berg [LTR 317, CMT 22]*

Response: Comment acknowledged.

Comment: *All the noise documentation in the Draft EIS causes me to believe that this can be a problem and really needs more than just an academic dissertation on the topic of sound. The most recent science should be considered in this study. [LTR 317, CMT 26]*

Response: Please see response to Comment LTR 79, CMT 11 above.

Comment: *The study did not use the noise level defined by the manufacturer of the proposed towers and the generating station which are larger and noisier than those discussed. It is unacceptable and reckless to conclude the noise would be within limits if you don't think the actual towers that are going to be used or the worst-case towers that are going to be used and the generation facility and all the cumulative effects of those things at once. Please add that to your study. [LTR 317, CMT 27]*

Response: Please see response to Comment LTR 60, CMT 6 above.

Comment: *I did not hear any sound coming from the turbines. [LTR 318, CMT 23]*

Response: Comment acknowledged.

G.3.8 LAND USE AND RECREATION

Comment: *As far as the space occupied by these turbines is concerned, they hardly take considerable space. What's more, due to their height, even the land below these turbines can be used for other purposes, such as farming. When we humans build a house or barn on a lot or acre are we not also denying the use of that small portion of land to anything but a house or*

barn? And God forbid anyone who tells you that you have no right to build a home or barn on your land! [LTR 1, CMT 2]

Response: Comment acknowledged.

Comment: *Although wind turbines can be very tall each takes up only a small plot of land. This means that the land below can still be used. This is especially the case in agricultural areas. [LTR 1, CMT 5]*

Response: Comment acknowledged.

Comment: *We all know that huge subsidies are paying for these developments. Why can't they be placed where the majority of tax payers are benefited and not impacted negatively? [LTR 22, CMT 7]*

Response: Comment acknowledged.

Comment: *I am writing to support the wind project at Whistling Ridge. This is an industrial forested area and has been subject to harvesting for decades and will continue in that capacity. It is not sensitive habitat and it will not become sensitive habitat--it is industrial timber lands. [LTR 31, CMT 1]*

Response: Comment acknowledged.

Comment: *The project is a compliment to the ongoing sustainable foresting operations. Furthermore, the useful life of turbines is expected to be 20 - 25 years. At which point a decommissioning and dismantling would effectively render their impact entirely unnoticeable. [LTR 40, CMT 6]*

Response: Comment acknowledged.

Comment: *I have read that agriculture and wind farming are actually quite compatible land uses… [LTR 43, CMT 2]*

Response: Comment acknowledged.

Comment: *This is a good project but quite simply, the wrong place. [LTR 59, CMT 2]*

Response: Comment acknowledged.

Comment: *This project is compatible with the forestry zone of the surrounding property and it is compatible with the neighboring lands that are zoned agriculture. [LTR 72, CMT 5]*

Response: Comment acknowledged.

Comment: *Wind power is important however every possible location is not the right location for windmills. Every windy ridge is not the right place for a wind farm. It is not necessary to put this wind power development in. There are too many people, livestock and wildlife in this area. [LTR 73, CMT 1]*

Response: Comment acknowledged.

Comment: *Eminent Domain: the right of the government to take property from a private owner for public use by virtue of the superior dominion of its sovereignty of all lands within its jurisdictions. Many times, over many years - the government has used the power of eminent domain to take property. Skamania County witnessed this in 1986 when Congress passed Public Law 99-663: The Columbia River Gorge National Scenic Area Act. This action, in and of itself was not a physical taking for which compensation was paid. It was a legislative action that caused, and continues to cause great economic hardships for individuals and communities within its boundaries. Twenty four years later - a different sort of eminent domain is trying to grasp hold, and take something from Skamania County. Again, it isn't a physical taking - but it is a taking that has the potential to exacerbate economic hardships and impede solid, community friendly developments like the Whistling Ridge Energy Project. This taking is done when special interest groups use financial resources to seed public hearings with naysayers, and in essence – drown out the voice of residents whose communities are most directly affected by the proposed project. [LTR 78, CMT 1]*

Response: Comment acknowledged.

Comment: *This wind power application involves several precedents: No large wind power installations are in or next to the Gorge Scenic Area, and none in the Pacific Northwest are located on forest lands. Impacts on wildlife and timber harvest in such locations are essentially little studied and unknown. Wind is a legitimate source of power production, but only if it does not conflict overly with other values. In this case, placing multiple wind turbines which would*

remove hundreds of acres of sustainable tree harvest on forest lands favored by many forms of wildlife immediately adjacent to the Gorge Scenic Area appears substantially unwise. [LTR 79, CMT 19]

Response: Comment acknowledged.

Comment: *Ownership. The Whistling Ridge Energy Project is located entirely on lands owned by two private entities. There are no other private or public parcels intermingled. This may seem like a small detail. However, different ownerships have different management philosophies and perhaps different levels of commitment to a project and can jeopardize the project as a whole. Having essentially a single landowner ensures the commitment to the project and helps guarantee the success. [LTR 155, CMT 2]*

Response: Comment acknowledged.

Comment: *In addition, the draft EIS found no significant impacts to plants and wildlife in the area. The lands in the project area are currently managed for intensive silviculture and have been harvested using heavy machinery multiple times. This area is neither natural nor a pristine environment. These are "working" lands and have been for a very long time. [LTR 155, CMT 4]*

Response: Comment acknowledged.

Comment: *Visual resources/site location. The proposed Whistling Ridge project is also important because it would set a precedent for siting wind projects on designated forest land in this state. This is important because many potential wind generating sites are located on Washington's forest lands. As the Whistling Ridge DEIS shows, wind energy and forest management are highly compatible. Wind energy becomes an additional renewable resource to be managed on forest lands. Washington's ailing forest industry needs to diversify whenever and wherever possible. The potential for wind farm siting on forest lands creates additional revenue diversification opportunities for large and small forest land owners alike and will help keep forest lands from being developed or used in other manners incompatible with forest management. With each recession, timber producers are at the mercy of the markets. This most recent downturn has been particularly hard on the industry, its workers and suppliers, and communities like White Salmon, Bingen, Stevenson and Carson. The proposed forest ridgeline site is low value for timber production. The proposed site provides great north/south topography for wind. The proposed site is also surrounded by mountains which significantly limits any visual impacts. Furthermore, the nearest existing residential structure to the proposed project is approximately 2500 feet, which is a greater setback distance than those structures located near the recently-approved Kittitas Valley Wind Power Project. [LTR 162, CMT 3]*

Response: Comment acknowledged.

Comment: *Surface Mines and Reclamation Issue: DNR permits and regulates surface mining reclamation on state and private lands. The proposal calls for at least 2.5 miles of new road construction as well as significant improvements and widening of the existing forestry roads to handle the oversized loads not associated with timber management. Since this work as proposed is being performed primarily to facilitate a wind power project, the DNR will not allow the use of aggregate from pits or quarries that do not have an active surface mine reclamation permit. Request: Please note that aggregate used to improve/construct roads, or for construction of Whistling Ridge project related foundations and infrastructure must come from a permitted surface mine, not from a forestry pit or quarry locations (exempt/unpermitted surface mine sites). [LTR 172, CMT 19]*

Response: This information has been included in the EIS and as part of the mitigation action plan that was produced with the FEIS.

Comment: *LAND USE REGULATION. This section of the DEIS includes discussion of applicable land use regulations. The only land use regulations discussed are the Skamania County's comprehensive plan and land use regulations. EFSEC has previously taken up the issue of land use consistency during proceedings held on May 6, 2009. Comments and briefs were filed by various parties during that time, including SOSA. Instead of making a decision on land use consistency at the time, EFSEC decided that this issue would be passed to the project adjudicative hearings. Accordingly, we find it inconsistent with the Council's responsibility to enter conclusions regarding land use consistency in the DEIS before it hears evidence in adjudicatory hearings. This is plainly prejudgment of a matter before the Council in violation of the appearance of fairness doctrine. As to the sections of the DEIS dealing with land use regulation, a determination made that the proposal is "consistent" with the Skamania County comprehensive plan and development regulations is erroneous. SOSA has provided comments on that subject in its letter to the Council dated May 6, 2009 which is attached hereto and incorporated by reference herein. In that letter SOSA provided detailed legal authority and factual background that demonstrated that the construction and operation of wind turbines at the location proposed by the applicant is clearly contrary to the 2007 Skamania County Comprehensive Plan. Since the zoning code of the county preceded the 2007 comprehensive plan, it cannot be considered to implement any of its terms. Fundamentally, Skamania County has never considered whether or not wind turbines are appropriate in any part of the County, much less within the conservancy designation in the comprehensive plan. As described in SOSA's May 6, 2009 letter, consideration of a draft ordinance that might have regulated the wind turbines was abruptly dropped, and never taken up again, by the Skamania County Commissioners after they learned they had to do an environmental impact statement before considering it. The apparent attempt of the DEIS to blame "local interest groups" for keeping the old zoning ordinance in effect is accordingly misplaced. The statement in the DEIS at page 3-145 that the "proposed updates are currently under appeal by local interest groups" is wrong. As noted in SOSA's May 6, 2009 letter attached hereto, Skamania County did not appeal the ruling against it by the Hearing Examiner and her decision is final. In summary, the proposal is not consistent with local planning and zoning regulations and the findings and conclusions regarding this ISSUE should be revised for the final EIS. [LTR 175, CMT 5]*

Response: The first sentence in the first full paragraph on page 3-152 of the DEIS under the subheading "Consistency with Applicable Land Use Regulations" has been deleted. The information presented in the remainder of the paragraph and in the text under the subheadings "Skamania County Comprehensive Land Use Plan" and "Skamania County Zoning Ordinances" is consistent with the position of the Skamania County Board of Commissioners as described in Resolution 2009-54. The phrase "...because the proposed updates are currently under appeal by local interest groups" has been deleted from the last sentence in the first paragraph under "Section 3.8.2.2 Skamania County Zoning Ordinance SCC Title 21" on page 3-145 of the DEIS.

Comment: *[In DEIS Section] 3.8.3.1, Proposed Action, Changes to Existing Land Use Patterns and Recreation, Project Operation, p. 3-151: In this section, the authors suggest that the project will not impact local agricultural tourism because wineries located in southeastern Washington are "thriving" despite the fact that there are four wind power facilities located between Walla Walla and Kennewick. This paragraph should be redacted. Correlation does not establish causation. Without more detailed analysis, the fact that wineries and wind power operations co-exist in Walla Walla County should not be used to predict the environmental impact of this project in Skamania County. [LTR 177, CMT 54]*

Response: The referenced text was intended to show that wind power and winery tourism can co-exist in the Columbia River area. As described in Section 3.8.3.1 of the EIS, the Project would not be expected to cause changes to existing land uses, land use activities, or development patterns.

Comment: *General Comment on DEIS - It appears that BPA may have initiated agreements with the landowner for specific parcels of land, which would be premature prior to the completion of an FEIS, perhaps even a ROD. Remedy - BPA must not enter into contractual agreements or commitments until the lawfully allowable time. [LTR 178, CMT 134]*

Response: BPA has not entered into any agreement concerning the purchase of land for the proposed BPA substation or any other facilities related to the proposed Project at this time. Nor has BPA begun any negotiations for such an agreement or undertaken necessary activities (such as parcel surveys or assessment of value) to actually purchase the property. As is typical in interconnection requests, BPA and the Applicant have discussed requirements for the proposed BPA substation in order to sufficiently develop a proposal for analysis in the transmission planning and environmental processes. The timing of any possible negotiations and agreement for a land purchase for the proposed substation is unknown at this time.

Comment: *In reference to Exhibit 2D, page 1 - The forested area inside the "red oval" above was not logged. Note that both sides have been clear cut in 2003-4 on this 70%+ slope. Ref FPA's 2702754 and 2702799. This location is on the west slope at the south end of the proposed project, in the middle of Turbine String A1- A7. The SEPA responsible official should*

investigate the nature of this area being restricted from logging, and what other information the DNR might have on this issue. [LTR 178, CMT 144]

Response: As described in Section 2.1.6, all of the parcels on which the Project is located are managed for a continual cycle of growth, harvest, and replanting. Timber harvests on the site have typically occurred approximately every 50 years; however, the harvest periods vary depending on the market and the demand for the type of timber. Additional harvests are planned and are subject to requirements of a Forest Practice Application.

Comment: *This is the only project for which multiple other agencies, including the United States Forest Service and the National Park Service, have recommended substantial modifications to the project. This is the only project proposed adjacent to a National Forest. This is the only project that would cause significant adverse impacts in two states (not just Washington). This is the only proposed project surrounded by recreational and cultural resources. And last but certainly not least, this is the only proposed project that would cause significant adverse impacts to a National Scenic Area. Because of these unique factors, the agencies must take a special, close look at the impacts. [LTR 179, CMT 4]*

Response: Comment acknowledged.

Comment: *The DEIS Prematurely and Erroneously Concludes That the Project Would Be Consistent With the Applicable Land Use Regulations. A. The Land Use Consistency Determination in the DEIS is Premature. The DEIS concludes that the proposed project would be consistent with the applicable land use regulations. DEIS 3-152. The DEIS further states that the project would be consistent with the Comprehensive Plan vision and the Conservancy designation in that it would conserve and manage existing natural forest and wind resources to maintain a sustained yield and utilization of both. Id. These and all other statements in the DEIS regarding consistency with applicable land use regulations are premature, because EFSEC has not yet concluded its land use consistency process nor issued a determination as to whether the proposed project is consistent and in conformance with the applicable land use plans and zoning ordinances through the process required by WAC 463-26-110 and RCW 80.50.090(2). The DEIS erroneously contains consistency determinations long before the issue of consistency will be adjudicated in the land use process before EFSEC. EFSEC has effectively prejudged the consistency results by including its premature conclusions in the DEIS. The DEIS should be revised to remove all conclusions as to land use consistency. [LTR 179, CMT 39]*

Response: The commenter is correct in stating that EFSEC has not concluded the Land Use Consistency Determination process. However, the information on Pages 3-152 to 3-154 of the DEIS is correct and accurately reports the position of the Skamania County Board of Commissioners, as described in Resolution 2009-54.

Comment: *Instead, the DEIS should state what the potentially applicable regulations are, and then state that EFSEC will reach a conclusion on consistency as part of its adjudicative process, and that the BPA will decide whether it concurs with that determination. At most, the DEIS could summarize the different arguments that have been made to date regarding the applicable regulations. But prejudging consistency long before the consistency process is complete is inappropriate and a violation of Friends' right to a fair and impartial adjudicative hearing. Contrary to the conclusions in the DEIS, the project is not consistent with applicable land use requirements. Friends will continue to address, via EFSEC's adjudicative process, the many reasons why the project is not consistent with the applicable land use requirements. [LTR 179, CMT 40]*

Response: Comment acknowledged.

Comment: *We also direct Council to our comments on the land use consistency issues which are attached hereto and incorporated herein by this reference. [Attached are comments from May 7, 2009 Land Use Consistency Hearing, see PDF page 11] [LTR 186, CMT 19]*

Response: The distribution of turbines on the site was designed to optimize the use of available wind resources. Eliminating the seven southernmost turbines (A-1 to A-7) would cause the Project to be economically infeasible, according to the Applicant.

Comment: *This site is driven by Greed and not quality of location for wind turbines. ...Bad for the future of wind farming and turbine acceptance. Please don't get me wrong, as I support wind farms and their development and was involved with a small wind turbine company in the late 70's and have witnessed the struggles that wind turbine development has faced. When I moved to the Gorge in 1984 there was a large Boeing proto type turbine in the Columbia hills, I visited often and spoke with the engineers. They were hopeful for this 120' span turbine but pointed out that the wind shear and turbulence was a huge factor in the placement of the turbine and it had to be taken down. This turbine was the prototype for all the turbines that are now being installed in the appropriate locations of the gently sweeping eastern basin of the Columbia River. Where topography and wind quality have created a rush of wind farms that are successful. A very positive point for the industry, Please do not make the a mistake of placing turbines in inappropriate locations as it will hurt the wind industry as well as disfigure a National treasure the Columbia River Gorge. [LTR 226, CMT 4]*

Response: Comment acknowledged.

Comment: *Would the fact that SDS has already claimed an economic need for the DNR site, and the fact that infrastructure like transmission lines and roads would be close by encourage SDS to bid once more for the public lands site? We believe they would. [LTR 256, CMT 12]*

Response: For the proposed action, the DEIS evaluated what had been proposed to the lead agencies by the Applicant, as required by SEPA and NEPA. What was proposed does not include development of any additional turbines on adjacent DNR land, nor does it include the interconnection of any additional power to the FCRTS. In addition, as discussed in Section 2.3.2 of the DEIS, DNR was not interested in allowing development of wind turbines on the adjacent DNR land, regardless of any previously expressed wishes by the Applicant. Given this situation, not only was wind development of DNR land not part of the proposed action, it was also not considered reasonably foreseeable for the purposes of the cumulative impact analysis in the EIS.

Comment: *[In reference to DEIS Section 3.4.1.1, Regional Environment; PDF pg. 49] If SDS is such a poor steward of their lands so that there is a mosaic of stand ages, few large, old growth conifers, and no late successional stands or old forest habitats, then I'm not quite sure why we would trust SDS to take care of and protect the 1000+ acres on the proposed wind farm site from further fragmentation and degradation! SDS's purported reason for proposing this wind farm is to help reduce the CO2 footprint of the Pacific NW. Then wouldn't it be better if they were growing more older and bigger trees which have been scientifically proven to store more CO2 then younger trees? Instead they have an area which has been under commercial forest production for the last century and average stand age has declined as a result of relatively short stand rotations and probably the practice of clear-cutting, a practice that should be prohibited in active forest management, has not helped the stands, either. [LTR 286, CMT 35]*

Response: Commercial timber harvest within the Project Area is subject to approval by the WDNR pursuant to the Forest Practices Act (Chapter 76.09 RCW) and the Forest Practices Rules (Title 222 WAC). The Forest Practices Rules establish standards for forest practices such as timber harvest, pre-commercial thinning, road construction, fertilization, and forest chemical application. The rules are designed to protect public resources such as water quality and fish habitat while maintaining a viable timber industry and are under constant review through the adaptive management program. (Source: *http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesRules/Pages/fp_rules.aspx*)

Comment: *[In reference to DEIS Section 3.4.2.1, Proposed Action; PDF pg.79] Skamania County has failed to update its Title 21A Critical Areas Ordinance, to date. They began the process in 2006 and have not managed to get an updated Critical Areas Ordinance done, and this is 2010. There are new, updated Best Available Science and Best Management Practices that are not in Skamania County's Title 21A. Skamania County has also not updated its Title 21 Zoning, having failed to ram through a version that would have industrialized Skamania County. The version supported by the Skamania County commission was soundly rejected after appeals to the Hearings Examiner, who issued a 37-page decision (see attachment) stating that the county could not implement the commissioners' zoning unless they did an Environmental Impact Statement. The county declined that is the reason they punted (and circumvented the public) Whistling Ridge a.k.a. Saddleback to EFSEC. [LTR 286, CMT 40]*

Response: Comment acknowledged.

Comment: *I think that rural areas are being discriminated against by being littered with Federally subsidized wind farms whose impermeable surfaces and hundreds of miles of environment-destroying, prairie crisis-crossing maintenance roads are highly destructive to the rural environment. Why aren't these wind farms located in urban areas, areas which they primarily serve with their energy production? [LTR 314, CMT 4]*

Response: Utility-scale wind turbine developments typically require large undeveloped land parcels with average wind speeds greater than 15.7 miles per hour (measured at 164 feet above sea level). (Source: *http://www.nrel.gov/gis/wind.html*) These conditions are less likely to be present in urban areas and more likely to exist in rural settings. The Applicant has selected the current site for its proposed Project based on many factors, including: The site has a proven, robust wind resource. The site is large enough to accommodate enough wind turbines to produce a minimum of 70 MW of electricity. The site is owned and controlled by the Applicant. The site has a long history of commercial logging and associated absence of native habitat, reducing or eliminating the need to clear additional forest land. The site is uniquely suited for its access to on-site high voltage transmission in proximity to urban power markets. And lastly, the site is in proximity to the mill site and business offices of the Applicant.

Comment: *I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. I was raised in Hood River and spent my youth enjoying the White Salmon, Carson, Cascade Locks and Stevenson area natural beauty. I have been traveling and hiking the Gorge all of my life. Other states have sacrificed priceless treasures for expediency. Notably Hetch Hetchy valley to provide water for San Francisco. While the percentage of power/water supplied by this source has been reduced over the years, it is almost impossible to undo the dam and the infrastructure because of the entrenched interests in the system. [LTR 19, CMT 4]*

Response: Comment acknowledged.

Comment: *As there is big game there will hunting still be allowed - my husband would like to know? [LTR 75, CMT 2]*

Response: Yes, with land-owner approval.

Comment: *We are writing to express our disappointment in the letter submitted by the National Park Service (NPS) to the Bonneville Power Administration (BPA) regarding the Whistling Ridge Energy Project. This letter mentions the project's proximity to the Lewis and Clark National Historic trail and the Oregon Pioneer National Historic Trail as well as it being adjacent to the Columbia River Gorge National Scenic Area as the basis for the Agency's objections. However, as you know, the National Trails System Act (NTSA) does not give*

authority to regulate or restrict private land that is not part of the designated trail. In fact the only mention of scenic protection in the Act is in Section 7 (k) authorizing private parties to donate scenic, recreational or conservation easements that enhance the trail and have the donation considered as a public gift for tax purposes. Although the letter was clearly outside any authority the NPS has under the NTSA, you went on to make specific demands, including "at minimum removing turbine corridor A1-A1 from farther project consideration." The letter also asserts that "the visual quality of the region is specifically protected by designation of the Columbia Gorge National Scenic Area (CRGNSA) in 1986." However, the National Scenic Act does not provide any authority to regulate activities outside the National Scenic Area, which the letter acknowledges itself is the case with this project. The relevant section of the Act states: Per Section 17. Savings provisions (Sec. 554o) (a)Nothing in sections 544 to 544p of this title shall… (10) establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas. [LTR 83, CMT 1]

Response: Comment acknowledged.

Comment: *In this letter, I provide comments on behalf of SOSA regarding the "Land Use and Recreation" chapter of the DEIS found at Section 3.8 at page 3-134 to 3-155. SOSA's comments will be divided between the recreation and land use sections. 1. RECREATION IMPACTS. The DEIS provides only a listing of recreational resources in the area with minimal discussion of the impacts that the wind turbine facilities will have on such areas. This discussion is inadequate. The DEIS should not only disclose the affected areas, but also the impacts on such areas. [LTR 175, CMT 2]*

Response: Section 3.8.3.1 of the DEIS included a description of potential temporary effects on recreation facilities during construction and potential long effects during operation. Potential effects on recreation during construction and operation are in most instances expected to be minor. The EIS acknowledges (DEIS page 3-151, fourth paragraph) that minor to moderate visual impacts could affect recreational users. These potential effects were discussed in Section 3.9, Visual Resources.

Comment: *3.8 LAND USE AND RECREATION 3.8.1.2 Recreation The Mark O. Hatfield Wilderness Area is within a 25 mile radius of the proposed project. Environmental impacts to this wilderness area should be identified and discussed in this section. [LTR 177, CMT 53]*

Response: The Mark O. Hatfield Wilderness Area has been added to Section 3.8.1.2, included in Table 3.8-1, and shown on Figure 3.8-3. Figure 3.8-3 has also been re-titled "Recreation Areas and Facilities within Twenty-Five Miles of the Project Area." The wilderness area was not considered eligible as a Key Recreation View Point due to the relative lack of

individuals present, the distance of potential viewers in the Wilderness to the Project, and the lack of public accessibility in the area.

Comment: *This is the only project proposed within three miles of the Lewis and Clark National Historic Trail, the Oregon Pioneer National Historic Trail, the Historic Columbia River Highway (designated as a National Historic District on the National Register of Historic Places, as well as a National Historic Landmark), and the Ice Age Floods National Geological Trail. [LTR 179, CMT 3]*

Response: Comment acknowledged.

Comment: *Additionally, the Gorge offers unique recreational opportunities with its many side-river canyons, ridge tops, and the Columbia River itself. Hiking, bicycling, river rafting, kayaking, skiing, boating, fishing, camping, kite boarding, windsurfing, bird watching, and wildflower viewing are all pursued actively by the public throughout the Gorge. The overall character of the surrounding region highly scenic, ranging from wilderness to rural areas with quaint towns and spectacular vistas, rather than industrial or commercial. In its November/December 2009 issue, National Geographic Traveler ranked the Columbia Gorge region #6 internationally, and second in the nation, among "iconic destinations." The Gorge was ranked higher than all of the county's national parks that were surveyed, and higher than Tuscany, Italy; the Serengeti Plains; and Mount Kilimanjaro. A primary reason given by National Geographic for the Gorge's high ranking was the Gorge's international reputation for "an incredible job of protecting the views." [LTR 179, CMT 7]*

Response: Comment acknowledged.

Comment: *Today the Gorge contains hundreds of miles of hiking and bike trails through locales as diverse as misty river canyons and arid grassland plateaus. The Gorge also contains dozens of lakes, parks, campgrounds, and other recreational areas. [LTR 179, CMT 9]*

Response: Comment acknowledged.

Comment: *The Columbia River segment, which includes the portions of the Trail that would be affected by the Whistling Ridge project, was designated for three types of trail development: a water trail, a land trail, and a motor route. The Columbia River, Interstate 84 and Washington State Route 14 are designated routes. The Management Plan notes that there was a "nearly continuous string of recreation sites along this segment." Lewis and Clark Trail Management Plan at 70. Individual sites within sight of the Whistling Ridge Energy Project include Viento State Park, which is directly across the Columbia River from where the Lewis and Clark*

Expedition camped on October 29, 1805 and April 13, 1806, and Starvation Creek State Park. L & C Management Plan at 74. [LTR 179, CMT 67]

Response: Comment acknowledged.

Comment: *As explained above, the Lewis and Clark National Scenic Trail includes the Columbia River, State Route 14, Interstate 84, Starvation Creek State Park, and Viento State Park. The DEIS fails to acknowledge these components of the National Historic Trail. The DEIS fails to acknowledge that Starvation Creek State Park and Viento State Park also provide river access for wind surfing, kite boarding, motor boating, canoeing and other water activities. The DEIS also fails to acknowledge that the City of Hood River is an international hub for windsurfing and that the project would be visible from multiple windsurfing locations. The DEIS also fails to recognize that the Little White Salmon River and the White Salmon River are internationally known in whitewater kayaking communities. [LTR 179, CMT 85]*

Response: The types of recreational activities mentioned by the commenter were described in Section 3.8.1.2 (page 3-139 of the DEIS). The level of detail on existing recreation activities provided in the DEIS is commensurate with the anticipated level of effects on those activities.

Comment: *The DEIS states that "[o]n the Oregon side of the Columbia River, land use within the Scenic Area is predominately commercial timber production and residential." DEIS at 3-265. This is one of the more absurd errors in the DEIS. The Forest Service owns thousands of acres of public land within the Scenic Area on the Oregon side of the Columbia that is managed to protect natural resources and provide recreation opportunities, not for timber production. The leading land uses on the Oregon side of the Gorge, excluding urban areas, are conservation and recreation. [LTR 179, CMT 85]*

Response: The description of existing land use mentioned in the comment was a description of existing land use located both within the Project Area and the boundary of the Scenic Area. It was not a description of existing land use within the entire Scenic Area.

Comment: *The DEIS states that "no parks or recreation facilities are planned within a 5-mile radius of the site, either as part of the Skamania County Parks and Recreation Master Plan or the Columbia River Gorge National Scenic Area Management Plan." DEIS at 3-139. This statement is patently wrong and ignores plans to restore and develop facilities at Mitchell Point as part of the Historic Columbia River Highway. While Mitchell Point is already owned by Oregon State Parks, the development proposals are certainly new and warrant acknowledgement. [LTR 179, CMT 85]*

Response: While additional detail on plans for recreational improvements could be added, the level of detail on existing recreation facilities provided in the EIS is commensurate with the anticipated level of effects on those facilities.

Comment: *The DEIS failed to give proper consideration to impacts to recreational resources, including a failure to analyze whether the project would be consistent with the Management Plan for the Lewis and Clark National Historic Trail and the Historic Columbia River Highway Master Plan, or the recreation resource provisions of the CRGNSA Management Plan. While these plans do not have direct regulatory authority over the project (assuming no ground disturbance would occur in the National Scenic Area), the goals and policies could be frustrated by the project. There needs to be at least a discussion of the potential impacts. [LTR 179, CMT 85]*

Response: Section 3.8.3.1 of the EIS discusses concerns regarding the compatibility of the proposed Project with the objectives and policies of the National Scenic Area Plan. Because the Project would be located on private property and the proposed wind turbines would be located outside the boundaries of areas that fall under the Management Plan for the Lewis and Clark National Historic Trail and the Historic Columbia River Highway Master Plan, further discussion of those plans in the FEIS is not warranted.

Comment: *Project construction activities would generate traffic delays that would adversely affect recreational users. Countless residents in the gorge hike, windsurf, or kayak every day of the week and use the roads that would be used as a haul route for this project to access these recreational spots. Industrial traffic and associated delays would have an adverse impact on these resources. For example, use of the east access for Cook-Underwood Road for this project would block access to a recreational trail along the White Salmon River. Similarly, the west access for Cook-Underwood Road is regularly used by whitewater kayakers to access the lower three miles of Little White Salmon River, which has achieved legendary status due to the challenging rapids and consistent water flows. By failing to fully acknowledge such impacts and prepare a traffic mitigation plan for public review, EFSEC and the BPA have foreclosed the opportunity to evaluate the project's true impacts and inform the public of these impacts. [LTR 179, CMT 85]*

Response: Potential temporary effects on traffic during the construction phase were acknowledged in Section 3.8.1.2 and were described further in Section 3.11. Please also see response to Comment LTR 179, CMT 87 under Transportation.

Comment: *Project operation would also affect recreation. The DEIS section that addresses direct impacts of project development fails to mention recreation resources. DEIS at 3-153. Similarly, the cumulative effects section of the DEIS does not identify a single impact to recreational resources. DEIS at 3-279–3-280. The DEIS does acknowledge low to moderate*

impacts to views, but fails to acknowledge that scenery is typically a central part of outdoor recreation. [LTR 179, CMT 85]

Response: DEIS Section 3.8.3.1 concluded that "Project operation would not result in a sufficient increase in population or traffic to impact local recreational facilities and that the only potential impact to recreation users would be the minor to moderate visual impacts discussed in DEIS Section 3.9 Visual Resources." In addition, DEIS Section 3.9.1.2 describes how the visual impact analysis considered recreational viewers such as hikers, water recreationists, and mountain bikers. Furthermore, DEIS Section 3.9.2.3 describes the criteria used to select Key Viewing Areas (KVAs) for the visual impact analysis, which included viewpoints that were "most representative of the different roads, population areas, and recreation areas where views of the wind turbines would occur." The lead agencies believe that the EIS has adequately considered the operational effects of proposed Project on recreation.

Comment: *As stated above, the scenic resource analysis was grossly inadequate. Recreation resources that were not acknowledged through the scenic resource assessment include Little Huckleberry Mountain, Nestor Peak, and Cook Hill. These hiking areas provide dramatic panoramic views of Mount Hood and Washington's southern Cascades. Impacts to these resources were completely ignored. The proposed development would be located in the heart of one of the greatest recreational destinations in the world. Windsurfers, kiteboarders, kayakers, and hikers come from around the world to this area, and the Gorge itself is recognized as a national recreational treasure. Beyond the international and national fame, the area surrounding the project is home to people who hike, boat, bird, view wildflowers, and explore mountains and forests as a primary recreational pursuit. The project would be located in the middle of many of these activities. The recreational impacts analysis warrants substantial revision to reflect the actual impacts to recreational resources. [LTR 179, CMT 85]*

Response: Issues related to Visual Resources are analyzed in Section 3.9 of the EIS, including visual impacts on recreation resources and trails.

Comment: *The other marketing push in Hood River? Recreation and scenery, of course. Just as the State of Washington has concluded in its studies, "high-quality, natural, and outdoor recreation resources" are our primary asset and must be leveraged. They must also be carefully guarded to assure our economic health and well being. [LTR 186, CMT 10]*

Response: Comment acknowledged.

Comment: *With the exception of federal lands, and lands acquired by the Federal Government for preservation of trails, the Federal Government has no authority to regulate or restrict the use of private lands near trails designated under the National Trail System Act, for any reason, especially for purported visual effects on trail segments. Moreover, as described in*

the Interior letter, the "trail" at issue here is coextensive with US Interstate 84 and Washington State Highway 14 which are not pristine "trail" segments - they are major, busy multi-modal transportation corridors, including the only sea level train route (on both sides of the Columbia River) through the Cascades, with over 80 commercial trains transiting per day. [LTR 197, CMT 2]

Response: Comment acknowledged.

Comment: *I have used this area for recreation and while losing this opportunity because of this project I still support the project. I do think this project is on the conservative side and should have been expanded. [LTR 224, CMT 2]*

Response: Comment acknowledged.

Comment: *It would cover more than 1,000 acres of land in an area that is prized as beautiful, wild recreation land, where people in Oregon and Washington go to get away from "civilization" and the city. [LTR 240, CMT 3]*

Response: Comment acknowledged.

G.3.9 VISUAL RESOURCES

Comment: *Many people find wind farms an interesting feature of the landscape. [LTR 1, CMT 6]*

Response: Comment acknowledged.

Comment: *Many people see large wind turbines as unsightly structures and not pleasant or interesting to look at and they disfigure the countryside and are generally ugly (In our current world some people see other people this way). If being Ugly becomes a deciding factor in this country then I will probably be out of a job real soon! [LTR 1, CMT 9]*

Response: Comment acknowledged.

Comment: *In addition, locating 426-foot-tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. [LTR 2, CMT 2]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 2, CMT 3]*

Response: Comment acknowledged.

Comment *[The proposed Project] would complement the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 3, CMT 2]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 4, CMT 4]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. This project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 5, CMT 3]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama*

Point. This project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 6, CMT 4]

Response: Comment acknowledged.

Comment: *We were hiking along the Deschutes River a couple weeks ago, and we could see the giant white wind turbines over on the Washington side of the Columbia. What an eyesore! It looks like "War of the Worlds". Wind energy is great, but why paint them glaring white? They should be a color that blends with the hills - a simple (partial) solution to the destruction of everyone's scenery, and it would not cost any more than painting them white. [LTR 7, CMT 1]*

Response: Although a brown turbine color would reduce visual contrast in views where the turbines are seen against the landscape or when the area is covered in snow, it would also accentuate visibility of the turbines where they would be seen against the sky. Section 3.9.4 describes mitigation measures that include the use of non-reflective flat neutral gray or light color since the turbines would most frequently be seen against the sky.

Comment: *I am writing to concerning the DEIS for the Whistling Ridge Energy Project. The proposed project would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. This proposal would degrade the scenic value of the Columbia Gorge National Scenic area by placing turbines and blinking lights in places that would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. [LTR 8, CMT 1]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 9, CMT 3]*

Response: Comment acknowledged.

Comment *…and this project will have minimal impact on views in the Gorge or on the surrounding environment. [LTR 10, CMT 3]*

Response: Comment acknowledged.

Comment: *I have a comment on the impact of the Whistling Ridge wind project; it includes photos and is online at http://www.lensjoy.com/Blog/windmills_are_coming.htm. I am the author of the online article. Nestor Peak is a key viewing area used by hikers, mountain bikers, ATV enthusiasts, and horseback riders. If this project is built, the view of Mt. Hood from this peak will be permanently spoiled. In addition, the onslaught of wind turbines will continue to encircle the Columbia Gorge and destroy once pristine views of the ridges and horizon that were one of the primary reasons the National Scenic Area was created. Please deny the project application. It is not suited for the proposed location. [COMMENT VIA WEBSITE:] The Windmills Are Coming. The Columbia Gorge faces many development threats. This one wasn't even on the radar screen ten years ago. But in the past few years as I hike and even drive the roads something is slowly creeping into my conscious perception, bit by bit. As I drive east starting near Hood River, in the far distance there's now a white jagged appearance to the horizon. At the top of the McCall Point trail on any clear day the wind turbines are visible. Eastward from there, on just about any high peak one can see a forest of white pinwheels is growing. [PICTURE] The shot above was taken from the top of Stacker Butte, also called Columbia Hills State Park. It is just a small piece of a much larger panorama. I am providing the full image so you can appreciate the impact. Remember that it is copyrighted, so any publication or non-educational use must be licensed by contacting me. The view is toward the east with the farms of the Klickitat River valley in the foreground. Once you open it, you will see thousands of turbines. My camera isn't good enough to show the most distant ones, but if you look closely they extend almost to the left (north) and right (south) edges of the view. They are getting closer to the edge of the Scenic Area boundary. In fact, a project called Whistling Ridge is in the approval process right now just north of Hood River on the Washington side of the Gorge, and it will be on the edge of the boundary and visible from Nestor Peak and Mitchell Point. It is a galling insult to the spirit of the Scenic Area Act to place a wind energy project a stone's throw from the regional boundary and call it compliant with the Act. [LTR 12, CMT 1]*

Response: Comment acknowledged.

Comment *…and it's obvious what they do to the view. [LTR 12, CMT 4]*

Response: Comment acknowledged.

Comment: *Soon it won't be possible to go on a hike to a viewpoint anywhere in the eastern end of the Gorge and see a pristine east horizon. Most of it is already gone. The view of the horizon was something I took for granted. Today I realized it's been taken from us and might never come back. [LTR 12, CMT 8]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 13, CMT 3]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 19, CMT 3]*

Response: Comment acknowledged.

Comment: *I finally saw a picture of what this development was going to look like throughout the central Columbia River Gorge area. I am shocked to think that we are going to spoil the wonderful vistas and view of the Columbia River Scenic area by more wind mills. Just look to the Eastern gorge... once out of the scenic area you are bombarded with literally thousands of wind mills. Why now, should we start placing these within view of the prime area in the Columbia River Gorge? Once these are built, they will forever be a backdrop to this pristine area. Why, are the turbines 400' tall? This is nearly double the size of other installations. Could more and smaller turbines be used that would not be so visible? These issues are not merely cost/benefit decisions - they will impact the natural beauty of the Columbia River Gorge Scenic area for lifetimes to come. The decision should not be made lightly and should be scrutinized from every perspective. Ask the developers WHY, five times. [LTR 22, CMT 1]*

Response: Please refer to Section 1.2.3 which describes the Project's purpose and need. Wind turbine heights and number are chosen based upon the proposed Project needs, current design standards, and site characteristics. For this Project, if shorter turbines were utilized, more of the turbines would be visible due to the increased number of turbines needed to meet the Project's purpose and need. The use of taller turbines permits would result in fewer turbines. The proposed Project would cause some visual impact to surrounding areas where turbines were visible, including some areas inside the CRGNSA and these impacts would largely be low to moderate (see Section 3.9.5; on DEIS page 3-196).

Comment: *Why are the turbines so tall? [LTR 22, CMT 4]*

Response: Please see response to Comment LTR 22, CMT 1 above.

Comment: *I support clean energy sources, but let's not unnecessarily sacrifice natural landscapes in the process. I've seen what this looks like. These windmills can be seen day and night, for miles around. That's the view from my grandmother's back porch in Haines Oregon now. Once dark night skies are now polluted by flashing red lights. So please, let's proceed with forethought. That said, I endorse this message from Friends of the Columbia Gorge. [LTR 23, CMT 1]*

Response: Comment acknowledged.

Comment: *The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 23, CMT 4]*

Response: Comment acknowledged.

Comment: *The 426 foot turbines will be seen in the center of the Columbia River Gorge National Scenic Area during the day and also at night because of the red blinking lights on the top of the turbines. SDS has understated the visual affect on their maps which are meant to appeal to the public for support. [LTR 30, CMT 2]*

Response: Comment acknowledged.

Comment: *Visual Impact – Not only will it be an eyesore for residents of this area, it will also negatively impact tourism. [LTR 33, CMT 2]*

Response: Comment acknowledged.

Comment: *The turbines and the handful of lights from this development would be visible from the deck of my home which faces due west but these lights are minimal compared to the lights from downtown Hood River and the Heights of Hood River that are also in my viewscape. [LTR 35, CMT 4]*

Response: Comment acknowledged.

Comment: *We have traveled the mountains of Italy, Spain, and California and found no ill effects of the view or the esoteric feeling of the mountains, [LTR 37, CMT 2]*

Response: Comment acknowledged.

Comment: *Locating the turbines on this ridge line where there are already existing electrical towers would cause no additional impact to the scenic value of the Gorge than the already existing utility works, and therefore no significant additional energy development into the forested landscape. [LTR 53, CMT 3]*

Response: Comment acknowledged.

Comment: *Please consider the scenic impact of the proposed turbines and that they would be highly visible from several viewing areas in the Columbia River Gorge. We own a Bed and Breakfast here in Hood River and our view would change from a lovely night time star light sky with low household lighting to hundreds of flashing pulsating lights day and night. One reason so many folks come here from all over the world is to enjoy the mountain, rivers and special views our area has to offer. The National Geographic continually recognizes Hood River and the Gorge as one of the most beautiful and special places to visit. Exert below, but wind turbines over 400 ft tall, blades 230 across and flashing lights 24/7 would completely be in direct contrast to the natural beauty that draws in 640,000 tourists a year to the Gorge. [Excerpts from National Geographic Traveler, see PDF] The local economy depends on the tourist dollar and many tourists come to enjoy the view. [LTR 55, CMT 1]*

Response: Comment acknowledged.

Comment: *It is directly across the Columbia River from where I reside and I feel it would seriously detract from the natural beauty of our Columbia River Gorge. This is not a suitable site for this project and represents a special interest not the greater good. [LTR 56, CMT 2]*

Response: Comment acknowledged.

Comment: *Typical Cloud line: Proposed Whistling Ridge turbine string will be in cloud/fog for part of the year. This is not covered in the EIS. For Hood River Whistling Ridge equals a major visual impact. [LTR 67, CMT 2]*

Response: In Section 3.9.1.3, the simulations prepared for the Whistling Ridge Project were prepared using photographs that exhibit some cloudy conditions.

Comment: *I was in Spain in 2008 and saw many windfarms - I found their movement enchanting and a thing of beauty. [LTR 69, CMT 1]*

Response: Comment acknowledged.

Comment: *This project is proposed at a right time in our local and national energy needs but placed in the wrong place. The space Needle is around 605 ft. tall; these turbines could all be 426 ft. high. There is no way this project could be defined as "visually subordinate." If I want to see the Space needle, which also has a red light on top, I will go to Seattle. I don't want to see 50 space needles from KVAS in the CRG. [LTR 74, CMT 9]*

Response: Comment acknowledged.

Comment: *Friend of the Gorge has way too much time on their hands. Windmills have impact on views – what about White Salmon and the large houses on cliff! [LTR 75, CMT 3]*

Response: Comment acknowledged.

Comment: *Avoidance of negative visual impacts is a primary objective of the Columbia Gorge Scenic Act, a fact that the draft purposely downplays. For example, no wind turbines are now visible from highways within the Scenic Area, but the draft indicates that they are. The draft achieves this misconception by making no distinction between views of turbines from the east end of the gorge outside of the Scenic Area and views from within the Scenic Area itself. Such intentional deception should be removed. [LTR 79, CMT 3]*

Response: Section 3.14 (and more specifically Section 3.14.3.10) discusses the cumulative visual effects of the Whistling Ridge Project when it is combined with other (built and as yet un-built) wind projects that are (or would be) either near or visible from the National Scenic Area (NSA). Windy Point is the most visible wind energy project from the NSA.

Comment: *Considering item 3 above, plus information now in the draft (including "Adverse Effects that Cannot be Avoided") and much public testimony about visual concerns, statements like one on page 3-154 are inappropriate and should be excised or restructured; that arbitrary statement claims that: "The project would have only minor to moderate impacts on visual quality as viewed from travel corridors inside the scenic area." [LTR 79, CMT 4]*

Response: This statement is a summary of the findings contained within Section 3.9.

Comment: *Subject: Wind farm siting and permitting officials can help lower the visual impact of wind farms by recommending the deployment of new AVWS technologies on wind turbines. While large wind farms generate clean energy, their constantly flashing red strobe lights cause great public annoyance and is usually not noticed until after the wind farm is sited and constructed. The wind farm's legacy can include this "light pollution" and have a tremendous negative impact on the community. For example, a 100-turbine wind farm can have approximately 30-50 turbines with two high-intensity flashing lights on at all times of the night. The effects of these flashing lights on the nearby community should be considered during the wind farm permitting and development process. Recently approved by the FAA, the new generation of "on-demand" lighting systems solves this problem by keeping all wind turbine obstruction lights OFF at all times - unless an aircraft is detected flying on an unsafe heading towards the wind farm. Only then does the turbine-based radar system turn the lights on for aircraft safety, and turn the lights off when the aircraft exits the airspace. [LTR 84, CMT 1]*

Response: Comment acknowledged.

Comment: *An Audio Visual Warning System (AVWS) is an on-demand lighting solution. Wind siting and permitting officials can request wind power developers to implement an AVWS into their wind farms to reduce these adverse visual impacts in your communities. An AVWS will benefit your community by: Lowering the overall environmental and visual impact of wind farms by reducing "light pollution" and increasing public acceptance in wind energy-producing communities. Reducing bird death rates in some areas since migratory birds are less likely to be attracted to wind farm lights and lured toward the operating turbines. Fostering more responsible siting practices and therefore overall positive and growth in the wind industry. [LTR 84, CMT 2]*

Response: Comment acknowledged.

Comment: *Naturally, we assume that if a facility was proposed for construction near the CGSA that our EFSC would likely receive numerous comments about the visual impacts. One of the tools we are hoping to test in the near future on some of our joint State/Federal projects is their visual impact model. I don't know much about it, but it is at least a starting point for determining when an impact is significant. Viewshed degradation is becoming a significant issue associated with both the commercial wind projects and the large transmission projects. [LTR 85, CMT 2]*

Response: Comment acknowledged.

Comment: *In addition, locating 426-foot-tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic*

Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 87, CMT 3]

Response: Comment acknowledged.

Comment: *Your clearcuts and proposed wind turbines will be visible throughout the Scenic Area for close to 20 miles. [LTR 91, CMT 4]*

Response: Comment acknowledged.

Comment: *The project will be very visible to Hood River residents who live at a higher elevation from Hwy 84. The area must remain pristine. Visual pollution is what Whistling Ridge will bring in the proposed location. [LTR 92, CMT 5]*

Response: Comment acknowledged.

Comment: *So you can see them. So what! I don't like green colored cars. Should I start a movement to prevent folks from having green cars who like them? Surely not! [LTR 100, CMT 4]*

Response: Comment acknowledged.

Comment: *I find this project disturbing enough, but won't it also set a precedent for even more and possibly even higher windmills? I fear we will have opened Pandora's Box if we allow this project to move forward. Are these super tall, stark white, three-winged towers the only or best technology? Do windmills have to be so terribly "in our faces?" Cell towers are sometimes disguised as trees. Can windmills be more of the "eggbeater" design, painted to disappear a bit more and possibly disguised? Once these windmills are built, they will stand for decades - in use or not. [LTR 117, CMT 2]*

Response: Mitigation measures to reduce the visibility are discussed in Section 3.9.4. Mitigation measures would include ensuring that non-reflective flat neutral gray or light color to minimize visual impacts. Another measure includes using lights/strobes on turbines that meet FAA standards which would to some extent be shielded from ground level view due to a constrained (3-5 degree) vertical beam. Please also see also response to Comment LTR 7, CMT 1 above.

Comment: *Lights. Another complaint we have read about wind turbines regards aviation lights. We request that the EIS investigate what types of light (color, synchronization, quantity, etc.) would have the least impact to people and wildlife. We also request that the EIS evaluate what, if any visual effects aviation lights will have on the night sky in our community (for example, will we see reflections of the lights in the sky on cloudy nights, or even on clear nights?) Likewise, we have read of complaints' about "shadow-flicker" from wind turbines. We request that the EIS evaluate whether late afternoon "shadow flicker" will affect our residences, or be visible on the ridges to the east of our community: [LTR 119, CMT 5]*

Response: Turbine night-lighting impacts were discussed in Section 3.9.2.3. The necessity for night simulations was also discussed in Section 3.9.1. Section 3.9.4, Mitigation Measures, discusses utilizing non-reflective flat neutral gray or light color to reduce visual impacts. The impacts from shadow flicker are discussed in Section 3.6.2.1 (DEIS page 3-104). The closest residence is approximately 2,000 feet from the nearest proposed turbine string.

Comment: *In addition, locating 426-foot tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. [LTR 121, CMT 5]*

Response: Comment acknowledged.

Comment: *I hope that all towers can be sited in a way that truly minimizes the visual impact on Gorge residents and visitors… [LTR 133, CMT 2]*

Response: Comment acknowledged.

Comment: *While the Whistling Ridge Wind Project proponents deserve credit for responding thoughtfully to some of the previous objections to their earlier proposals, the revised proposal remains of great concern. If allowed the proposed wind mills will still seriously impact the beauty of the Gorge Scenic Area. As presently proposed viewers from numerous locations including parts of the cities of White Salmon, Underwood, and Hood River, as well as the Columbia River itself will have their views of the Gorge defaced by 425 foot towers of steel, rotating blades and flashing strobe lights. [LTR 135, CMT 1]*

Response: Comment acknowledged.

Comment: *We see no evidence that the proposed mere "painting of the wind turbines a gray color" will adequately mitigate the profoundly detrimental effect on the truly unique and exceptional scenic and recreational resources wisely preserved and protected for the enjoyment of all through the Columbia Gorge National Scenic Area Act. "436" foot-tall wind turbines lining the scenic area would surely denigrate the scenic experience and we feel certain, was not remotely foreseen when determining the scenic area boundaries and thus, would undermine the intent of the Act. The draft EIS constructed visual representations of the turbines depicted against backgrounds of haze and clouds obscures the significant adverse impact that will be experienced by viewers. This draft EIS and its simulated pictorial representations shamefully understates the actual impact. [LTR 139, CMT 23]*

Response: Section 3.9.1.3 on preparation of visual simulations assumed the 2.5 MW Clipper Liberty model C93 with a height of 415 feet tall. Using this assumption, the EIS found that the Project would have moderate to low impacts from key viewing areas. In 16 USC Section 544O(a)(10), the National Scenic Act specifies that "no protective perimeters or buffer zones shall be established around the scenic area or each special management area." Additional discussion of the National Scenic Act appears in Section 3.9.2.3. As noted in Section 3.9.1.3, the visual simulations prepared likely overstate the visual impact by assuming a larger number of turbines. Atmospheric haze is discussed in Section 3.9.1.3. Simulated views that depict haze or clouds are representative of weather conditions in the Project Area.

Comment: *No significant impact on scenic views. [LTR 140, CMT 3]*

Response: Comment acknowledged.

Comment: *All of the HCRH is a Key Viewing Area within the Columbia River Gorge National Scenic Area (CRGNSA). Portions of the HCRH that are a trail are designated as a National Recreational Trail. Portions of the HCRH are closer to the proposed project than the sites chosen for visual resource analysis. The Mitchell Point overlook is more visually sensitive than Interstate 84, both because it is higher in elevation and because it is a place where people stop and get out of their cars to take photos. It is closer to the proposed project than Viento State Park, Koberg Beach State Park and the Hood River to Mosier section of the Historic Columbia River Highway State Trail that were analyzed. This site should be analyzed for visual impact from the proposed project. [LTR 141, CMT 2]*

Response: The criteria used for selecting viewpoints are discussed in Section 3.9.2.3 (DEIS page 3-164). Locations were chosen based upon their representation relative to the Project Area, those that were most accessible to the public, and locations with the largest number of viewers. Mitchell Point features a variety of trails that would probably have views of the Project Area, but was not chosen because it is not frequented by the largest number of viewers and the views are only accessible by trail thus minimizing access and the number of visitors.

Comment: *Residents do not even realize that if this project is built, most will never again be able to see anything but a full moon in the sky. In the last month there have been a plethora of lawsuits across the county initiated by residents dealing with the harmful effects from wind turbines located in their local areas. [LTR 142, CMT 2]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. The Columbia River Gorge is a National Treasure that people travel from around the world to see and experience. The draw is it's natural beauty; waterfalls, cliffs, rivers, mountain vistas. One can drive or hike countless areas in the gorge and be surrounded by exquisite beauty. However, these pristine views are in jeopardy of being lost forever if Wind Turbines are not kept from intruding onto these skylines. [LTR 151, CMT 1]*

Response: Comment acknowledged.

Comment: *Also, my husband and I do not believe their placement will hamper the beauty of the Columbia River Gorge. On a recent trip from Carson, WA to Pendleton, OR along 184, we actually stopped along the freeway to take pictures of the windmills there because we thought they were so awesome and beautiful! Thank you for allowing us the opportunity to comment. [LTR 160, CMT 3]*

Response: Comment acknowledged.

Comment: *Visual resources methodologies. In drawing the conclusions reached in the DEIS, three federal methodologies were used to evaluate visual impact assessment of the proposed project: (1) the Federal Highway Administration methodology (FHWA); (2) the U.S. Forest Service methodology (USFS); and (3) the Bureau of Land Management methodology (BLM). In addition, a "hybrid" methodology (FHW A and USFS), used in the Kittitas Valley Wind Power Project (KVWPP), was also used, totaling four visual impact assessment methodologies. Visual impacts are purely subjective in nature and vary greatly from person to person. AWB believes the four methodologies used in the DEIS are sound, comprehensive and sufficiently objective to measure potential visual impacts in reaching the DEIS conclusions - particularly when adding the fourth KVWPP standard, which is the most rigorous and comprehensive standard. Opponents of the KVWPP challenged the visual assessment before the Washington Supreme Court, with a unanimous court rejecting that challenge. For purposes of certainty, predictability and fairness, methodologies among various projects should be consistent. Proximity to (not inclusion in) a National Scenic Area should not impose a different standard. To do so would not only establish a buffer on the Scenic Area, but also would set a dangerous precedent of inconsistent visual standards and be very problematic for wind power*

development throughout the state. In addition, this wouldn't just set a bad precedent for future wind projects - a new, higher standard for proximity to a scenic area could exclude other, non-wind, development such as electrical transmission, residential, commercial or industrial development that is otherwise compliant and consistent with applicable land use laws and regulations, and essential to Washingto's economic viability and ongoing prosperity. [LTR 162, CMT 7]

Response: Comment acknowledged.

Comment: *U.S. DEPARTMENT OF THE INTERIOR COMMENTS. AWB recently received a copy of the U.S. Department of the Interior (Department) DEIS comment letter dated July 19, 2010. The Department raises concerns about visibility of the proposed project from the nationally designated Lewis and Clark National Historic Trail (NHT) and suggests elimination of several visible turbines from the site. AWB disagrees with this assertion. AWB is extremely concerned with the Department's comments on this application. The National Trail System Act, 16 USC §§ 1241-1251 (NTSA) does not, by mandate or implication, authorize the Department to regulate or restrict private lands or to even negatively comment on or oppose private projects proposed on private lands. In fact, the reference to this Act as authority for the comment letter is an abuse of federal authority and exceeds the policy directives of the NTSA. The Department's comments are particularly egregious here, where the comment would necessitate the conclusion that any land development or activity visible from any trail designated throughout the Western United States under the NTSA should be prohibited. Many thousands of miles of trails are designated throughout the Western United States under the NTSA. Here, the "trail" at issue is coextensive with U.S. Interstate 84 and Washington State Highway 14. These are not pristine "trail" segments - they are major, busy transportation corridors. It should be abundantly clear to the Department that man-made structures and activities are visible and will be seen along these highways where the most visible "impacts" on travelers are the many automobiles, semi-trucks, trains, transmission lines, and dams, as well as residences, commercial buildings and industrial facilities. Finally, consistent with the concerns raised above, elimination of visible turbines from view/proximity of the NHT would similarly be a direct violation of the CRGNSA "savings clause." The National Trails System does not have regulatory authority to affect such an outcome. Again, this would set a bad precedent and have negative implications for other non-wind related projects such as electrical transmissions systems, dams, and residential, commercial and industrial development. Thank you again for the opportunity to provide comments on this important matter! [LTR 162, CMT 10]*

Response: Comment acknowledged.

Comment: *Lewis and Clark National Historic Trail The proposed Whistling Ridge Energy project is located within five miles of the Lewis and Clark National Historic Trail (NHT), a congressionally-designated NHT, which follows the Columbia River and is within the area analyzed in the DEIS for potential visual impacts. In addition, US Interstate 84 and Washington Route 14 are the state designated Lewis and Clark auto tour routes in the project area. Many*

visitors experience Lewis and Clark NHT by traveling the auto tour routes and stopping at interpretive and recreational sites along the way. The Department considers the viewshed along the river and auto tour routes to be a critical part of the trail visitor experience. The Lewis and Clark NHT was established by Congress in an amendment to the National Trails System Act in 1978. 16 U.S.C. § 1244(a). As administrator of the trail, the National Park Service (NPS) is charged under this Act with the identification and protection of the historic route, remnants, and artifacts of the trail for public use and enjoyment. Based on the analysis of visual impacts in the DEIS, it appears that a varying number of turbines will be visible from the trail's historic river and auto tour routes from near Koberg Beach State Park to Lindsey Creek State Park. This approximately 15-mile stretch of the Columbia River Gorge has numerous recreational opportunities and scenic views that add significantly to enjoyment of the historic trail. Of the five viewpoints along US Interstate 84 analyzed in the DEIS, Viewpoint 14 at Viento State Park, is rated in Table 3.9-2 as having an anticipated moderate to high level of visual impact. However, on page 3-193 of the DEIS, the potential visual impact for this viewpoint is stated as only moderate. Furthermore, it appears that the turbines were inadvertently omitted in the photomontage in Figure 3.9-11. While difficult to discern the impact at this location without clarification on the accuracy of the visual simulation, we believe that the impact should be rated as high given the placement of turbines on the skyline within four miles of a park located along the auto tour route. Turbine string A1-A 7 would be highly visible from numerous locations along the trail due to its placement on a ridgeline close to the Columbia River Gorge. The NPS recommends removing or relocating these seven turbines, if feasible. This would significantly reduce the impact to visual resources along the historic trail. The visual resources in this region-Columbia River Gorge National Scenic Area and Lewis and Clark NHT-are important resources that should be protected. [LTR 164, CMT 2]

Response: This impact to Viewpoint 14 is considered moderate. The text on DEIS page 3-193 has been corrected in the Final EIS to say that that the impact would be moderate. Due to the minimal visibility of the turbines from this viewpoint, the turbines have limited visibility from Viewpoint 14 in Figure 3.9-11. The wireline drawing illustrates the relative visibility of the turbines against an elevational model devoid of vegetation. As noted in Table 3.9-2, the visual quality in the area of Viewpoint 14 is moderately high to high and the viewer sensitivity is moderate to high, therefore the conservative estimate for the level of impact would be moderate. A key factor in this impact assessment is the 6.43 km distance from the viewpoint to the Project, the number and sensitivity of the viewers, and the visibility of the Project from this viewpoint. Visual impacts to the Lewis and Clark National Historic Trail are discussed in response to Comment LTR 179, CMT 68 below.

Comment: *THE WHISTLING RIDGE ENERGY PROJECT. The Whistling Ridge Energy Project is the right kind of renewable energy at the right time, but at the wrong location. Why is this the wrong location? Figure 3.8-2 of the Draft Environmental Impact Statement (DEIS) indicates that the Underwood and Mill A residents are much closer to the visible wind farm than any others, including the residents of Bingen, White Salmon, and Hood River. The tips of the wind turbine blades of the southern most wind towers will rotate within a few feet of the boundary of the Columbia River Gorge National Scenic Area. The wind towers will be highly visible from Underwood and Mill A, and other locations up and down the gorge. We believe this*

is a visible insult to the unique beauty of the scenic area and the Lewis and Clark trail. How long will it be before developers start building wind turbine sites in juxtaposition to Mt. Rainier, Crater Lake, Yellowstone, Grand Canyon, etc., national parks? A specification for The Whistling Ridge Energy Project enumerated in the DEIS clearly indicates that construction of the project will be a major industrial development in and juxtaposition to the Scenic Area. [LTR 170, CMT 2]

Response: Figure 3.9-2 provides a better depiction of how residences in Underwood and Mill A would be affected by Project visibility. Much of White Salmon and portions of Underwood would not have views of the Project, while Hood River, Mill A, and Bingen would have views of the Project.

Comment: *Of particular concern is the impact that the turbine operations will have on these areas, particularly visual impacts. This section should be expanded to include impacts on key viewing areas within the scenic area and other areas affected by visual and noise impacts from wind turbine operations. [LTR 175, CMT 3]*

Response: Comment acknowledged.

Comment: *The proposal has multiple serious environmental impacts, including severe impacts on the visual surroundings of the Columbia River Gorge National Scenic Area. [LTR 176, CMT 2]*

Response: Please see response to Comment LTR 22, CMT 1 above. The Project would cause some visual impact to CRGNSA KVAs but these impacts would largely be low to moderate (see DEIS pages 3-177 and 3-196).

Comment: *Adoption of USFWS BMPs: The proponent should adopt the Best Management Practices set forth by the USFWS Wind Turbine Guidelines Advisory Committee. Most of the BMPs suggested by the committee are already in the DEIS, but a good faith effort should be made to meet all of these guidelines to minimize project impacts. One BMP not presented in the DEIS includes appropriate lighting of on-site facilities (in addition to the towers themselves) to control light pollution and maintain the dark skies needed by bats and migrating birds. [LTR 177, CMT 43]*

Response: Mitigation measures listed within Section 3.9.4 addressed potential impacts from night lighting. Not every turbine would be equipped with aircraft safety lighting as noted in Section 3.9.3.1. The minimal number of strobes would be intermittent and would not light up the evening sky. Section 3.6.2.1 describes additional measures, namely the use of motion-sensor lighting systems for the operations and maintenance facility. This would further reduce night-time lighting impacts.

Comment: *Consistency with Applicable Land Use Regulations, Columbia River Gorge National Scenic Area Management Plan, p. 3-154: Under the bullet point entitled "Scenic Appreciation and Scenic Travel Corridors," strike "only" from the discussion so that the sentence reads: "The project would have minor to moderate impacts on visual quality as viewed from travel corridors inside the Scenic Area." Trails and Pathways. The discussion in this section needs to be clarified. The project will have low to moderate visual impacts on viewpoints from some trails and pathways in the CRGNSA. The statement that "the project would not affect any trails or pathways in the Scenic Area" is incorrect. [LTR 177, CMT 55]*

Response: The word "only" has been removed from the second sentence of the second bullet in Section 3.8.3.1, under subheading Columbia River Gorge National Scenic Area Management Plan (page 3-154 of the DEIS). The word "directly" has been inserted after "not" in the second sentence of the first bullet (on page 3-155 of the DEIS).

Comment: *[In reference to Section] 3.8.3.2, No Action Alternative. If a No Action Alternative is pursued, there will be no impact on visual resources. [LTR 177, CMT 56]*

Response: Visual impacts from the No Action Alternative are discussed in Section 3.9.3.2.

Comment: *[In reference to DEIS Section] 3.8.5, Unavoidable Adverse Impacts. If the applicant is unwilling or unable to reconfigure turbines to minimize visual impacts, then this section should identify minor to moderate impacts on visual resources within the CRGNSA as an unavoidable adverse impact. [LTR 177, CMT 58]*

Response: As most of the viewpoints would experience low to moderate visual impacts, the Project would not have significant and unavoidable impacts as noted in Section 3.9.5 (DEIS page 3-196).

Comment: *[In reference to Section] 3.9, VISUAL RESOURCES, [Section] 3.9.1, Methodology. The methodology applied should be expanded to include the Visual Resource Management system employed by the Bureau of Land Management. The CRGNSA has established visual resource objectives for a large and specific area within the Columbia River Gorge. Although the project is located just outside the scenic area boundaries, it will be clearly visible from within the scenic area and will impact the area's scenic values. That the project is located just outside the scenic area boundary should not exclude it from an analysis that fully identifies and discusses the project's visual impact on this nationally-recognized, high value regional view shed. [LTR 177, CMT 59]*

Response: Impacts to the CRGNSA were extensively discussed in Section 3.9. The methodologies employed in the analysis have been used for other wind energy projects in Washington State (see Section 3.9.1). As noted in this section, the use of the BLM Visual

Resource Management system would not be appropriate in this context due to the lack of visual resource objectives for private lands where the Project is situated.

Comment: *[In reference to Section] 3.9.1.3, Preparation of Visual Simulations. The photographs underlying the visual simulations are problematic. Visual simulation photographs should be taken with a 50 mm lens, as this focal length most closely captures human visual perception. See Environmental Impacts a/Wind-Energy Projects, National Research Council (2007) at 247. The use of other focal lengths distorts the image and makes it difficult to compare impacts between different photographs. Id If a digital camera is used, it should be set at the highest resolution possible. Id. The visual simulations should also be re-sized to a 10 x 12 inch format, at a minimum, for comfortable arm's length viewing. Id. at 250. Most of the simulations produced in the DEIS appear to be taken from viewpoints along roads and highways. Additional simulation should be provided with views from the Columbia River, hiking trails, and wilderness areas. See Id at 251-52. The DEIS states that simulations were not prepared for night time conditions. An inventory of current night time lighting conditions would be helpful in assessing the extent to which FAA mandated turbine lighting will impact the night sky. [LTR 177, CMT 60]*

Response: Section 3.9.1 discusses the methodology for the preparation of the simulations. While visual distortion is anticipated in the preparation of simulations from focal lengths between 40 to 70mm, this EIS also provides "wireline" simulations as a means of showing a perspective of the Project that is not influenced by atmospheric conditions or other visual objects (other than landforms). Whatever distortion is introduced through the use of digital simulations, the use of wireline drawings provides a consistent means of measuring the visibility of the Project and comparing impacts from different perspectives. The use of larger size photographs is therefore not needed. Furthermore, the criteria used for selecting viewpoints are discussed in Section 3.9.2.3. Locations were chosen based upon their representation related to the Project Area, those that were most accessible to the public, and locations with the largest number of viewers. For a discussion of Mitchell Point, see response to Comment LTR 141, CMT 2 above. No additional viewpoints for the Columbia River, hiking trails, and wilderness areas will be analyzed as they do not fit the criteria noted in Section 3.9.2.3. As Section 3.9.3.1 notes, a generic illustration of night lights can be found in the Draft EIS for the Nine Canyon Wind Project.

Comment: *[In reference to Section] 3.9.4, Mitigation Measures. In addition to painting the turbines an unobtrusive, non-reflective color and following FAA lighting guidelines, the following additional mitigation should be included: Either reducing or reconfiguring the turbine locations to minimize visual impacts. Explore whether vegetative buffers can be grown or maintained to minimize visual impacts. To the extent visual impacts are unavoidable, mitigation should include the preservation of off-site visual resources. [LTR 177, CMT 63]*

Response: No further mitigation is required as visual impacts from the Project would not be significant, but instead are low to moderate for most of the viewpoints.

Comment: *Save Our Scenic Area (SOSA) is involved with the Whistling Ridge Energy (WRE) project application as an Intervener. SOSA is a non-profit corporation formed by concerned local Gorge citizens. Its primary mission is to help preserve the Columbia River Gorge National Scenic Area view-shed; to further maintain the existing rural and scenic character of Underwood, Washington, and surrounding communities in Washington and Oregon; and work to preserve the intent of the Columbia River Gorge National Scenic Area Act. I am writing today to provide comments on the recently issued draft environmental impact statement (DEIS) for the WRE proposal. SOSA is submitting several different comment letters, covering a variety of subject matter within the DEIS. We have also reviewed the comments submitted by the Friends of Columbia Gorge, agree with them and incorporate them by reference. There are multiple environmental issues involved in the consideration of this project and it is important that each be given through consideration in the EIS process. [LTR 178, CMT 1]*

Response: Comment acknowledged.

Comment: *[In reference to Section] 3.9.1.3, [s]imulations were prepared assuming a conservative scenario of 50 turbines. This approach to creating simulations most likely overstates the visual impacts. This is because the Applicant has applied for EFSEC certification for a maximum of 75 MW. If 2.5 MW turbines were to be used, only 30 turbines could be built, and overall visual impact would be less. ... Because the DEIS contemplates the use of 2.5MW turbines to reduce the visual impact of the proposed project, this needs to be one of the Alternatives to consider under Section 1.4 of this EIS. Remedy - Add to the Alternatives in Section 1.4, a proposed project configuration of 30 Turbines of 2.5MW capacity. [LTR 178, CMT 69]*

Response: The exact number of turbines to be implemented on the site will be determined during the micrositing process should the Project be approved.

Comment: *[In reference to Section] 3.9.2.3, All 3.9.2.3 Viewpoints (entire section). The assignment of Scenic Quality and Viewer Sensitivity to the Viewpoints are fundamentally bias towards the Applicant's interests. Even if the author wrote this from a desk in the middle of Yosemite or any world class visual destination, one would be challenged to rate most locations in and around the CRGNSA anything but a 5 or 6, based on Table 3.9-1 DEIS at 3-158. The assignment of Viewer Sensitivity are based on a focus of facts only to justify the lowest ratings. Remedy - As opposed to inserting such important analyses in the body text of the DEIS, a truly quantitative analysis needs to be performed by a qualified project personnel (See section 6.3). [LTR 178, CMT 70]*

Response: Qualified project specialists were utilized during the preparation of this section (see Section 6). For a discussion of alternative methods of analyzing visual effects, see response to Comment LTR 178, CMT 154 below.

Comment: *[In reference to Section] 3.9.1, All 3.9.1. METHODOLOGY (basis for whole section). The Visual Analysis is NOT complete or meaningful. As presented with only "Scenic Quality" and "Viewer Sensitivity" as separate factors, there has been no coupling of factors in a scientific or statistical basis for decision-makers to relate the visual impacts to a defined standard, or to a relative reference frame. No accurate conclusions could reasonably be made about Visual Impact of the project, given the format existing in this DEIS. Remedy - Professionals in this field would be able to offer guidance on how to identify and quantify the common variables, and to combine them in such a way as to numerically demonstrate a given Viewpoint's potential degradation relative to some tangible reference point. The work done on this subject must by a credential expert. The Visual resource Management System used by the BLM seems more relevant for this EFSEC Application, due to its visual objectives for lands with multiple management objectives. [LTR 178, CMT 71]*

Response: Scenic quality and viewer sensitivity are commonly used measures in visual impact assessment (see Section 3.9.1). Other mathematical or statistical models for measuring visual impacts are not typically used by any federal agencies that routinely consider impacts to visual resources. Qualified project specialists were utilized during the preparation of this section. As noted in Section 3.9.1, the use of the BLM Visual Resource Management system would not be appropriate in this context due to the lack of visual resource objectives for private lands where the Project is situated.

Comment: *[In reference to Section] 3.9.2.3, All 3.9.2.3 Viewpoints (entire section). There are a number of important Viewpoints that were omitted, for example - Panorama Point in Hood River County, Oregon. Remedy - The majorly significant viewpoint of Panorama Point, OR must be included in this analysis. It is a KVA within the CRGNSA, one of the most visited. [LTR 178, CMT 72]*

Response: Panorama Point was analyzed as it appears in Section 4.2-3 of the Application for Site Certification (Appendix A of the DEIS).

Comment: *[In reference to Section] 3.9.2.3, Viewpoint 23: Ausplund Road End Scenic Quality. This viewpoint represents the view from local area roadways at specific intersections where local area travelers might converge. These roads are old logging roads that have been upgraded to meet the local residential use. However, they are still used for logging and would be used in the construction portion of this project. This would include upgrading and in some instances widening the roads, which can affect visual quality. This view is from the end of the Ausplund Road, which would be used to access the area for construction and maintenance. Very few viewers beyond those associated with the project would see this viewshed. Without the vehicles in the foreground, the scenic quality rating assigned to this view is moderate. Viewer Sensitivity. When considering the distance of the project from this viewpoint (less then 1 mile), the portion of the project that is visible from the viewpoint, the viewer types (local area workers and residence), and the scenic quality rating, the level of sensitivity was rated as low to moderate. 1) This Viewpoint (23) is near the end of Ausplund Road, looking to the NNW*

direction. This intersection represents a viewpoint central to 4 separate legal parcels, 3 of which have homes on them with active residential use. This site is roughly 1/2 mile from the proposed project. Each of these agriculturally-zoned parcels have about one acre each established for residential use. Submitted for your review is a picture taken from the home at the "end" of Ausplund Road, which is a typical view from most all the homes on Ausplund Road, and many, many homes in Underwood as a whole. This is not a Scenic Quality of 3, but rather a very substantial 6. (ref AusRdEndSouthView.pdf) Reference - SOSA Comment letter of Aug. 27, 2010 - titled Visual Analysis Section 3.9. Remedy - This viewpoint, as with ALL the others in this DEIS, cannot be judged for Scenic Quality SOLEY on its view of the proposed project. The starkly contradictory photo introduced here should establish that most of the Viewpoint analyses are faulty and bias, and must be remanded for reevaluation, or utilize a more appropriate Methodology (3.9.1) and objective consultant. [LTR 178, CMT 73]

Response: Visual quality ratings of six are reserved for landscapes with exceptionally high visual quality that are significant nationally or regionally (see Table 3.9-1). This portion of the Project Area is much more representative of a place with a visual quality rating of "3" - a landscape that is common or typical and exhibits an average scenic value. The vehicles in the picture are representative of the activities that occur in the Project location and the photographs indicate that the area has been affected by existing logging operations. These types of activities are usually not dominant features within landscapes associated with "Outstanding" Visual Quality Ratings.

Comment: *General Comment on DEIS - The State of Oregon has on their books very good scenic protections, not only for the National Scenic Area, but a huge number of State public lands which are deemed appropriate to save from visual intrusion of Wind Turbines. Washington State should prepare and release an analogous document. EFSEC should consider the spirit of Oregon's protections, and apply similar standards when considering the overall benefits to society and the public welfare. Remedy - EFSEC should consider the spirit of Oregon's scenic protections relating to Energy Facility Siting, and apply similar standards when considering the overall benefits to society and the public welfare. Longer term, EFSEC is urged to pass some guidelines similar in spirit to the Oregon statues, either within the Department, or at the State legislative level. [LTR 178, CMT 136]*

Response: Comment acknowledged.

Comment: *Topic: Visual Resources, Section 3.9, DEIS at 3 155 [through] 3 196. The Federal Highway Administration process (FHWA) used by the Applicant should be replaced with the BLM methods referred to in the DEIS. If the FHWA methods are retained, then many parts of this methodology must increase in complexity and quantitative analysis, to ensure useful information for EFSEC decision makers. The deficiencies and proposed remedies outlined below serve only as a partial list of issues to address in correcting the DEIS Visual analysis to a level suitable for use as a unbiased, objective decision making "Tool." To this end, SOSA furthermore incorporates by reference, the Friends of the Gorge DEIS comments by Dean*

Apostle. As the phrase goes "a picture is worth a thousand words," I am focusing my comments on the problems associated with the photomontages. The visual photomontage's size, resolution, contrast ratio, and background sky conditions all serve to completely under represent the likely visual impact created by the proposed Project. In fact they fail to provide any useful measure of the degradation in scenic value. [LTR 178, CMT 147]

Response: As noted in Section 3.9.1, the use of the BLM Visual Resource Management system would not be appropriate in this context due to the lack of visual resource objectives for private lands where the Project is situated.

Comment: *Deficiencies with the DEIS Section 3.9: 1) There is only one lighting scenario provided in the DEIS. The (daytime) conditions provided in the DEIS do not depict other illuminated conditions which will occur namely, sunrise, sunset, and night time. (Reference Exhibit B) [LTR 178, CMT 148]*

Response: In addition to Section 3.9, the EIS discusses impacts at varying levels and angles of sunlight (see Section 3.9.3.1). As noted in this section, sunny days account for 39.7% of days in Skamania County. The majority of time some clouds are present. Nighttime lighting impacts are discussed in Section 3.9.3.1. Also, as noted in Section 3.9.1.3, night time simulations are inherently inaccurate, since they do not show the periodic flashing of air warning lights. For a generic illustration of night lights see the internet link in Section 3.9.3.1.

Comment: *There is only one contrast ratio provided in the DEIS hazy. The four that should be used are clear, hazy, front lit and back lit. A Cloudy condition should result in minimal degradation, and should not need to be formally analyzed. (Reference Exhibit A and B) [LTR 178, CMT 149]*

Response: Atmospheric haze is ever present in most landscapes (see Section 3.9.1.3). Simulations were used to present worst case scenarios so that impacts could be fully evaluated regardless of lighting condition (see Section 3.9.1.3). In addition, this EIS also provides "wireline" simulations as a means of showing a perspective of the Project that is not influenced by atmospheric conditions, lighting, or other visual objects (other than landforms).

Comment: *The Landscape Scenic Quality Scale (Table 3.9 1, DEIS p 3 158) uses a numeric scale, but its them by appropriate weighting factors, then summing to a final numeric output. (not "Low, Moderate, High") [LTR 178, CMT 150]*

Response: Comment acknowledged.

Comment: *The Summary Table (Table 3.9 2, DEIS at 3 177) provides the "Level of Visual Impact" in qualitative terms. This is not a useful output for proper assessment or decision making. Classifying the final output of this "qualitative" process with its 3 step scale underreports Scenic Degradation. It's kind of like asking a person that needs corrective vision to take off their eyeglasses to drive their car. The EFSEC Council, at the least, needs statistical, refined numbers to use in various "what if" scenarios, to probe the effects of various mitigation concepts. Evaluating the effect of removal of various turbines or turbine strings, as an example. A finer resolution, numeric basis will provide a clearer consensus for decision makers. [LTR 178, CMT 151]*

Response: The table accurately conveys the findings of the visual impacts discussed in Section 3.9. Mathematical or statistical models for measuring visual impacts are not typically used by any federal agencies that routinely consider impacts to visual resources. The use of untested statistical models would not add clarity to Project impacts.

Comment: *The "Scenic Quality" value of "3" assigned to Viewpoint 23 is flawed. (Reference Exhibit C) Further, other viewpoint "scenic quality" values are likely under valued or under scored. [LTR 178, CMT 152]*

Response: Please see response to Comment LTR 178, CMT 73 above.

Comment: *This summer 2010, SDS logged the 80 acres sloping south beneath the proposed A string turbines, from the ridgeline down. (Ref. DNR FPA# 2704293) (Reference Exhibit E primary, and A and B secondary) There is now a huge 80 acre brown patch on the south facing slopes by Chemawa Hill, contrasting with adjacent green forest for the foreseeable future. Furthermore, and more importantly, it removes about 100 feet of vertical distance between the rotor swept area and the now visible ridgeline, thereby aggravating the disparity between the each "A" Turbine and the natural land forms around them. The DEIS's existing visual photomontage's do not account for this recent and dramatic scenic landscape "modification," and thereby understate even further the magnitude of visual impact to viewpoints to the South and to the East. Affected Viewpoints are: 4, 15, and 23. The FPA 2704293 was approved in October 2008, so the Applicant had ample time and knowledge to advise their URS consultants as to the visual site conditions which should have applied to the Photomontages, to have them prepared appropriately. [LTR 178, CMT 153]*

Response: The nature and characteristics of logging in the area was discussed in Section 3.9.2.2. The logging of the 80 acres near the Project may make it more visible with the removal of the vegetation but it would also degrade the scenic quality of that particular location. The use of "wireline" drawings assists in understanding the visibility of the turbines against the surrounding landforms but in the absence of vegetation (see Section 3.9.1.3). Several viewpoints also provide perspectives that include views of the Project near areas that have been recently been logged (see photos from Viewpoints 5, 6, 12, and 15).

Comment: *Even the most accurate picture cannot replicate the true image in real life. To this end, there must be a more quantitative approach to reaching an "accurate measurable difference", as proposed in paragraph 1 above. There are analogous quantitative tools, which Engineers like myself, use in their profession. For example FMEA (Failure Modes Effects Analysis). These tools put tangible numbers to normally qualitative phenomena, allowing decision makers to make accurate comparative decisions. Objectively applied, I would predict that most all the viewpoints reported in this DEIS would show significantly higher scenic degradation than other application to the Viewpoints appear non objective and bias towards minimizing the appearance of scenic degradation. Imagine not even one "postcard view" rating from the USA's only National Scenic Area (NSA). [LTR 178, CMT 154]*

Response: The utilization of other mathematical or statistical models for measuring visual impacts is not typically used by any federal agencies that routinely consider impacts to visual resources. The use of speculative, untested models for measuring visual impacts would not add clarity to the EIS.

Comment: *The three levels of Visual Sensitivity (DEIS at 3 158 and 3 159) provide too coarse a resolution for true numeric analysis, especially given it's a combined parameter. As stated at DEIS 3 158, Visual Sensitivity is defined as a combined parameter of number of viewers, type of viewers, viewing conditions, and quality of the view. It would be far more appropriate to evaluate each parameter separately. To each parameter apply a 6 level scale, then multiplying Wind Turbine Projects in Washington state. I propose that EFSEC, as the EIS responsible official, incorporate a process similar to the above referenced FMEA process, to the existing WRE template and to future EFSEC Applications, as well. Further refinement of visual impact could be achieved by classifying the percent of time a particular viewer will see the Turbines with a given contrast ratio. Meaning from a given location, say 35% of the time, a viewer will see flashing red lights, 16% of the time they will see only cloud cover, 40% of the time clear deep blue sky, 5% sunrise/sunset, etc. Then sensitivity and view value for each situation can be quantified for each location. [LTR 178, CMT 155]*

Response: Please see response to Comment LTR 178, CMT 154 above.

Comment: *This author lives adjacent to Viewpoint 23 (DEIS at 3 190), and has produced scaled photomontages to illustrate the dramatic visual difference that lighting direction, and clear blue skies will affect the contrast ratio, and hence visual impact. All of the assumptions are clearly stated on the photomontages, and information is on each for independent confirmation as to scale. These are intended to serve as scaled representations, not photo realistic images, and not dissimilar from the URS supplied image. REMEDIES proposed actions by DEIS responsible official to correct Deficiencies 1) All photomontages should accurately depict the four viewing conditions of: a) clear, bright blue sky, b) hazy, c) back lit(i.e. sunset) and d) night time. [LTR 178, CMT 155]*

Response: To provide visual simulations of the Project for all possible weather and lighting conditions is beyond the scope of the EIS. The photo simulations provide representative views of the proposed Project to give viewers an indication of impacts to the greatest extent possible.

Comment: *The contrast ratios should be adjusted higher to closely simulate how the Turbines would beseen in "real life" resolution. ("real life" resolution is clearly articulated in Dean Apostle comments) [LTR 178, CMT 155]*

Response: The resolution of the photosimulations in the EIS is similar to those used in other environmental documents which study the visual impacts of wind turbine projects. Furthermore, the "wireline" drawings provide a clear demarcation of the Project's impacts and it's positioning within landforms stripped of color and visually competing landscape components. The use of "real life" image resolution would not add clarity to the level of impacts caused by the Project and is beyond the scope of the EIS.

Comment: *The "Level of Visual Impact" in Table 3.9 2 must be a numeric product of a multi variable analysis, each variable with a numeric scale of at least 6 levels of distinction. The variables identified previously, along with the additional variable discussed above will provide a quantifiable output with clear relative importance being attributed to each viewpoint. [LTR 178, CMT 155]*

Response: See response to Comment LTR 178, CMT 154 above.

Comment: *The analysis "output" for Table 3.9 2, "Level of Visual Impact" needs to be a finer resolution, numeric basis to provide a clear consensus for decision makers to enter into "what if" scenarios when contemplating various mitigation opportunities. [LTR 178, CMT 155]*

Response: See response to Comment LTR 178, CMT 154 above.

Comment: *For current and future EFSEC Applications, consider evaluating Scenic Degradation compared to a standardized reference view shed say an expansive desert shrub steppe/wheat field environment where most Turbines are effectively located. (One could also consider this same approach for wildlife habitat and mortality impacts...) [LTR 178, CMT 155]*

Response: See response to Comment LTR 178, CMT 154 above.

Comment: *Due to clear cutting of the A Turbine String Ridgeline this summer 2010, the visuals from sites 4, 15, and 23 sorely under represent reality, and must be re created using new photographs and properly scaled Turbines, and on a worst case contrast ratio. "Changes to topography," as (vaguely) mentioned in DEIS at 3 9, must also be included. [LTR 178, CMT 155]*

Response: See response to Comment LTR 178, CMT 153 above.

Comment: *These slopes of the proposed A1 7 string, if not others, will have permanent land scarring activity. Depending on the geologically allowable locations of Turbines, land scarring may be in full view of, and facing the National Scenic Area. The visual impact of these landform disturbances must be including in the Visual analysis. [LTR 178, CMT 155]*

Response: See response to Comment LTR 178, CMT 153 above.

Comment: *As a reference to the magnitude and scale of "changes to topography" (DEIS at 3 9) a photograph of construction activity on a ridge top in Maine is included as Exhibit G. The slope in Exhibit G appears not as steep as the Northwestern and Western slopes of the proposed Project, which are the windward side of the prevailing wind direction. In particular to the A1 A7 proposed Turbines, this is also true, but furthermore, the opposite slope of the A1 A7 string is similar in slope to Exhibit G. This supports our claim that significant and permanent land scarring activity is likely, especially true for the A1 A7 proposed Turbines. [LTR 178, CMT 155]*

Response: See response to Comment LTR 178, CMT 153 above. The "wireline" drawings provide an indication of where the turbines will be potentially situated within a sloping landscape devoid of vegetation.

Comment: *Exhibit A : Clear Day Scaled Photomontage Viewpoint 23 - Ausplund Road End compare to Figure 3.9-15 at DEIS pg. 3-190 Note this area was clear-cut since DEIS release Photomontage: Source Tom Drach using Reengineer CAD software and CorelDraw software to overlay scale rendering of Vestas V82 (Exhibit H). Hub Height - 80m (262 ft) from top of ridgeline, Rotor Diameter - 82m (270 ft) Bottom of swept diameter from the ground = 262 ft - 135 ft = 127 ft. Note: Douglas Fir trees at ridgeline at left are assumed fully mature at 110-120 feet, to be conservative. If trees are actually shorter, turbines would need to be scaled LARGER in relation to the photo. Dashed circle for rotor diameter on left included for independent confirmation of scale. [LTR 178, CMT 156]*

Response: Please see response to Comment LTR 178, CMT 153 above.

Comment: *Exhibit B : Sunset (back-it condition) Scaled Photomontage Viewpoint 23 - Ausplund Road End compare to Figure 3.9-15 at DEIS pg. 3-190 Note this area was clear-cut since DEIS release Photomontage: Source Tom Drach using ProEngineer CADsoftware and CorelDraw software to overlay scale rendering of Vestas V82 (Exhibit H). Hub Height - 80m (262 ft) from top of ridgeline, Rotor Diameter - 82m (270 ft) Bottom of swept diameter from the ground = 262 ft - 135 ft = 127 ft. Note: Douglas Fir trees at ridgeline at left are assumed fully mature at 110-120 feet, to be conservative. If trees are actually shorter, turbines would need to be scaled LARGER in relation to the photo. Dashed circle for rotor diameter on left included for independent confirmation of scale. [LTR 178, CMT 157]*

Response: Please see response to Comment LTR 178, CMT 153 above.

Comment: *Exhibit C : DEIS Visual Quality Rating of "3" Contended Original Photo - unreduced location is the end of Ausplund Road End, looking South, photo by Tom Drach, Nikon 5MP cheapo camera Proposed turbines to the North, reference Viewpoint 23, Figure 3.9-15 at DEIS pg. 3-190 DEIS rates this location as: (Table 3.9-2 at 3-177) Scenic Quality = Moderate (3 on a scale 1 to 6, 6 being postcard quality) (REALLY ??? should be a 6) Viewer Sensitivity = Moderate, hence overall rating of Visual Impact = Moderate Authors Note: How many other Viewpoints "analyzed" in the DEIS suffer from this same disparity in "Scenic Quality" rating? [LTR 178, CMT 158]*

Response: Interpretation and conclusions on the degree of visual impact are subjective and dependent upon the viewer. The nature and characteristics of logging in the area were discussed in Section 3.9.2.2. The logging of the 80 acres near the Project may make it more visible with the removal of the vegetation but it would also degrade the scenic quality of that particular location. The use of "wireline" drawings assists in understanding the visibility of the turbines against the surrounding landforms but in the absence of vegetation (see Section 3.9.1.3). Several viewpoints also provide perspectives that include views of the Project near areas that have been recently been logged (see photos from Viewpoints 5, 6, 12, and 15).

Comment: *Exhibit D: Table 3.9-1 Presented in original format, ease of reference purpose only. [LTR 178, CMT 159]*

Response: Comment acknowledged.

Comment: *Exhibit E: Due to recent clear-cuts by SDS Lumber Company during this summer of 2010, reference Comment below DEIS table: (table 3.9-2) Comment by SOSA: Due to clear-cutting of the A-Turbine String Ridgeline this summer 2010, the visuals boxed in RED above, [viewpoints 4, 15, and 23] must be re-created using new photographs and properly scaled Turbines on a worst case contrast ratio. Topographic changes must also be included, per This summer, SDS logged the 80 acres sloping to the south-east of the proposed Astring turbines,*

from the ridgeline down. This now leaves a dramatic brown patch contrasted with the green forest for at least 5 years, and land scarring activity of the turbine foundations and roads, all of which must be included in the applicable photomontages. Furthermore and more importantly, it removes about 100 feet of vertical distance between the rotor-swept area and the closest ground features. The existing visual photomontage's do not account for this recent and dramatic scenic landscape "modification," and thereby understate even further the magnitude of visual impact to viewpoints to the South and East. [LTR 178, CMT 160]

Response: Please see response to Comment LTR 178, CMT 153 above.

Comment: *Exhibit F: original photomontage from DEIS at 3-190, with comment in Grey Box below: Comment by SOSA: Either these turbines are not scaled correctly, or turbine bases are 80-100 feet down on the North face of Chemawa Hill. Foundation height not identified, no mass soil displacement shown for turbine foundations on steep slopes, all slopes now clear-cut, and all soil displacement will be visible for many miles. Turbines would likely be sited on Southeastern slope, due to Northwestern face is identified as unstable slope by DNR in Forest Practices Application (FPA 2702799). [LTR 178, CMT 161]*

Response: The siting of individual turbines will be determined during the micrositing process (see Section 3.1.1.3). A 650-foot turbine corridor was analyzed in the EIS to take into account some variations in turbine placement that may occur during the micrositing process.

Comment: *Exhibit G Ridge Carving for Geologic Stability Mars Hill, Maine 2006 Similar visual impacts are likely for WRE Project, but no details are given either visually, geologically, or environmentally. [LTR 178, CMT 162]*

Response: Please see response to Comment LTR 178, CMT 161 above.

Comment: *The proposed energy project would be highly visible from several urban areas and unincorporated communities in or near the National Scenic Area. These include Underwood, Hood River, Mosier, Mill A, Willard, and White Salmon. Hundreds of residents of these and other communities are strongly opposed to the project and have expressed their opposition and concerns in comments to the reviewing agencies and to Skamania County. [LTR 179, CMT 10]*

Response: Comment acknowledged

Comment: *The DEIS Fails to Adequately Evaluate and Address the Impacts of the Proposed Development on Scenic Resources. SEPA requires that the environmental analysis include*

discussion of impacts to sensitive areas. The SEPA official "shall" consider whether a "proposal may to a significant degree ... [a]dversely affect environmentally sensitive or special areas, such as loss or destruction of historic, scientific, and cultural resources, parks, prime farmlands, wetlands, wild and scenic rivers, or wilderness." WAC 197-11-330(3)(e)(I). SEPA also requires analysis of impacts to scenic resources. WAC 197-11-440(1)(e)(iv). The current proposal is for a major industrial development towering over ridgelines on the perimeter of the Columbia River Gorge National Scenic Area, overlooking important segments of the Lewis and Clark National Historic Trail and the Historic Columbia River Highway, adjacent to the Gifford Pinchot National Forest, and adjacent to recreational trails on Washington Department of Natural Resources land. The proposed facility would overlook miles of National Scenic Area viewsheds that have been inventoried as some of the highest quality scenic landscapes in the Gorge. Unfortunately, the DEIS grossly mischaracterizes the likely impacts of the Whistling Ridge Energy Project on scenic resources. Instead of following SEPA's mandate to provide an unbiased and objective assessment of likely impacts, the DEIS blatantly misapplies established principles of landscape management to conceal the likely impacts of the proposed action. [LTR 179, CMT 64]

Response: Project impacts to visual resources were discussed in Section 3.9, thus fulfilling the requirements mentioned in this comment. Project effects from most of the viewpoints are anticipated to be low to moderate.

Comment: *The analysis also violates NEPA's requirement that "[a]gencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." 40 C.F.R. 1502.24. The DEIS does not list a single landscape architect, much less a landscape architect with training in scenic resource analysis methodologies, in the list of preparers. DEIS at Section 6.0. The lack of professional and scientific integrity is plainly evident through the scenic impacts analysis. The analysis is fundamentally flawed and violates both NEPA and SEPA. As explained in the attached comments of Dean Apostol, the analysis completely misinterprets and misapplies the Federal Highway Administration's visual assessment system and the Forest Service's Scenery Management System. [LTR 179, CMT 65]*

Response: Please see response to Comment LTR 178, CMT 71 above. As noted in this comment, federal agencies "shall insure the professional integrity, including scientific integrity of the discussions and analyses in environmental impact statements." 40 C.F.R. 1502.24. The NEPA regulations, however, do not stipulate that landscape architects be used to evaluate impacts to visual resources. The professionals used for the visual resource analysis for this Project have considerable experience in evaluating visual impacts from wind energy projects. Further, these professionals applied methods that are in common use by other federal agencies and which have been used for wind energy projects on previous occasions (see Section 3.9.1). See also response to Comments LTR 180, CMT 2 through LTR 180, CMT 28 below.

Comment: *Views from the Lewis and Clark National Historic Trail would be adversely affected. The Lewis and Clark National Scenic Trail was created to "stimulate Federal, State, and local agencies and individuals to identify, mark, and preserve for public inspiration and enjoyment the routes traveled by the Lewis and Clark Expedition." Lewis and Clark Trail Management Plan at 1. The Management Plan for the trail recognizes that many of the historic and cultural resources have been altered or lost and the Expedition left scant traces of their passing. However, "In a very real sense, many of the historic resources are the landmarks, vistas, flora, and fauna that make up the Trail's natural resources. It is virtually impossible to find either historic or natural resources along the Expedition route, which have not been altered in some way by man or nature." Lewis and Clark Trail Management Plan at 4 & 13. Thus, the scenic vistas and natural resources of the Expedition route are critical to appreciating the trail. Locations where those vistas and natural resources are intact are exceedingly rare, and warrant the greatest attention during SEPA and NEPA review. [LTR 179, CMT 66]*

Response: Comment acknowledged.

Comment: *The DEIS fails to acknowledge adverse scenic impacts to the Lewis and Clark National Scenic Trail. Locations along the route with intact scenic vistas that retain some of the same views that the Lewis and Clark Expedition experienced are critical important resources for the trail system. The views from I-84, the Columbia River, Viento State Park, and Starvation Creek State Park are largely intact as evidenced by the Forest Service's resource inventories. The project would dramatically alter these views causing significant adverse impacts to the trail. This conclusion was clearly expressed by the National Park Service in at least two separate letters to the BPA and EFSEC. This conclusion is also supported by the BPA's previous environmental analysis of other projects that would have similar, although less severe, impacts on the Lewis and Clark National Historic Trail. The egregious failure to acknowledge significant adverse impacts to the Lewis and Clark National Historic Trail must be corrected. [LTR 179, CMT 68]*

Response: The Lewis and Clark National Historic Trail (LCNHT) is considered a recreational resource and is discussed in Section 3.8.1.2. Visual simulations were prepared for several locations along the I-84 corridor as well as from Viento State Park which are situated along the LCNHT. These viewpoints provide representative views of the Project and adequately illustrate Project impacts to the LCNHT. Other areas, such as the Columbia River and Starvation Creek State Park were not chosen as they did not meet the criteria for choosing viewpoints noted in Section 3.9.2.3.

Comment: *The fundamental aesthetic problem of commercial wind energy development is that it introduces very large-scale, modern, industrial structures into rural, semi-natural, or even wild landscapes. Due to their large scale and unique appearance, modern wind turbines by their very nature result in high visual contrast to most landscapes. High contrast normally results in high impacts to scenery. Wind turbines challenge conventional approaches to scenic resource conservation, which rely on eliminating or reducing the contrast of built facilities or landscape*

alterations. In most cases modern wind turbines cannot reasonably be "visually blended" into natural or cultural landscapes. They are inherently visually dominant due to their huge scale, unique appearance, high color contrast, moving parts and the need for continuous lighting for air safety. Key factors in assessing the visual impact of wind turbines include: The number of visible turbines and the extent to which they dominate vertically and horizontally. The visual coherence or sense of order they present. Because they tend to be so prominent, turbines have to "make sense" within the view. Wind turbines look best in simple, open, low relief landscapes like farm, prairie or rangeland. They fit uncomfortably in highly complex landscapes with lots of vertical relief and diverse vegetation patterns, like the Columbia Gorge. Roads and power lines serving turbines can add substantially to visual impacts of wind energy developments. Turbine placement may include other landscape disruptions, particularly land clearing and ground disturbance. [LTR 180, CMT 2]

Response: Comment acknowledged.

Comment: *There is little question that the vertical and horizontal scale of modern wind turbines has the power to transform entire landscapes. The huge size of individual towers and the horizontal scale of large projects can create substantial impacts even when viewed from distances of 10 miles or more. Page 3-172 of the DEIS states: "wind turbines are relatively large." Commercial wind turbines are very large, out of scale with anything in the landscape around Underwood. They are nearly as tall as the tallest buildings in downtown Portland, and they do not look like any rural building or structure in existence. Modern wind towers and blades are nothing like the historic, small-scale, vernacular windmills of the Netherlands, Crete and Portugal. They feature sleek, industrial designs. They are large enough, different enough, and high contrast enough, to transform the surrounding landscape from predominantly natural or rural into an industrial scene. [LTR 180, CMT 3]*

Response: Comment acknowledged.

Comment: *Wind turbines are not designed to be place-sensitive. Energy companies are focused on maximizing productivity and minimizing costs. Thus, a one size fits all approach is used, and custom design is almost never considered. Wind facilities are context-free, meaning they look the same anywhere. And while they may be perfectly appropriate as an expression of their own function, they do not aesthetically fit in many landscapes. Every landscape includes the basic elements of form, line, color and texture that provide visual identity. Forms result from large and small scale elements interacting to create spaces. They can be regular or irregular, curvilinear or geometric. Lines are linear features, like roads or the edge of a clearing. Natural colors tend to include greens, browns, tans and blues. Textures can be rough, smooth, fine or coarse grained. To the extent that landscape changes or new objects repeat these elements, contrast is reduced between the proposed development and natural landscape character. This in turn results in less of a visual impact. Large arrays of modern wind turbines easily dominate over the form, line, color and texture of scenic natural and cultural landscapes. It is extremely difficult to relate them to existing landforms, vegetation patterns, and natural lines in ways that*

reinforce or harmonize. They introduce strong vertical lines and have a color and texture unlike anything that is found in most natural landscapes. [LTR 180, CMT 4]

Response: Comment acknowledged.

Comment: *Ridgelines are places where the land meets the sky, and where the viewer's eye is easily drawn. Wind turbines, including those proposed for the Whistling Ridge Energy Project, are often located on high, visually prominent topographic points, causing them to extend far above the horizon and create "skyline" impacts that accentuate their visibility. This detracts from surrounding landforms. One reason wind turbines look more at home on flat or gently rolling topography is the absence of conflict with prominent land forms, such as those found around the project area. The rotating blades of wind turbines are another unique feature that attracts additional attention. Lighting (including both nighttime and daytime lighting) accentuates visual impacts and extends them to all hours. [LTR 180, CMT 5]*

Response: Comment acknowledged.

Comment: *Flawed Methodologies On 3-155 of the DEIS: "It assesses the potential for visual impacts using accepted methods of evaluating landscape quality and predicts the type and degree of effects the project likely would have on those attributes." Two methods were used: The U.S. Forest Service Landscape Aesthetics Handbook and the Federal Highway Administration (FHWA) process for visual impact assessment. In my opinion, the FHWA method is not a suitable method for evaluating the visual impacts of wind energy projects in general, and this project in particular. This system was designed to be used only for assessing impacts from highway related development. It contains no process or method for assessing the visual contrast presented by wind turbines or related energy facilities (such as power lines). This is stated in the very title of the FHWA manual: Visual Impact Assessment for Highway Projects, and is explicitly noted in the opening sentence on page one: "This field guide is intended to help those who prepare or review the coverage of visual impacts in environmental assessments for highway projects" (emphasis added). Unlike the Forest Service and BLM methods, the FHWA process is not a flexible method that can easily be adapted to different project types. The mere fact that other wind projects have used it in the past does not justify its continued misuse. Like all visual impact assessment methods, the FHWA contains terminology, approaches and ideas that can be borrowed or used elsewhere, but the proponent seems to have gone beyond mere borrowing and has assumed this method is more adaptable than it is. The decision to use this method seems based on a single factor, that it is used in lands that do not have assigned visual quality objectives. The flaws and limitations of the FHWA method have been overlooked. [LTR 180, CMT 6]*

Response: The comment does not provide specifics on how the FHWA methodology was flawed in its application to this Project - only that in general the use of FHWA method is not a suitable method for wind facility projects. By combining the FHWA and USFS methodologies, the methodology used for this Project provides a clear understanding of how the proposed

Project would affect the visual landscape as seen from key viewing areas, portrays the differing viewer groups and their sensitivity to visual change, defines distance zones, and evaluates the contrast between pre- and post-project conditions as seen from the different viewpoints, by different viewer groups, and from different distances. The FHWA methodology has been used successfully to convey impacts to landscapes for other wind facility projects including the Kittitas Valley, Desert Claim and Wild Horse Projects.

Comment: *Visual Contrast Rating: Degree of Contrast Criteria None The element (wind turbines) contrast is not visible or perceived Weak The element contrast can be seen but does not attract attention Moderate The element contrast begins to attract attention and begins to dominate Strong The element contrast demands attention, will not be overlooked, and is dominant In the BLM method, an objective measurement of contrast is combined with viewer sensitivity to determine the level of impact. A number of factors are considered, including distance, view angle, view duration, project size, atmospheric conditions and motion (i.e. spinning blades). The Forest Service method (Landscape Aesthetics, A Handbook for Scenery Management) has similar applicability, but substitutes the terms Retention (no contrast), Partial Retention (weak contrast), Modification (moderate contrast) and Unacceptable modification (strong contrast). Either of these methods would be appropriate for use on the Whistling Ridge project. A second flaw in methodology is the failure of the DEIS to analyze the landscape character of the project site and its vicinity. Only a general description of the regional landscape and local surroundings is presented on pages 3-161 to 3-163. [LTR 180, CMT 8]*

Response: The use of the BLM methodology, particularly the application of the contrast rating, hinges upon the comparison with established visual classifications. As noted in Section 3.9.1 (on page 3-156 of the DEIS), in order to use the BLM process for projects on private lands where no visual resource objectives have been established, it would be necessary to complete a full visual management inventory to delineate all lands in question and then classify each delineated area using the BLM classifications. The EIS does describe the visual setting in Section 3.9.2 (on DEIS pages 3-161 to 3-164). The EIS also provides measures for Landscape Scenic Quality in Table 3.9-1 and applies these measures to each viewpoint. The application of USFS landscape management objectives to private lands would not be appropriate for this Project.

Comment: *The DEIS fails to recognize the visual prominence of the series of landforms and water bodies that comprise the surrounding landscape, including Whistling Ridge, Saddleback Mountain, Underwood Mountain, Underwood Bluff, Chemawa Hill, Dog Mountain, and the mouth of the Little White Salmon River. These are prominent and important focal features. The visual integrity of some of these landforms has already been somewhat compromised due to timber harvest and utility line construction, but that does not make these visually complex landforms any less important or less visible. On the contrary, it argues for being careful to not introduce additional impacts that increase cumulative effects. The DEIS's failure to analyze the impacted area's landscape character is an important omission, because landscape character is the baseline from which changes or contrasts are determined. Natural and cultural landscapes*

have identifiable form, line, color and texture characteristics that can be documented and described. The extent to which a development either blends or contrasts with these characteristics is a key basis for understanding impacts. [LTR 180, CMT 9]

Response: The EIS does describe the visual setting in section 3.9.2 (on DEIS pages 3-161 to 3-164). The EIS also provides measures for Landscape Scenic Quality in Table 3.9-1 and applies these measures to each viewpoint. Furthermore, photo simulations provide additional visual representations of the Project Area from viewpoints thus accurately portraying the visual character of the Project Area.

Comment: *Another flaw in the DEIS is the way the scenic quality ratings were created. Page 3-158 includes a table (3.9-1) that describes scenic quality ratings 1 (low) through 6 (outstanding). It states that "each viewpoint is assigned a final rating based on this scale." A landscape is either scenic or it isn't based on its intrinsic qualities. Every landscape region has places that are more inherently scenic than other places. In the Washington Cascade Mountains, steep, rugged, complex and diverse landscapes, especially those with water features rank higher on scenic quality scales than do areas with gentle terrain, bland vegetation cover and no visible water. This is true regardless of where the observer happens to be standing. Both the BLM and Forest Service methods are useful in assessing the intrinsic scenic quality of landscapes. These sources and materials should be used, so that scenic impacts can be properly evaluated. Pages 3-159 contains questionable statements and assumptions on viewer sensitivity. Given that the project borders on a federally protected national scenic area and that key viewing areas and visual quality objectives have already been established for this landscape, there seems little need to create new assumptions about sensitivity from these viewpoints. All KVAs are by definition high sensitivity. Viewer sensitivity from KVAs is high based on the very definition the proponent uses on page 3-159: "High. Residential, recreational and viewers congregating in public viewing areas (churches, schools, designated scenic viewpoints, etc) are considered to have comparatively high visual sensitivity." (emphasis added). [LTR 180, CMT 11]*

Response: Visual quality is adequately assessed in the analysis. The criteria used for assessing landscape scenic quality are discussed in Table 3.9-1. Not all CRGNSA KVAs can be classified as having high viewer sensitivity as viewer sensitivity to landscape changes for many of the KVAs is moderated by the distance from the viewer to the Project and other factors. As noted in the USFS Scenery Management System, the scale for viewer concern levels include the degree of public importance placed on the landscape and "the visibility of lands in each distance zone" [emphasis added] (USFS 1995). Even the BLM guidance in BLM Manual H-8410-1 encourages coordinating distance zones delineation with Sensitivity Level Analysis (see BLM Manual H-8410-1, Section IV.B). Additionally, the views from KVAs are not "by definition" highly sensitive. According to the Interim Guidelines for the Scenic Area, the KVAs were chosen based upon where large numbers of people view the CRGNSA. Just because there are a large number of people however, does immediately mean it is highly sensitive. The type of viewers, viewing conditions, and scenic quality of the view must also be considered.

Comment: *Additionally, contrary to the statements on page 3-159, sensitivity is not related to distance. A KVA, by definition, is a high sensitivity viewpoint, regardless of the distance to the object viewed. What changes is the degree of contrast experienced. At greater distances contrast is reduced and thus visual impacts normally decrease. Sensitivity, which is related to the observer, does not diminish with distance. On page 3-163, the DEIS states: "The local landscape visual appearance is of moderate visual quality with a moderate level of sensitivity." (emphasis added). For reasons stated above, there is no analytical basis for making this determination. The landscape surrounding the proposed turbines may be of low, moderate or high quality scenically. But viewer sensitivity is inherently high from designated scenic viewpoints such as key viewing areas. For viewpoints outside of the Scenic Area (i.e. Husum) some analysis on sensitivity may be useful. The selection and analysis of viewpoints in the DEIS is flawed. On page 3-164, the DEIS states: "Each viewpoint was assessed for its scenic quality and viewer sensitivity, and a rating was applied to provide an overall average for the area." This sentence makes no sense. The scenic quality of the viewpoints is not an issue. The scenic quality of the project site and how this would change under the proposal is the issue. Viewer sensitivity, as previously stated, should be presumed to be high from any KVA. That is exactly why they were designated KVAs in the first place. There is no such thing as an "overall average" with respect to scenic quality. One cannot average the scenic quality or impacts among differing viewpoints. Each must be assessed on its own merits. [LTR 180, CMT 12]*

Response: Comments in regards to viewer sensitivity are addressed in response to Comment LTR 180, CMT 11 above (see also Section 3.9.1.2). The selection of viewpoints is not flawed as they were selected based upon several factors based upon their representation relative to the Project Area, locations that are most accessible to the public and locations with the largest number of viewers (including residences) (see DEIS page 3-164). Several CRGNSA Key Viewing Areas (KVAs) with views of the Project were chosen for analysis as noted in Section 3.9.2.3. The analysis considers the context of the visual experience from each viewpoint (see Section 3.9.1.2). Views from KVAs can vary greatly in terms of the visual quality. The commenter fails to note that in many instances, the views from KVAs include a number of human activities and structures including logging clearcuts, roads, highways, and residences. Further, Hood River County, Skamania County, and the Columbia River Gorge Commission have not ascribed a visual quality score for each KVA within its respective jurisdiction. KVAs are principally designed, rather, as a means for ensuring that development within the NSA is subordinate as the Project is seen from a KVA. One, however, cannot assume that a KVA would necessarily have a visual quality score of a 6 due to this variety of factors.

Comment: *Viewshed and Viewpoint Analysis Figures 3.9-1 and 3.9-2 are useful in assessing the potential visibility of proposed turbines from within the National Scenic area and elsewhere. But they fail to note the full extent to which the turbines would be exposed to key viewing areas. The analysis treats the scenic impact problem as a viewpoint impact as opposed to a view corridor impact, but several of the affected KVAs are corridors, not points. These corridors include designated scenic roads and the Columbia River. The DEIS should be revised to analyze the distance along the entire length of these KVAs from which the project would be visible and to simulate views from multiple points along these KVAs in order to identify where the greatest impacts are likely to occur. As it stands, the viewpoints chosen for analysis may not be truly*

representative: I-84, the Columbia River and the Historic Columbia River Highway all have multiple possible view locations that may experience greater impacts than the single locations chosen by the applicant. Each of these view corridors come within 3 miles of the project, yet all sample viewpoints are more than 4 miles from the project. Additional views along these three KVAs should be analyzed. For example, a simulation from the Historic Columbia River Highway at Mitchell Point, directly across the Columbia River from the project, is critical. [LTR 180, CMT 13]

Response: As noted in Section 3.9.2.3 (on DEIS page 3-164), CRGNSA key viewing areas (KVAs) (including those along corridors) with no turbines visible were not selected as viewpoints for visual simulations and were not further analyzed. However, the EIS does consider impacts to the various CRGNSA KVA corridors where turbines would be visible. Each KVA along the various corridors was chosen to convey the greatest extent of Project impacts. Furthermore, in describing the levels of visual sensitivity, the analysis considers the type of viewers who travel within a particular corridor as well as those who are more likely to gather in one location. For a discussion of Mitchell Point, see response to Comment LTR 141, CMT 2 above.

Comment: *The visibility maps (Figures 3.91 and 3.92) illustrate that a huge area covering thousands of acres is potentially within line of site of one or more turbines. Given the high visibility of the project, additional viewpoints need to be selected to help analyze visual impacts. For example, the analysis failed to consider the impact from certain KVAs, including Tom McCall Point. Finally, there is a need to identify which turbines are visible from which viewpoints. This will aid the applicant, reviewing agencies, and the public in understanding both the extent of impact and in identifying potential mitigation measures. Photomontages. The applicant is relying heavily on the small number of selected viewpoints and photomontages to determine the level of impact. Regulatory reviewers of this proposal, as well as concerned members of the public, need to understand the inherent limits of what these photomontages can represent. [LTR 180, CMT 14]*

Response: The photo simulations, in addition to Figures 3.9-1 and 3.9-2, provide information on the number and location of the wind turbines that would be visible from the various CRGNSA KVAs. The locations of the individual turbines are identified in the two figures and can be cross-referenced with the photo simulations. Additional viewpoints are analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A). A more detailed description for each viewpoint follows the summary table and figures (as noted on page 3-176 of the DEIS). The process of preparing the photomontages is described in Section 3.9.1.3.

Comment: *First, the choice of viewpoints is critical. Are the viewpoints chosen truly representative of the views available in the area? For reasons mentioned, I do not believe this has been shown to be the case. Given the scale of this project and the number of viewpoints potentially affected, additional viewpoints should be analyzed. [LTR 180, CMT 15]*

Response: Please see response to Comment LTR 141, CMT 2 above.

Comment: *Second, photomontages are not, and cannot, be true to life representations and should not be viewed as such. The inherent limitations of photomontages should be discussed in the DEIS. Two-dimensional photo images can never replicate a three-dimensional world because people see stereoscopically, and will view real life turbines from within three-dimensional space, not as if they were painted upon a flat plane. Real world resolution is also much greater than what can be portrayed on a photo. Brightness ratio is a measure of contrast between the lightest and darkest elements in any given view. On a clear day, a viewer might experience a 1,000 to 1 brightness ratio. The same image on a computer monitor provides a 100 to 1, or at best 400 to 1 brightness ratio. If this image is printed, the brightness ratio is cut in half or less. What this means is that a photographic image is inherently much lower contrast than what one would see in the real light of day. Additionally, the size of the image one looks at and the distance from which one views that image are crucial. [LTR 180, CMT 16]*

Response: The EIS does not claim that the simulations are "true to life," but it does disclose and describe the process by which they are prepared. The term "simulation" intimates that the photomontages are estimates of Project appearance using the best information available at the time the DEIS was prepared. Comments regarding the brightness ratio and image contrast are noted. The simulations were prepared using commonly used computer modeling and printers with adequate resolution.

Comment: *Page 3-160 of the DEIS states that "Visual simulations were developed using photographs taken with a 35 mm digital SLR camera. Various focal lengths from 40-70mm were used with the intent to capture the maximum pixels and resolution for the simulation." A 50mm focal length approximates what the human eye sees. A 40mm length shows a wider angle, and pushes an image farther away, while a 70mm length brings it closer to the viewer. Most people will view the photomontages either on a computer monitor or on a printed page. Research indicates that to get a realistic sense of scale and distance, the original photo should be taken with a 70mm focal length and the image should be printed or viewed at a full page size, either 8 x 11 or 11 x 17 depending on the extent of the area being shown. This is because most people need to hold an image 15-20 inches away from their eyes in order to be focused. Viewing a photo of an object several miles distant, and moving that photo a few inches away adds miles to the effective visual distance. Also, by clipping images together to create panoramas, the photomontages effectively make the turbines recede farther into the background than they would appear in reality. It is nearly impossible for people to judge the true scale of wind turbines when looking at photos of them taken from a distance of several miles. The problem is there is usually no clear frame of reference within the photo to measure the size of a turbine against. Unless there is something of known size near the turbines, a house or barn for example, one cannot tell if the turbines are 100 or several hundred feet tall. In short, the images provided are too few and otherwise limited to be able to accurately assess the potential visual impacts of the proposal. [LTR 180, CMT 17]*

Response: The 40-70 millimeter (mm) focal length is a reasonable range that takes into account how the Project will be viewed. Wider angle lengths (up to 40 mm) were used to accentuate panoramic viewer experiences. Higher lengths (up to 70 mm) were used to provide more Project detail. Differences in focal length provide flexibility in the presentation of the simulations to provide reviewers the opportunity to experience broader fields of vision and/or more Project details. While several photos do contain objects that lend the Project some sense of scale, the use of wireline drawings lends additional clarity to the illustration of Project effects and provides a reasonable degree of scale to the viewer. Furthermore, by understanding that the turbines are up to 415 feet tall, the viewer can judge relative distance and scale and hence impacts by analyzing viewpoints with background and foreground Project views.

Comment: *The images included in the DEIS vary greatly in scale. For example, the turbines appear much larger in the simulation for viewpoint 3, a distance of 7.6 kilometers, than they do for viewpoint 1, a distance of 6.4 kilometers. How can this be? The turbines should appear larger in the closer view. The answer must be that the reproduced image provided, no matter what focal length was used, does not reflect the distance. This is also evident in comparing viewpoints 11 and 12, which are similar view angles. The turbines in the simulation for viewpoint 12 appear smaller and farther away than those for viewpoint 11, even though the former is 3 kilometers nearer according to the data provided on the image. [LTR 180, CMT 18]*

Response: The methodology for preparing the simulations is described in Section 3.9.1.3. The different sense of Project scale and distance in the simulations may vary due to a number of different variables including viewer positioning, differences in respective viewpoint elevation, intervening landforms, and varying vegetation levels.

Comment: *Lastly, even if the photo images were perfect representations of the wind turbines, they would fail to capture the added impacts due to the motion of spinning blades. Blade motion would attract the eye and add to visibility. Simulations that include motion (animations) should be provided by the applicant to properly assess impacts. Specific viewpoints I have selected a few viewpoints to illustrate the magnitude of impacts that may result from this project as designed. [LTR 180, CMT 19]*

Response: The development of animated simulations to represent moving blades is beyond the scope of this EIS. Visual impacts from moving blades are already considered in Sections 3.9.1.3 and 3.9.3.1. The impacts from shadow flicker are discussed in Section 3.6.2.1.

Comment: *Viewpoint 11: I-84 Westbound. As viewed from this viewpoint, the 25 turbines with visible hubs clearly are visually dominant over the natural form, line, color, and texture of the existing landscape. They are high contrast, even with the inherent brightness ratio limitations of the photomontages. They have a strong skyline presence that draws attention to them. Spinning blades would only increase their obvious visual dominance. A key problem from*

this viewpoint is the chaotic, jumbled appearance of the turbines. They are bunched up and overlap each other, creating too much visual density, with too little space between individual turbines and clusters. The turbines viewed from this vantage point present a very high contrast. Given the huge number of viewers, long view duration, and high sensitivity, the visual impact from the I-84 KVA and the adjacent Columbia River KVA in this area is very high. [LTR 180, CMT 20]

Response: Interpretation and conclusions on the degree of visual impact are subjective and dependent upon the viewer. Because viewers are 14 km from the Project and are typically moving in vehicles in the I-84 corridor, the viewer sensitivity for Viewpoint 11 is considered moderate.

Comment: *Viewpoint 12: Koberg Beach State Park. Impacts from viewpoint 12 are high, but not as high as from viewpoint 11. The angle of view is similar to the previous one, but because the distance is shorter, some of the turbines have ducked behind the horizon. The result is a bit better visual composition and thus somewhat less impact. The turbines are still visually dominant, but their horizontal scale is less, and the array is more coherent. Taking these two images together, one can conclude that the impacts might be even greater when viewed from further east. This is supported by the viewpoint map, which indicates that more turbines are visible from further east. [LTR 180, CMT 21]*

Response: While a larger number of turbines may be visible further to the east, impacts further east of Viewpoint 12 would actually be less due to the greater distance from the Project. In general, viewer sensitivity is reduced as distance between the viewer and the Project increases. The factors that lead into measures for viewer sensitivity are addressed in Comment LTR 180, CMT 11 above.

Comment: *Viewpoint 13: I-84 Eastbound. The photomontage included in the DEIS is suspiciously low contrast. Given the much shorter view distance as compared with the previous two viewpoints, and taking the wireframe into account, the 12 turbines seen from here would be visually dominant. The skyline effect is strong, but the horizontal scale is modest. The biggest impact is from the dense cluster of turbines at the high point in the center of the image, best viewed on the wireline (Figure 3.9-10). Again, in looking at the viewpoint map, it appears that the turbines would be visible from along I-84 stretching 2 miles to the west and several miles to the east. This means a long duration view, and possibly more visible turbines. The composition of the turbines from this viewpoint is problematic. There are two areas of overlapping rotors, which create some visual incoherence. Impacts from this viewpoint are high. [LTR 180, CMT 22]*

Response: Because viewers are 5.52 km (3.429 miles) from the Project and are typically moving in vehicles in the I-84 corridor, the viewer sensitivity for Viewpoint 13 is considered moderately low. The sense of Project scale and distance in the simulations may vary due to a

number of different variables including viewer positioning, differences in respective viewpoint elevation, intervening landforms, and varying vegetation levels.

Comment: *Viewpoint 14: Viento State Park. This is a very misleading photomontage. The image is very faint, and the size does not correspond to the relatively short view distance of 6.4 kilometers (4 miles). The wireframe view indicates that the 18 turbines seen from this viewpoint would be very high contrast and would have high impacts, similar to those discussed under Viewpoint 11. All 18 turbines break the skyline, there are overlapping rotors and a jumbled, chaotic composition. The turbines located at the high point in the center of the image are particularly strong impact. The turbines would be framed by Dog Mountain, seen on the left side of the photo, and a portion of Underwood Bluff, seen on the right side of the photo (Figure 3.9-11). These are very natural, highly intact landforms, exacerbating the contrast that the turbines would introduce. Existing development prohibitions on these landforms, which lie within the National Scenic Area, are at the highest protection level, allowing no visual contrast. This illustrates the high sensitivity of the viewshed. [LTR 180, CMT 23]*

Response: Because viewers are 6.43 km (3.995 miles) from the Project and the number of visitors to the area, the viewer sensitivity for Viewpoint 14 is considered moderate to high. The sense of project scale and distance in the simulations may vary due to a number of different variables including viewer positioning, differences in respective viewpoint elevation, intervening landforms, and varying vegetation levels. See also response to Comment LTR 164, CMT 2 above.

Comment: *Viewpoint 19: Historic Columbia River Highway. This is also a visually misleading photomontage that most likely vastly understates the visibility and contrast of the 11 turbines in view. The image is much too hazy, and the white clouds behind the turbines provide a convenient low contrast backdrop for white turbines. By viewing the wireframe, I conclude that the turbines would be moderate to high contrast, and would be co-dominant to dominant. Impacts would be at least moderate, and possibly high. One visual advantage is that from this angle the turbine composition is reasonably coherent and the horizontal scale (along the horizon) is not great. The location of the turbines at a low point along the ridge presents lower impacts than noted in the previous photos. My concern is that the Historic Columbia River Highway runs within 3 miles of the project boundary west of this site. Selecting a single viewpoint over 7 miles from the project probably does not fully reflect the actual impacts to this Key Viewing Area. [LTR 180, CMT 24]*

Response: Because viewers are beyond 10.75 km (6.679 miles) from the Project and moving along the corridor, the viewer sensitivity for Viewpoint 19 is considered moderate. The sense of Project scale and distance in the simulations may vary due to a number of different variables including viewer positioning, differences in respective viewpoint elevation, intervening landforms, and varying vegetation levels.

Comment: *Second, the DEIS mentions new and improved roads, but no roads are shown in the photomontages. Has the proponent determined that these roads will not be visible, or have they simply been left out of the picture? Since the turbines are along prominent, narrow ridges, it is possible that roads will have to be cut into the sideslopes in order to be at an appropriate grade. If this is the case, the road cuts could be visible from some viewpoints. [LTR 180, CMT 26]*

Response: As noted in Section 3.9.3.1 (DEIS page 3-174), "New permanent and improved roads will be visually similar to existing secondary and gravel roads in the Project Area and most would be difficult to see from outside the Project Area."

Comment: *Fourth, the analysis does not include an evaluation of impacts from lighting (both daytime and nighttime). Lighting can cause a high contrast with surrounding landforms, dramatically increasing the impacts of development, both during the day and at night. The DEIS does not even attempt to estimate the extent of lighting, instead merely providing general guidance regarding the placement of lights and stating that the FAA will require lighting later. The DEIS needs to be revised to estimate the extent of lighting for this project and its impacts within the affected landscapes. [LTR 180, CMT 28]*

Response: The EIS discusses the impacts of light in several places. The impacts from shadow flicker are discussed in Section 3.6.2.1. The simulations provide estimates of Project impacts in varying degrees of light and weather conditions. Turbine night lighting impacts are adequately considered and disclosed in Section 3.9.2.3. The necessity for night simulations is also discussed in Section 3.9.1. As Section 3.9.3.1 notes, a generic illustration of night lights can be found on in the DEIS for the Nine Canyon Wind Project.

Comment: *Findings. The visual impact analysis provided in the DEIS is faulty and incomplete. In addition, the DEIS's conclusions that visual sensitivity is only low to moderate and that impacts would be low to moderate from most viewpoints (Table 3.9-2) are not supported by the facts. The project as presented would have substantial adverse impacts to scenic resources. [LTR 180, CMT 29]*

Response: Please see response to Comments LTR 180, CMT 1 through LTR 180, CMT 28 above.

Comment: *MOVING THE "A TOWERS" MITIGATES TOURISM IMPACTS. Facts. The seven "A Towers" sit alone on a clear-cut ridge at the very most southern portion of the proposed project. If installed they would dominate views, day and night, from far more locations than are depicted in the application submitted to Council. To remove any uncertainty about the visual impacts of the seven A Towers, the Agri-Tourism Association hired a pilot to fly a photographer along the ridge where these towers are proposed. In Appendix 7 to our comments,*

you will find the results. Take note of the photograph that was taken directly over the ridge at an elevation of 300 feet above the ridge. This photograph tells the story of who will see the seven A Towers. Also note that the photograph was taken 120 feet below the top of the proposed towers. Then take note of the next photograph that shows the locations of existing businesses along the Underwood Agri-Tourism Loop. The impacts are clear. The solution is also clear. The re-siting of the seven A Towers eliminates all visual impacts to the Underwood Agri-Tourism industry, as well as the visual impacts to a vast area throughout the Gorge. [LTR 186, CMT 16]

Response: The removal of the seven A-towers would not meet the objectives established in the Project's purpose and need.

Comment: *Comment on: Whistling Ridge Energy Project Draft EIS Concerning: FAA aircraft safety lighting requirements. Viewpoint associated with my full-time year round residents: Viewpoint 1: Pucker Huddle (Within Scenic Area), 16-25 Turbines visible. Lighting Suggestion Based On Reference: The U.S. Department of Transportation FAA Advisory Circular (AC 70/7460-1K) "Obstruction Marking and Lighting" Web Link to FAA Advisory Circular (AC 70/7460-1K): http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/B993DCDFC37FCDC486257251005C4E21?OpenDocument&Highlight=obstruction marking,lighting. [LTR 188, CMT 1]*

Response: Comment acknowledged.

Comment: *My suggestions here are to help minimize the visual impact while still adhering to the FAA aircraft safety lighting requirements. My house was built to take advantage of the view I have of Underwood Mountain, and because of this my Master Bedroom, Living Room, Dining Room and Kitchen windows all face Underwood Mountain. During the day, the wind turbines for me add to the scenic view, but at night the flashing lights can be extremely distracting, if not configured properly. My reference for the lighting being distracting are the wind turbines outside of Goldendale. When you are driving south on hwy 97 from Goldendale, the flashing lights are surprisingly distracting due to the fact that every wind turbine in the row had a light on it and possibly the speed at which the lights were flashing. This drive south on hwy 97 seemed representable of what the view from my house would be. My suggestions are based off of what I experienced driving south on hwy 97, and what I believe could reduce the distraction. The greatest issues were: 1. The number of lights, since every wind turbine appeared to have one. 2. The rate at which they flashed. 3. How they flashed, which was either off or on. [LTR 188, CMT 3]*

Response: Comment acknowledged.

Comment: *My suggestion would be to: 1. Put lights on the minimum number of towers based on the FAA Advisory Circular (AC 70/7460- 1K). For linear turbine configurations, this would be one at each end of the line with no more than 1/2 mile between lights in the line. Based on this requirement, a possible lighting configuration for Whistling Ridge could be placing lights on: A1, A4, A7, A8, A13, F1, F3 ,B1, B7, B13, B18, B21, D1, D3, E1, E2, C1, C4, C5, C8. 2. Set the flash Per Minute of the lights to 20 FPM (Flashes Per Minute). This suggestion is based on if the L-864 light is used, which is allowed to flash between 20 and 40 FPM. 3. Have the lights fade off and then fade on, as opposed to being either completely on or completely off. There was nothing in the FAA Advisory Circular (AC 70/7460-1K) that indicated the lights could not fade off then on, as opposed to being on or off when flashing. That is the extent of my suggestion. Thanks for extending the comment period. [LTR 188, CMT 4]*

Response: The Project will comply with FAA requirements as a condition of the site certification agreement. See also Sections 3.9.3.1 and 3.9.4 in regards to complying with FAA requirements and mitigation respectively. See also response to Comments LTR 119, CMT 5 and LTR 177, CMT 43, both above.

Comment: *The DEIS wrongly concludes that visual impacts will be low to moderate. Page 3-171 describes the north facing view from Hood River Hospital, an urban setting in the middle of town, but fails to describe the impact to any of the viewpoints along the waterfront, residences in town and recreation areas scattered throughout Hood River and The Gorge. These viewpoints are cherished and attract tourists and residents alike to the area. Industrial wind turbines 400' high will have a high impact on the scenic quality of these view sites, not a low impact. [LTR 190, CMT 3]*

Response: Please see response to Comment LTR 141, CMT 2 above. The viewpoints in the EIS adequately illustrate the potential impacts from the Project. The viewpoints were selected for their representation relative to the Project Area, locations most accessible to the public, and locations with the largest number of viewers. The number of turbines that would be visible from the areas the commenter mentions is illustrated in Figure 3.9-1, which shows the locations of the simulation viewpoints relative to the Project Area.

Comment: *The DRAFT refers to micrositing of towers, however I do not see anywhere in the draft that a site-by-site, micrositing analysis was done for each specific turbine or meteorological tower. Certainly the turbine & meteorological towers sited in the project area foreground as viewed the crucial viewpoints I identified above will have high visual impact. I recommend site-by-site, micrositing analysis be done for each specific turbine or meteorological tower within view from: Hood River, Columbia River Waterway (adjacent to Hood River), Columbia River Shoreline Recreation Sites (Adjacent to Hood River and Mosier), I-84 Freeway (From Hood River to Mosier in both directions). [LTR 194, CMT 2]*

Response: The EIS analyzes the impacts of a project that would occur within a wind turbine siting corridor and the analysis conducted assumes the worst case scenario of turbine placement

so that the greatest potential project impacts can be analyzed. The visual resource section was prepared based upon this assumption as noted in Section 3.9.1.3.

Comment: *The Board finds: Many man-made structures and activities are visible and will be visible along these "trails" that follow Interstate highways, where the most visible of "impacts" on travelers are the many semi trucks, trains, transmission lines, dams, industrial facilities, mines, and coal, gas and nuclear power generating facilities, as well as many cities, homes, commercial buildings, advertising signs and billboards, that they pass by. It is a gross abuse of federal authority to negatively comment on, and seek to obstruct a renewable energy project on private lands merely because a small portion is remotely visible from an Interstate highway. [LTR 197, CMT 4]*

Response: Comment acknowledged.

Comment: *Nestor Peak and Mitchell Point are key viewing areas used by hikers, mountain bikers, ATV enthusiasts, and horseback riders. If this project is built, the view of Mt. Hood from Nestor Peak and the view of Mt. Adams from points along the Oregon side of the Columbia Gorge will be permanently spoiled. [LTR 201, CMT 1]*

Response: Please see response to Comment LTR 141, CMT 2 above.

Comment: *Please deny the project application and institute a moratorium on further wind development within 20 miles of the Gorge Scenic Area boundary until we can understand the long-term impacts of wind development on animals and develop a meaningful plan that mitigates the visual impact of these projects. BPA and the Army Corps of Engineers took Celilo Falls away from us in 1957. Now it is 2010, and BPA plans to take away the horizon as well. The ongoing rape of natural beauty to fuel mankind's greed for energy and dollars must stop, here and now. [LTR 201, CMT 4]*

Response: Comment acknowledged.

Comment: *I personally think the generators are beautiful and do not detract from the Gorge view. [LTR 212, CMT 3]*

Response: Comment acknowledged.

Comment: *The mailing that SDS sent out was very troubling. Our neighborhood is comprised of $500,000 and up homes that moved here for the view. Our view will now be looking at windmills all day and blinking lights all night. We will receive no benefit from these windmills and we are in a different county. SDS gains the money, we gain nothing except a destroyed skyline. [LTR 213, CMT 1]*

Response: Comment acknowledged.

Comment: *My only compromise would be to lower the windmills below the ridgeline so we don't have to look at these unsightly beasts. [LTR 213, CMT 2]*

Response: Comment acknowledged.

Comment: *I think the turbines look graceful and I do not mind them during the day. At night the red hazard lights are an eyesore. I would vote no just to avoid seeing the lights at night. Probably not possible to get rid of the lights... but it sure would be nice. [LTR 214, CMT 2]*

Response: Comment acknowledged.

Comment: *Called to comment because he's too busy to attend the meetings for Whistling Ridge because he's hosting a beautiful event, a 15th birthday party, at the bed and breakfast. He loves to see the view of the gorge the way it's always been, and he believes it's inappropriate to place 50 decibel, 500 foot tall towers there. It's just not a good trade off for the small amount of power. When he got permits to build his B&B, he had to plant lots of trees as to not upset his neighbors. [LTR 218, CMT 1]*

Response: Comment acknowledged.

Comment: *Whistling Ridge is outside the delineated boundary of the National Scenic Area and totally exempt from its restrictions but due to the scale and proximity of the proposed turbines to the boundary, the project applicant has not ignored evaluation of aesthetic and other impacts from within the National Scenic Area. The Visual Resources section (3.9) consists of what appears to be a thorough and objective analysis of relevant impacts. I found no reason to doubt the completeness of the data or the validity of the methodology or findings. It is worth noting that the analysis rated no visual impacts as "High". Rather, most were rated moderate or low and only one, Viento State Park rated up to "Moderate to High". The DEIS's evaluation of viewer sensitivity states on Page 3-171: "When considering the distance of the project from this viewpoint (greater than 5 miles), the portion of the project that is visible from the viewpoint, the viewer types (recreational), and the scenic quality rating, the level of sensitivity was rated as*

moderate to high." This is the worst visual impact of this project documented by the DEIS thus it is reasonable to conclude that scenic resources of the National Scenic Area would not be compromised by the proposed action. [LTR 231, CMT 4]

Response: Comment acknowledged.

Comment: *I think people will get used to seeing the wind turbines. We need all forms of energy generation and this project is just one piece of that energy needs. [LTR 232, CMT 2]*

Response: Comment acknowledged.

Comment: *The effects on human habitation, which is fairly close, would be for the persons living nearby, very, very bad and of course this is right in line of sight of the Columbia Gorge Highway, the national scenic area. So this is not a satisfactory project. [LTR 233, CMT 3]*

Response: Comment acknowledged.

Comment: *However, the visual impact of the large array of flashing red lights will create a disturbing visual impact when directly viewed at night, and may reflect off low clouds, when present, and seriously affect the darkness of the night sky. Direct observations of the red lights on wind farms in Washington, from the Oregon side, creates a very distracting and potentially disturbing effect on the darkness of the environment. [LTR 237, CMT 3]*

Response: Turbine night lighting impacts are discussed in Section 3.9.2.3. The necessity for night simulations is also discussed in Section 3.9.1. As Section 3.9.3.1 notes, a generic illustration of night lights can be found in the DEIS for the Nine Canyon Wind Project.

Comment: *This project would ruin the beautiful view in the area. [LTR 240, CMT 4]*

Response: Comment acknowledged.

Comment: *The Mitchell Point overlook is even more visually sensitive than Interstate 84, both because it is higher in elevation and because it is a place where people stop and get out of their cars to take photos. It is closer to the proposed project than Viento State Park, Koberg Beach State Park and the single location on the Hood River to Mosier section of the Historic Columbia River Highway State Trail that were analyzed. This site must be analyzed for visual impact from the proposed project. [LTR 242, CMT 2]*

Response: Comment acknowledged.

Comment: *When the highway was constructed in 1913-1922 Samuel C. Lancaster wrote: "our first business was to find the beauty spots, or those points where the most beautiful things along the line might be seen in the best advantage, and if possible to locate the road in such a way as to reach them." This was accomplished by directing curves to draw attention to dramatic viewsheds and design features that enhance the appreciation of dramatic scenic landscapes. These design techniques are a critical component of the historic value of the Historic Highway, the first scenic highway in the country. Harming the views from these viewing locations directly undermines the historic integrity of this nationally important historic resource. The view from Mitchell Point in particular highlights the important relationship between highway design and maximizing appreciation of scenic landscapes. The original Tunnel of Many Vistas provided enhanced views of the Columbia River and the geologic features across the river on Underwood Bluff. The recreated tunnel will also highlight similar views. The proposed development would directly harm these views. As evidenced by the attached photos and the design features that highlight views from the "Tunnel of Many Vistas" underscore the views' significance to the highway designers. [LTR 242, CMT 3]*

Response: Comment acknowledged.

Comment: *The DEIS fails to acknowledge the scenic resource inventory or how the proposed development would impact this view. The development would include enormous industrial structures with moving parts and flashing lights that would break the sky-line of this view. Attention would be drawn away from the historic view and be focused on modem industrial development. This would cause significant adverse effects to the views. While the most severe impacts would occur to views from the HCRH at Mitchell Point, significant adverse impacts to views from miles of the HCRH would occur. The DEIS must be revised to accurately reflect the impacts to the length of the HCRH. The single simulation of a view from the Mosier to Hood River section of the HCRJ-I State Trail (Viewpoint 19) is both misleading in its presentation and incomplete. There is no analysis of impacts to the view corridor. [LTR 242, CMT 5]*

Response: Turbine night lighting impacts are discussed in Section 3.9.2.3. The necessity for night simulations is also discussed in Section 3.9.1. As Section 3.9.3.1 notes, a generic illustration of night lights can be found on in the DEIS for the Nine Canyon Wind Project. Viewpoint 11 is indicative of the visual impacts from the Project within the Hood River to Mosier segment of I-84. No additional simulations for this I-84 segment will be prepared. For a discussion of Mitchell Point, see response to Comment LTR 141, CMT 2 above. Response to Comment LTR 180, CMT 13 above discusses project impacts to CRGNSA KVA corridors.

Comment: *In sum the DEIS fails to adequately analyze the likely impacts to views from the Historic Columbia River Highway. Because the impacts were not adequately addressed,*

appropriate alternatives were not analyzed and appropriate avoidance and mitigation measures were not considered. Friends of the Historic Columbia River Highway encourage EFSEC and the BPA to revise the DEIS to actually reflect the likely impacts of the proposed development on the Historic Columbia River Highway. [LTR 242, CMT 7]

Response: Comment acknowledged.

Comment: *The revised EIS must include alternatives that would not include any turbines within viewsheds from the HCRH. At the least, the agencies must consider an alternative that would avoid impacts viewsheds from important viewpoints such as Mitchell Point. Thank you for the opportunity to comment on this DEIS. [for the following attachments see PDF] View from Mitchell Point – 2010 [picture] Historic Views of Mitchell Point [3 pictures] HCRH Reconnection Strategy – Segment 8 Mitchell Point Tunnel [map and article] [LTR 242, CMT 8]*

Response: The photo simulations provide within the EIS give an indication of the greatest potential Project impact to visual resources. This visual resources section (Section 3.9.1) takes into account both the size and movement of the turbines. Interpretation and conclusions on the degree of visual impact are subjective and dependent upon the viewer. Additionally, removing or reconfiguring the location of turbines that would be visible from the CRGNSA would be contrary to the Project's purpose and need.

Comment: *Mr. Bushman phoned on 8/25 to register his opposition to the Whistling Ridge wind farm that is being proposed. He is not opposed to alternate means of energy such as wind, but he does not want it in the scenic area of the gorge. [LTR 246, CMT 1]*

Response: Comment acknowledged.

Comment: *Our area has this beautiful scenic area and she doesn't understand why people want to ruin it by adding windmills. Her and her husband were over at friends the other evening, and they had the perfect view of the river and the gorge. It was absolutely beautiful! [LTR 247, CMT 2]*

Response: Comment acknowledged.

Comment: *She said they should focus on another project. This would ruin the gorge -- and the view. [LTR 251, CMT 2]*

Response: Comment acknowledged.

Comment: *She agrees with the Friends of the Gorge that it is not a good idea to build the windfarm where proposed. She would like it denied as it will ruin the beauty of the gorge. [LTR 252, CMT 1]*

Response: Comment acknowledged.

Comment: *Washed out photographs and simulations of wind towers may lead you to conclude that the visual impact of wind power is insignificant. Once again, the studies do not reflect how the human mind actually works. First of all, the human eye is drawn to movement, and the wind tower blades are huge and moving. At night the blinking lights attract your attention. Then there is the problem of size. The human eye is attracted to size, especially on ridgelines. The photographs and simulations simply do not capture the actual human experience when these wind machines come into view. The studies diminish the impact where the actual experience is that the machines command your attention, even when you try to ignore them. [LTR 256, CMT 16]*

Response: The photo simulations provide within the EIS give an indication of the greatest potential Project impact to visual resources. This visual resources section (Section 3.9.1) takes into account both the size and movement of the turbines and the need for aircraft warning strobes (see Section 3.9.1.3 and response to Comment LTR 177, CMT 43 above). Interpretation and conclusions on the degree of visual impact are subjective and dependent upon the viewer.

Comment: *As described in your analysis on Table 3.9.2 (Viewpoints 13 and 14) the Columbia River gorge has moderately high to high levels of visual quality. Visitors and residents within the gorge place a high value on scenic quality and viewer sensitivity is substantially higher than described in the DEIS. As such, I would ask that you consider potential scenic effects throughout project design and implementation. Considerations such as turbine placement, color and size through project design and implementation will help to ensure scenic quality, as viewed from within the CRGNSA, will be maintained and/or scenic modifications minimized. [LTR 257, CMT 3]*

Response: Please see response to Comment LTR 180, CMT 11 above.

Comment: *The Wind Towers will have a clearly definable adverse impact on the CGNSA. In the Management Plan for the Gorge are a list of "Key Viewing Areas" and guidelines for color, height, etc. for anything built that can be seen from a key viewing area. (See below.) The guidelines are there to prevent new structures from having an adverse impact on key viewing areas. The wind towers proposed would be visible from several key viewing areas in the Gorge, and do not meet the guidelines in the management plan, so they will have a clearly defined adverse impact. [LTR 262, CMT 1]*

Response: For a discussion on the applicability of the Skamania County Code as it pertains to the CRGNSA, see response to Comment LTR 301, CMT 5 below.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. [LTR 265, CMT 3]*

Response: Views from the HCRH are considered in Viewpoint 19.

Comment: *The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 265, CMT 4]*

Response: Many factors, as described in the EIS, were considered in assessing visual impacts and whether they could be considered significant. Viewer sensitivity, visual quality, and distance from the nearest turbines were three key factors in determining the level of Project impacts to visual resources. Using the methodology described in Section 3.9.1, and after considering CRGNSA KVAs and other viewpoints, it was determined that for most viewpoints impacts were low to moderate.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 266, CMT 4]*

Response: The EIS notes that the turbines are up to 415 feet tall so the viewer can judge relative distance and scale and hence impacts by analyzing viewpoints with background and foreground Project views. Additional viewpoints are analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A). A more detailed description for each viewpoint follows the summary table and figures (as noted on page 3-176 of the DEIS). The HCRH is considered in the visual resource analysis (see Viewpoint 19 on page 3-189 of the DEIS). For additional discussion regarding CRGNSA KVAs, see response to Comment LTR 265, CMT 4 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and*

other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 270, CMT 4]

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *"Facts". The promoters of this project have concentrated their money and power on a sales job based on selective misinformation in an attempt to promote the economic and political benefits (which have been grossly exaggerated) to Skamania and Klickitat Counties and WA State. Photos and "facts" have been specifically chosen or rejected to distort the realities as well as to quote old studies that are no longer appropriate. For example, there is a blatant omission (and highly selective inclusions) in the Draft EIS document of any photos of potential visual impacts from the Strawberry Mountain area in White Salmon. How about from the Mark O. Hatfield State Park scenic hike/bike trail along the Columbia River between Hood River and Mosier? [LTR 273, CMT 3]*

Response: All analysis prepared by the Applicant has been objectively reviewed by EFSEC. In some instances, EFSEC has requested and received additional information from the Applicant to improve the analysis presented in the DEIS and for the Final EIS. Strawberry Mountain was analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A). According to this document, the scenic quality from Strawberry Mountain was rated as moderate, viewer sensitivity was rated as moderate, and the level of impact was anticipated to be low to moderate. Viewpoints from hiking trails would not meet the criteria used for determining viewpoints for the visual resources analysis as noted in Section 3.9.2.3.

Comment: *Light pollution. Visualize a peaceful summer evening enjoying the sunset view of the Gorge from Strawberry Mountain in White Salmon where we live (and from many other areas in the Gorge), and seeing 50 blinking red lights all going off at once as the sun goes down behind them! One of the big draws to rural areas is the beauty of the night sky devoid of city lights. We hope you will conclude as we have that this is the absolute wrong location for this project, and probably the wrong technology for this time. ~ Please let's use some good old NW common sense that we are known for. Rely on facts and not just somebody's sales pitch, political pressure, and the enticement of big "free" subsidies, going into private pockets paid for by all US citizens. Please recommend the denial of this project in its proposed location to Governor Gregoire. It is the right decision. [LTR 273, CMT 6]*

Response: The details concerning obstruction lighting have not been determined but it is not likely that each wind turbine would need to be lit with a warning strobe given FAA requirements. Turbine night lighting impacts are discussed in Section 3.9.2.3. Impacts from night lighting are not expected to be significant.

Comment: *We will focus on three areas in which we feel we do have a certain amount of expertise: Scenic resources, Transportation resources and Recreation resources. As a former Commissioner serving at the pleasure of Governor Mike Lowry on the Columbia River Gorge Commission, Sally has a more than passing interest in (and acquaintance with) the local landscape. She also worked as a school bus driver for Mill A School, traversing Cook-Underwood Road between Mill A School and the Underwood Community Center for over 10 years. As a professional driver, she had a unique perspective on the safety aspects of this road, as well as SR14, which was often used to transport students to games and field trips. Paul has lived in Underwood all his life, and for the first 10 years of his adult life worked for Broughton Lumber Company at the Willard Mill, commuting on Cook-Underwood Road from Underwood to Willard. Both of us are avid horsemen, riding and packing in and around Underwood, Mill A and Willard, as well as on the nearby Buck Creek Trail System and in the Gifford Pinchot National Forest. To the scenic component of the DEIS, we would point out that the photographs purporting to depict the scenic impacts from various vantage points were obviously selected to minimize the impacts in the eye of the beholder. Importantly, NONE of the photographs depict the way these views will look at night, with red aviation lights destroying the appearance of the ridgelines in the moonlight. After all, it is dark about half of the time, and we think the scenic value of the project area at night should be a consideration, especially since there is currently nothing. In the area that generates the kind of scenic distraction that a string of red aviation lights (visible for 20 miles) strobing every few seconds will. These are not low to moderate impacts, especially if they are visible from YOUR living room windows. While the project is (just barely) outside the Columbia River Gorge National Scenic Area, we feel that a project that impacts a national treasure should be evaluated carefully. Buckets of money, not to mention blood, sweat, tears and emotional distress on all sides have been expended to preserve the scenic, natural, cultural and recreation resources of this place, and to encourage economic development in a way that is compatible with that preservation. It makes no sense to us, after 25 years of effort, for the State of Washington to produce a 1500 page document that fails to properly consider the impact this project would have on the CRGNSA. When the boundaries for the scenic area were established, no one could possibly have conceived that just 25 years later, the state would be considering allowing structures 400 feet high a mere 50 feet outside that boundary, and clearly visible from major viewing areas, including two population centers within the CRGNSA. We are among the many people who have invested their lives and their life savings in this beautiful place with the understanding that is a special, protected place, recognized by our government with special status to allow it to remain beautiful for future generations to enjoy. We are among the people who willingly, through design and landscaping, try to make our homes and other structures blend with the surrounding landscape. We are among the many people who understand that even though we own a fairly large piece of land, will not be able to divide it among our children and grandchildren, in the service of a larger public ideal. And that's okay with us, as long as the sacrifice is shared equally. It seems to us that for the state to allow a desecration of the scenery of this kind makes a mockery of that sacrifice in the name of lining the pockets of a wealthy local dynasty. We didn't notice any analysis of that in the DEIS. [LTR 277, CMT 2]*

Response: Please see response to Comment LTR 256, CMT 16 above.

Comment: *The DEIS is also deficient in the area of recreation. The Buck Creek Trail System receives short shrift in the DE IS. This trail system was built years ago by a local couple, with the cooperation and assistance of the Washington Department of Natural Resources. There was a trailhead, known as the Whistling Ridge Trailhead, complete with corral and campsite immediately adjoining the project area to the north. That trailhead has disappeared, along with the trail connecting it to the rest of the Buck Creek Trail System. The local chapter of Backcountry Horsemen of Washington recently had a work party on the trail system, and after much searching, found the northern end of the trail, but lost it in the clear-cut to the south. The trailhead is depicted on the wooden map near Northwestern Lake, and on paper maps distributed by DNR as recently as three years ago. Figure 4.2-27 purports to depict recreation facilities and key viewpoints. It shows the trailheads, but fails to clearly depict the trails and topography in a way to meaningfully show the potential visual impact on trail users. These include, but are not limited to the Buck Creek Trail System, and the Monte Cristo and Monte Carlo trails north of it. There are many places in the Gifford Pinchot that the project would be visible from, like Little Huckleberry Trail north of Willard. The project will be highly visible from the best southerly views from Little Huckleberry and the Buck Creek Trails, and could preclude the rebuilding of the Whistling Ridge Trail due to degradation of the trail experience. The DEIS does not discuss the disruption of a backcountry campout by aviation lights flashing to the south, and generally makes light of the impacts that will be suffered by recreationists subjected to the deterioration of their experience due to the scenic impacts associated with the project. In sum, we think your DEIS is deficient and that the Whistling Ridge Energy Project has the wrong name, in the wrong place. [LTR 277, CMT 4]*

Response: Please see response to Comments LTR 318, CMT 44 and LTR 302, CMT 11 below.

Comment: *[In reference to Section 3.6.2.1, Impacts, Proposed Action; PDF pg. 157-158], [t]he industrialization of Skamania County and other counties in the region is NOT preserving the rural character of the area! The Futurewise article, Planning for Sustainable Rural Areas, written in March 21, 2005 has a definition for rural character: 'The rural area is the land located outside the urban growth area and outside resource lands. Resource lands are agricultural, forest, and mineral lands of long-time commercial significance.' "Rural character" refers to the patterns of land use and development established by a county in the rural element of its comprehensive plan: (a) In which open space, the natural landscape, and vegetation predominate over the built environment; (b) That foster traditional rural lifestyles, rural-based economies, and opportunities to both live and work in rural areas; (c) That provide visual landscapes that are traditionally found in rural areas and communities; (d) That are compatible with the use of the land by wildlife and for fish and wildlife habitat; (e) That reduce the inappropriate conversion of undeveloped land into sprawling, low-density development; (f) That generally do not require the extension of urban governmental services; and, (g) That are consistent with the protection of natural surface water flows and ground water and surface water recharge and discharge areas. "Rural development" refers to development outside the urban growth area and outside agricultural, forest, and mineral resource lands designated pursuant to RCW 36.70A.170. Rural development can consist of a variety of uses and residential densities, including clustered residential development, at levels that are consistent with the preservation of*

rural character and the requirements of the rural element. Rural development does not refer to agriculture or forestry activities that may be conducted in rural areas.' I don't think that putting up 50+ industrial wind turbines and constructing maintenance roads throughout the landscape conforms to the definition of rural character " (a) In which open space, the natural landscape, and vegetation predominate over the built environment"!! [LTR 286, CMT 55]

Response: The existing setting and landscape was considered in the analysis upon visual resources. Through the scenic value assessment (Section 3.9.1.2) and the affected environment (Section 3.9.2) sections of the DEIS, the existing character of the visual resources were described and evaluated at the regional and local levels. For additional information concerning the applicability of RCW 36.70A.170, please see the discussion on Land Use and Recreation in Section 3.8 of the EIS.

Comment: *[In reference to Section 3.9.1, Proposed Action; PDF pg. 165], [t]hese 400-foot turbine towers break up the horizon, are visible to the eye, and don't belong in the visual landscape of the Columbia River Gorge National Scenic Area. Klickitat County has pillaged their entire prairie landscape with turbines and maintenance roads and these turbines are intrusive to one's enjoyment of the rural environment. The view shed would be ruined by these monstrous entities. [LTR 286, CMT 57]*

Response: The visual impact to existing visual resources is expected to be low to moderate for most of the viewpoints as analyzed in Section 3.9 of the EIS.

Comment: *[In reference to Section 3.9.3.1, Proposed Action; PDF pg. 182], [t]his statement "turbines will therefore blend with the background" is an opinion and is not factual. Those of us who live in the NSA and surrounding areas certainly would notice, as I can state from personal experience, 400 foot spinning turbines in the landscape! These suckers are BIG and they do impinge on one's visual area of interest. [LTR 286, CMT 61]*

Response: Most viewpoints located in the NSA would have views of the Project, however, due to the distance from the viewer to the Project, as well as the presence of atmospheric haze, varying levels of scenic quality, and the varying levels of viewer sensitivity effects are expected to be low to moderate for most of the viewpoints analyzed.

Comment: *[In reference to Section 3.9.4, Impacts, Proposed Action; PDF pg. 193], [t]hese are not "potential" visual impacts! These are real impacts and they would be very annoying and intrusive in our rural environment. [LTR 286, CMT 63]*

Response: Impacts are referred to as "potential" due to the fact that the Project is being "proposed" at this stage of the regulatory process. Therefore, anticipated levels of impact can

only be referred to as potential. EFSEC and the BPA are required to disclose these anticipated impacts in the DEIS.

Comment: *I wish to make comments on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. I live in Hood River, OR and I am concerned this project will cause visual pollution of our view shed, which is one reason tourists visit here. In addition this proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains and on the boundary of the Columbia River Gorge National Scenic Area. [LTR 287, CMT 1]*

Response: Visual impacts are discussed in Section 3.9. Impact to wildlife and other biological resources is discussed in Section 3.4. Your concerns regarding the potential Project impacts to these resources are noted.

Comment: *The DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains and on the Boundary of the Columbia River Gorge National Scenic Area. [LTR 288, CMT 1]*

Response: Comment acknowledged.

Comment: *Furthermore, the DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 288, CMT 4]*

Response: Please see response to Comment LTR 22, CMT 1 above. The Project would cause some visual impact to KVAs within the CRGNSA, but these impacts would largely be low to moderate (see Sections 3.9.3.1 and 3.9.5 ,DEIS pages 3-177 and 3-196).

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 289, CMT 5]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 290, CMT 5]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 291, CMT 6]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 292, CMT 5]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 294, CMT 5]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *I am firmly opposed to the proposed Whistling Ridge wind energy project. These unsightly towers do not belong at the very edge of a National Scenic Area. We mustn't let one individual's greed and ambition ruin a national treasure. If California must have the power*

generated by these wind turbines, then they should be located in California or at the very least, way out in eastern Oregon or Washington where their visual and environmental impact is less egregious. Please do not permit this project to go forward. We hike often in the eastern end of the Columbia Gorge -- it is a wonderful area. The presence of huge wind turbines would ruin the experience completely! Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 295, CMT 1]

Response: Comment acknowledged.

Comment: *I am totally opposed to this wind project in the gorge. The Whistling Ridge project is a disaster. Proposed to be located seven miles northwest of White Salmon, Friends of the Gorge writes "the proposed wind turbines would cover more than 1,000 acres of highly visible ridgelines and would be seen from several designated key viewing areas in the Gorge including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would also be highly visible from communities and cities such. as Mill A, Underwood, Hood River, and White Salmon." [LTR 296, CMT 1]*

Response: Comment acknowledged.

Comment: *The photo simulations are poorly accomplished. Please allow the time to consider other viewpoints, including views from the Historic Columbia River Highway and the Native tribes that may be impacted by the proposed projects. Thank you for extending the public comment period. [LTR 297, CMT 6]*

Response: Please see response to Comment LTR 266, CMT 4 above. For a discussion of tribal consultation, see Section 3.10.

Comment: *Starting on page 3-155, the DEIS uses the same methodology and visual simulations, though fewer viewpoints than in the SDS application. It appears to completely ignore the risks of significant impacts and recommendations identified in the USFS scoping letter. It simply depicts the same inaccurate and misleading conclusions presented in the SDS application. We ask, as Lynn Oliver of the USFS asked, "Was a qualified landscape architect consulted in the preparation of the DEIS?" None appear in the List of Preparers (pages 6-1 to 6-7). We must conclude one was not. The quality of this DEIS would have been substantially improved had the recommendations of Diana Ross, CRGNSA landscape architect been utilized. Her analysis of the application and our comments regarding relevant points of the DEIS follow. [LTR 300, CMT 1]*

Response: For a discussion on the methodology used for the visual analysis see response to Comment LTR 180, CMT 6 above. A discussion of how Visual Resource analysis was

performed – Methodology – please see Section 3.9.1. For viewpoint selections, please see response to Comment LTR 141, CMT 2 above, or you may also refer to Sections 3.9.1.1, 3.9.1.2, and 3.9.1.3, as well as Section 3.9.2.3. For a discussion on the professionals who conducted the visual resource analysis, please see response to Comments LTR 178, CMT 71 and LTR 179, CMT 65 above, or refer to Section 6.0, List of Preparers.

Comment: *Key Viewing Areas (KVAs): As mentioned in the application, the effects to scenic resources in the Scenic Area are assessed by analyzing the effects of a project on lands visible from 26 selected public vantage points from which the public views the landscape. It was not foreseen at the time the Act was passed that any development outside of the Scenic Area would be seen from these viewpoints. However, it is clear from the application that several Scenic Area Viewsheds (the land seen from these vantage points) will be affected 9 of the 21 viewpoints analyzed are also Key Viewing areas (#6 & 9 were missing). DEIS table (page 3-177) shows that Key Viewing Areas #6 (SR-14) and #9 (Tom McCall Point) are still missing and that #10 (Panorama Point) has been deleted. Why were these not included in the DEIS? Clearly, they are required in order to accurately analyze the visual impact of this proposed project. [LTR 300, CMT 1]*

Response: The selection of viewpoints is based upon the criteria developed in Section 3.9.2.3. The SR-14 (Viewpoint 6) and Tom McCall Point (Viewpoint 9) were not chosen to be analyzed due to their limited visibility of the Project and because there were other viewpoints that offered a better representation of Project effects. Visual impacts, as viewed from Panorama Point, are analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A of the DEIS). It was not chosen to be placed in the visual resource section of the EIS, due to its limited views of the Project and because other viewpoints offered a better representation of Project effects. As noted in Section 3.9.1.3, the visual simulations prepared likely overstate the visual impact by assuming a larger number of turbines.

Comment: *Methodology and Summary of Scenic Impacts: There are many unknowns in the summary of methods on page 4.2-30-31 of the application. For example, the methods section did not disclose the heights used for the turbines or whether the software placed and sized the turbines or whether this was done in Photo Shop as an art project. The simulations created using these methods are seriously flawed and do not represent an accurate visual depiction of what the viewer will experience. This is documented in the August 19, 2010, Dean Apostol, Landscape Architect memo on the DEIS presented to BPA and EFSEC ... "In short, the images provided are too few and otherwise limited to be able to accurately assess the potential visual impacts of the proposal. The images included in the DEIS vary greatly in scale. For example, the turbines appear much larger in the simulation for viewpoint 3, a distance of 7.6 kilometers, than they do for viewpoint 1, a distance of 6.4 kilometers. How can this be? The turbines should appear larger in the closer view. The answer must be that the reproduced image provided, no matter what focal length was used, does not reflect the distance. This is also evident in comparing viewpoints 11 and 12, which are similar view angles. The turbines in the simulation*

for viewpoint 12 appear smaller and farther away than those for viewpoint 11, even though the former is 3 kilometers nearer according to the data provided on the image." [LTR 300, CMT 1]

Response: The height of the turbines used is disclosed (415 feet - see Section 3.9.1.3). The method of creating the visual simulations is also discussed in Section 3.9.1.3. Visual Nature Studio, widely-used three-dimensional Geographic Information System (GIS) software, manufactured by 3D Nature, LLC, was used to model the turbine locations on terrain built from USGS digital elevation model data. The use of Adobe Photoshop, commonly used software for developing photo-composites, is also discussed in Section 3.9.1.3. For a discussion on the variability of turbine size from different perspectives, see response to Comment LTR 180, CMT 18 above.

Comment: *The USFS 2009 scoping analysis continues ... "There are also several questions concerning the methods used to 1) choose viewpoints, 2) define visual quality and viewer sensitivity, and 3) represent and make conclusions about impact. 1) Choosing viewpoints in the Scenic Area should be based on Key Viewing Areas. Several of these were missing from the discussion (SR-14, Tom McCall Point) and others are linear viewpoints where only one or no views were picked in the NSA (Columbia River, Hwy 35, 1-84, Historic Columbia River Highway). Therefore, it is unclear whether the impacts to NSA scenic resources were adequately captured." As pointed out earlier, SR-14 and Tom McCall viewpoints are still missing and Panorama Point has been deleted in the DEIS. It is abundantly clear from Dean Apostol's WRE DEIS analysis (2010) that the impacts to the NSA were not adequately captured in the DEIS. [LTR 300, CMT 1]*

Response: Please see response to Comments LTR, 300 CMT 1 above. Scenic Quality is adequately defined in Section 3.9.1.1 and viewer sensitivity is defined in Section 3.9.1.2.

Comment: *Figures 3.9-1 and 3.9-2 are useful in assessing the potential visibility of proposed turbines from within the National Scenic area and elsewhere. But they fail to note the full extent to which the turbines would be exposed to key viewing areas. The analysis treats the scenic impact problem as a viewpoint impact as opposed to a view corridor impact, but several of the affected KVAs are corridors, not points. These corridors include designated scenic roads and the Columbia River. The DEIS should be revised to analyze the distance along the entire length of these KVAs from which the project would be visible and to simulate views from multiple points along these KVAs in order to identify where the greatest impacts are likely to occur. As it stands, the viewpoints chosen for analysis may not be truly representative: 1-84, the Columbia River and the Historic Columbia River Highway all have multiple possible view locations that may experience greater impacts than the single locations chosen by the applicant. Each of these view corridors come within 3 miles of the project, yet all sample viewpoints are more than 4 miles from the project. [LTR 300, CMT 1]*

Response: The selection of some of the viewpoints within several of the corridors mentioned in this comment adequately conveys the extent of impacts from positions where viewers would

be most heavily impacted. The selection of viewpoints is further discussed in response to Comment LTR 141, CMT 2 above. Figures 3.9-1 and 3.9-2 convey the extent of potential Project impacts along the corridors noted in this comment by depicting the expected number of turbines that would be visible from these locations.

Comment: *Additional views along these three KVAs should be analyzed. For example, a simulation from the Historic Columbia River Highway at Mitchell Point directly across the Columbia River from the project is critical. "Mitchell Point is a significant view point" [LTR 300, CMT 1]*

Response: Please see response to Comment LTR 318, CMT 44 below. A simulation was prepared for the HCRH as shown in Figure 3.9-14.

Comment: *Continuing, the USFS scoping analysis (2009) points out ... "2) The NSA is a nationally known and protected landscape of high quality and high sensitivity. All KVA scenic analyses should reflect this. The results of the applicant's analysis are heavily weighted on the assignment of existing scenic quality and viewer sensitivity. These methods were not tracked and do not represent the reality of the Scenic Area." The visual sensitivity assessment is heavily influenced by what appears to be an arbitrary decision. Quoting from the DEIS: "Moderate levels of sensitivity were assigned to areas where turbines would be visible from 0.5 mile to 5 miles within the primary view of residences and roadways" (page 3-159). This is not based on any scientific studies presented. It is, in our opinion, self-serving and results in a measurement scale purposely designed to create faulty conclusions the proponent wants to support... namely that any turbine sited further than 0.5 mile will not have a high level of viewer sensitivity. This is not analyzing the facts to determine the impact, but skewing the measurement tools and analysis to achieve the desired results for the proponent. The visual contrast method, as thoroughly discussed in the Dean Apostol comment (2010), is a more objective method and would be less susceptible to manipulation by such arbitrary decisions. The analysis should be redone using the visual contrast method rather than the Federal Highway Administration Process that was used. "In my opinion, the FHWA method is not a suitable method for evaluating the visual impacts of wind energy projects in general, and this project in particular. This system was designed to be used only for assessing impacts from highway related development". "... visual contrast is a useful way of measuring impacts regardless of whether a resource management objective has been established, because it relies on simple and time tested analytical standards" This visual contrast method was indeed recommended in the USFS scoping comments (2009), but once again ignored in the preparation of the DEIS ... [LTR 300, CMT 1]*

Response: Visual quality is adequately assessed in the analysis. The criteria used for assessing landscape scenic quality are discussed in Table 3.9-1. Not all CRGNSA KVAs can be classified as having high viewer sensitivity as viewer sensitivity to landscape changes for many of the KVAs is moderated by the distance from the viewer to the Project. As noted in the USFS Scenery Management System, the scale for viewer concern levels include the degree of public importance placed on the landscape and "the visibility of lands in each distance zone" [emphasis

added] (USFS 1995). Even under an alternative visual analysis system (like the BLM's VRM) coordinating distance zones delineation with Sensitivity Level Analysis is encouraged (see BLM Manual H-8410-1, Section IV.B). For a discussion on using alternative methods for evaluating Project effects, see response to Comment LTR 180, CMT 8 above.

Comment: *The conclusions made on the summary chart would more accurately be made using degree of contrast with the natural landscape both during the day and at night, and distance of the viewer from the project area. This assumes that the most visually impacted viewpoints have been found and that the simulations accurately depict the degree of contrast. The impact summaries starting on page 4.2-68 discuss these contrasts but the ratings do not reflect the discussion. For example the text for viewpoint #1 states that "the presence of the turbines would reduce the scene's degree of intactness by introducing a large number of highly visible engineered vertical elements" but the impact rating is low to moderate. Rather than adjusting the rating to reflect the discussion in the original application, the sentence referenced just above regarding viewpoint #1 was deleted from the DEIS. A discussion was added in an attempt to justify the proponents desired low to moderate ratings. The "average scenic value"(DEIS 3-168) within the NSA is high scenic value in contrast to most other landscapes outside the NSA, not moderate. "The American Society of Landscape Architects included the Columbia River Gorge as one of the 100 most outstanding landscapes in the United States, ranking it along with Yosemite, Yellowstone and other national icons." (Apostol 2010). [LTR 300, CMT 1]*

Response: The comment regarding the significance of the CRGNSA is acknowledged. For a discussion on using BLM's methodology and its use of a contrast rating, see response to Comment LTR 180, CMT 8 above, or consult Section 3.9.1. While alterations to the text involving Viewpoint #1 occurred between the preparation of the Application for Site Certification and the preparation of the DEIS, the findings of the analysis has remained the same.

Comment: *The USFS scoping comments (2009) continues, "The Summary of Existing Scenic Quality and Project Visual Impacts on page 4.2- 67 did not rate any viewpoint as having a high level of impact defined as: turbines "highly visible in areas with a high number of sensitive viewers" and greatly altering levels of vividness, unity, and intactness. Viento State Park was rated as highest impact (moderate to high) but the photo print did not show any turbines (Figure 4.2-17). The Summary of Existing Scenic Quality and Project Visual Impacts in the DEIS (page 3-177), incredulously does not rate the anticipated visual impact on any viewpoint as high. The same flawed methods were used in the DEIS as in the SDS application. None of the needed changes suggested by the USFS were addressed. The Viento State Park photomontage in the DEIS (Figure 3.9-11), still does not show a single turbine. The same "photo prints" used in the SDS application are used in the DEIS. Despite a year to prepare the DEIS, no new photos or photomontages were utilized nor were the former photos even corrected. As Dean Apostol (2010) points out: "This is a very misleading photomontage. The image is very faint, and the size does not correspond to the relatively short view distance of 6.4 kilometers (4 miles). The wireframe view indicates that the 18 turbines seen from this viewpoint would be very high*

contrast and would have high impacts, similar to those discussed under Viewpoint 11. All 18 turbines break the skyline, there are overlapping rotors and a jumbled, chaotic composition. The turbines located at the high point in the center of the image are particularly strong impact. The turbines would be framed by Dog Mountain, seen on the left side of the photo, and a portion of Underwood Bluff, seen on the right side of the photo (Figure 3.9-11). These are very natural, highly intact landforms, exacerbating the contrast that the turbines would introduce. Existing development prohibitions on these landforms, which lie within the National Scenic Area, are at the highest protection level, allowing no visual contrast. This illustrates the high sensitivity of the viewshed. [LTR 300, CMT 1]

Response: For issues pertaining to Viewpoint 14, refer to response to Comment LTR 164, CMT 2 above. It should be noted that there are also several landscape components to this view that show alterations to the viewshed by other activities such as logging and transportation (roads). Another factor that would not make the visual impact from Viewpoint 14 high is the distance of the Project from the viewer. No new photo simulations were prepared because the existing analysis provides an approximation of project effects given the best available information.

Comment: *Pointing out further limitations with the pictures, the USFS scoping comments (2009) continue ... "It is generally very difficult to fully depict the visual effect of viewing the landscape in a small photo and because of these limitations, pictures with clouds at the skyline should not be used". [LTR 300, CMT 1]*

Response: For a discussion on the use of photomontages that show a range of weather conditions, see responses to Comments LTR 180, CMT 28; LTR 178, CMT 155; LTR 300, CMT 1; and LTR 139, CMT 23 above. For a discussion on the focal lengths used for the individual photographs, see response to Comment LTR 177, CMT 60 also above.

Comment: *In addition, many non-NSA viewpoints and non-KVA viewpoints were added making it difficult to assess the effects in the Scenic Area. The scenic impacts both at night and during the day would be better depicted using photos of existing turbines in the Gorge. The existing development east of the Scenic Area provides a better indication of the impact on the scenic resource than represented in these visualizations. The visualizations are important for finding the number and location of the visible turbines, but have limited utility for assessing scenic impact. [LTR 300, CMT 1]*

Response: Table 3.9-2 clearly shows which viewpoints are within the CRGNSA, which viewpoints are also KVAs within the CRGNSA, and which viewpoints lay outside the CRGNSA. The simulations use turbine models that may be used for the Project as a way of conveying the Project's effects to visual resources.

Comment: *The exact same small photos used in the application with clouds are used in the DEIS, disregarding the comments of the USFS. We agree with Dean Apostol's (2010) statement: The photomontage images in the DEIS are flawed. The scale and distance appear to be inconsistent. Atmospheric conditions on some photos are hazy. Use of a white cloud background reduces apparent color contrast of turbines skylined on visually prominent ridges. This should have been addressed in the preparation of the DEIS. It must be addressed with more realistic depictions of the turbines both during the day and at night in a revised DEIS. The public will be more accurately informed and then could make relevant comment. [LTR 300, CMT 1]*

Response: Please see response to Comments LTR 180, CMT 2 through LTR 180, CMT 28 above.

Comment: *We agree with the findings of Dean Apostol (2010) ... "The visual impact analysis provided in the DEIS is faulty and incomplete. In addition, the DEIS's conclusions that visual sensitivity is only low to moderate and that impacts would be low to moderate from most viewpoints (Table 3.9-2) are not supported by the facts. The project as presented would have substantial adverse impacts to scenic resources." [LTR 300, CMT 1]*

Response: Please see response to Comments LTR 180, CMT 2 through LTR 180, CMT 28 above.

Comment: *Finally the USFS scoping comments (2009) made the following recommendations, which were either ignored or not adequately addressed. "3) Recommendations In order to assure that the scenic resource impact is adequately analyzed, I recommend the following improvements to the scenic resource impact assessment: Include a discussion or summary of the most visible turbines. [LTR 300, CMT 1]*

Response: The DEIS summarizes the effects of the Project upon each viewpoint in Table 3.9-2.

Comment: *Include photographs of existing energy projects visible in the NSA. [LTR 300, CMT 1]*

Response: Please see response to Comment LTR 79, CMT 3 above. The cumulative effects from other wind energy projects visible within the CRGNSA are discussed in Section 3.14.3.10. Insertion of additional photographs would not add clarity to the discussion of cumulative effects.

Comment: *Do not use visual simulations (at a small scale with clouds in the picture) to depict the visual impact of visible turbines. [LTR 300, CMT 1]*

Response: Visual simulations are an important part of the visual analysis as it provides an estimate of the Project's impact upon visual resources. The images also convey the Project within its representative setting which includes varying weather and atmospheric conditions.

Comment: *Make certain that the most visible viewpoints have been covered, especially with respect to the linear viewpoints. [LTR 300, CMT 1]*

Response: Please see response to Comment LTR 141, CMT 2 above.

Comment: *Make certain to include the night-time effects in your analysis. Instead the DEIS does not include photographs of existing energy projects visible in the NSA. Uses, "visual simulations (at a small scale with clouds in the picture) to depict the visual impact of visible turbines" Leaves out the two specifically USFS requested viewpoints SR-14 (#6), Tom McCall Point (#9) and eliminates Panorama Point (#10). Does not "include the night-time effects" in the analysis. [LTR 300, CMT 1]*

Response: Please see response to Comment LTR 119, CMT 5 above.

Comment: *The USFS scoping comments (2009) concludes with the following: "In order to prevent the scenic impact of the turbines visible from the Scenic Area Key Viewing Areas, I also recommend that the applicant eliminate turbine locations found to be visible from Scenic Area KVAs. I am hopeful that close attention to these impacts will result in a solution which will fit the unique area that this project will potentially benefit." [LTR 300, CMT 1]*

Response: The removal of the towers visible from the CRGNSA would not meet the objectives established in the Project's purpose and need.

Comment: *The proposed Whistling Ridge Energy Project is illegal under Title 22 of the Skamania County Code [LTR 301, CMT 1].*

Response: Please see response to Comment LTR 301, CMT 5 below.

Comment: *The proposed wind turbines are 430+/- feet tall and must be equipped with strobe lights at the top to satisfy FAA regulations. [LTR 301, CMT 2]*

Response: Comment acknowledged.

Comment: *Because the proposed Whistling Ridge Energy Project cannot meet the test of visual subordination the project is illegal. The proposed project violates both the letter and the spirit of Title 22. [LTR 301, CMT 5]*

Response: The Project lies outside the National Scenic Area and is therefore not subject to Skamania County Code Title 22. Furthermore, the National Scenic Act states that "no protective perimeters or buffer zones shall be established around the scenic area or each special management area. Activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas" (16 USC Section 544O(a)(10)).

Comment *…to the extent any of the turbines and/or their strobe lights are visible from Cook Underwood Road, (or any other key viewing area) the requirements of Section 22.18.030 must be met. In order to meet the requirements of Section 22.18.0308, the portion of the Whistling Ridge Project which is visible from Cook Underwood Road must be "visually subordinate to its setting as seen from" Cook Underwood Road. [LTR 301, CMT 7]*

Response: Please see response to Comment LTR 301, CMT 5 above.

Comment: *Clearly, the proposed wind turbines and their strobe lights which are visible from Cook Underwood Road cannot pass the test of visual subordination. Additionally, Section 22.18.030L of Title 22 provides that "Exterior lighting shall be directed downward and sided, hooded and shielded such that it is not highly visible from key viewing areas". [LTR 301, CMT 8*

Response: Please see response to Comment LTR 301, CMT 5 above.

Comment: *Application of Title 22 to the Cook Underwood Road "Key Viewing Area" results in the proposed project being illegal. Because the proposed project would impact the Cook Underwood Road view shed in a manner that is prohibited by Title 22. [LTR 301, CMT 10]*

Response: Please see response to Comment LTR 301, CMT 5 above.

Comment: *Title 22 clearly asserts jurisdiction over visual impacts seen from Cook Underwood Road which originate from outside the NSA boundaries and clearly prohibits intrusions on the Cook Underwood Road view shed which originate from outside the NSA. Viewshed is defined in Section 22.04.010 as "a landscape unit seen from a key viewing area". (emphasis added) This definition is not limited to landscape units which originate from within the NSA boundaries. [LTR 301, CMT 11]*

Response: Please see response to Comment LTR 301, CMT 5 above.

Comment: *…if Title 22 had been intended to protect the view shed of the Cook Underwood Road Key Viewing Area (or any other key viewing area) only from visual impacts originating from within the boundaries of the NSA, the Ordinance would have specifically done so by including that limitation in the definitional sections discussed above. Since no such limitations exists in Title 22, it is clear that the View Shed of Cook Underwood Road is protected by the express provisions of Title 22 from visual impacts originating from both within and outside of the NSA boundaries. [LTR 301, CMT 12]*

Response: Please see response to Comment LTR 301, CMT 5 above.

Comment *…one of the major flaws of the DEIS is a failure to include much analysis of the visual impacts from hiking trails or viewpoints from within the Gifford Pinchot National Forest. [LTR 302, CMT 11]*

Response: In general hiking trails that would provide views of the Project did not meet the criteria for selecting viewpoints (see Section 3.9.2.3). Viewpoints were chosen based upon their representation relative to the Project Area, those that were most accessible to the public, and locations with the largest number of viewers. However, Viewpoints 7 and 5 provide representative views of the Project from areas just east of the Gifford Pinchot National Forest.

Comment: *One of the potential impacts to the view shed is looking toward the northeast to Mount Adams and to the southeast to Mount Hood. We would like additional visual analysis done from areas on the GPNF which include visual simulations of the views from that area to be included in the Final Environmental Impact Statement. [LTR 302, CMT 12]*

Response: Please see response to Comment LTR 302, CMT 11 above.

Comment: *Please don't allow SDS to put the wind turbines in the natural beauty of the Columbia River Gorge… Please consider how poorly it will effect our wildlife and views. [LTR 304, CMT 1]*

Response: Comment acknowledged.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. [LTR 307, CMT 5]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 307, CMT 6]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. [LTR 308, CMT 5]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 308, CMT 6]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. [LTR 309, CMT 5]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 309, CMT 6]*

Response: Please see response to Comment LTR 266, CMT 4 above.

Comment: *May 2010 Draft EIS is fundamentally and legally deficient in applying well known principles of perceptual psychology to the assessment of the visual and auditory impacts of the proposed wind farm. [LTR 315, CMT 1]*

Response: Comment acknowledged.

Comment: *[P]roject proponents, and Jason Spadaro in particular, have kept up a steady public drumbeat to the effect that scenic impact is irrelevant because the project lies outside the CRGNSA. This position is a spectacular example of the Fallacy of the False Inverse...the proponents' position is not only fallacious as a matter of logic; it is wrong legally. The lawful authority of the WEFSEC to determine the impact of the Whistling Ridge Energy Project on scenic values inside and outside of the CRGNSA exists independently of the authority of the Gorge Commission in this matter...The standards that the WEFSEC applies in order to minimize wind-farm visual impact may not be the same as the CRGNSA rules, but that does not make them any less permissible or necessary. [LTR 315, CMT 3]*

Response: Visual impacts are not considered irrelevant during the environmental review process. The EIS considers visual impacts in Section 3.9.

Comment: *In outlining the theoretical components of visual-impact analysis, the Draft EIS does not consider three elements of perceptual psychology which will aggravate the visual impact of any wind farm, especially in the Gorge. (a) In evaluating scenery the mind pays special attention to skylines: the shapes and complexity of the profiles of ridges and peaks. Anything which interrupts a smooth contour is immediately homed in on to assess whether it is a natural or unusual feature. [LTR 315, CMT 4]*

Response: Project lines and shapes and their positioning against ridgelines have been considered in Section 3.9. See various discussions of the individual viewpoints in Section 3.9.2.3.

Comment: *The text states that at higher rotation velocities (i.e., in strong winds), turbine blades would become blurred essentially to the point of invisibility, reducing visual impact. This assessment ignores some hard-wired brain circuitry, which is primed to seek out and focus on*

motion [possible adaptive value: spotting moving predators/prey against a complex, camouflaging visual background]. Modern turbines have relatively low maximum velocities, slow enough that viewers will find their attention drawn toward their rotation even in strong winds. [LTR 315, CMT 5]

Response: Visual impacts from moving blades have been considered in Sections 3.9.1.3 and 3.9.3.1. The impacts from shadow flicker are discussed in Section 3.6.2.1.

Comment: *Moon illusion will make the wind turbines on the horizon look larger than they really are. As a result, the photo simulations used in the Draft EIS to evaluate wind-turbine visual impact systematically underestimate the perceived size of the turbines to human viewers. [LTR 315, CMT 5]*

Response: Comment acknowledged. Interpretation and conclusions on the degree of visual impact are subjective and dependent upon the viewer.

Comment: *It is suggested that since the Whistling Ridge area has only about 140 sunny days a year and sunny days are the only ones when the turbines will present a visual contrast to the background sky, the net visual impact of the facility will be minimal. This is nonsense, for any number of reasons. This is the time the gorge receives the most visitors and people come out to enjoy the view... [LTR 315, CMT 7]*

Response: Comment acknowledged.

Comment: *It is suggested that because the local scenery near Whistling Ridge already is significantly degraded by high-tension power lines and towers and by clear-cuts, the additional visual impact of wind turbines will be mitigated by the high background visual degradation. This is essentially the classic argument of polluters that since the environment already is degraded by others, they should have their own license to pollute. Now we don't like to look at clear-cuts and power lines any more than the next guy does. However, we've also learned over the decades that clear-cuts grow out remarkably rapidly to the point that their view is not as jarring as that of a fresh clear-cut; relative to a fresh clear-cut, turbines are forever. [LTR 315, CMT 8]*

Response: Comment acknowledged.

Comment: *Views 6 and 9 are missing from the visual analysis [LTR 315, CMT 9]*

Response: Comment acknowledged.

Comment: *The creator of the photos for view analysis power over the perspectives shows. This can cause bias... For example, the images of views #7 (Mill A), #17 (Providence Hospital), #20 (OR 35), and #21 (Kollock-Knapp and Scoggins Roads) include foreground (power lines, buildings, or trees) which tends to obscure and de-emphasize the wind-farm view. Selection of a different viewing spot in the same vicinity would have increased dramatically the subjective impression of visual impact. The Mill A case is especially obvious, because the Draft EIS commentary employs the considerable baseline visual pollution of a power line in the foreground to decrease the significance of scenery degradation by the wind farm [LTR 315, CMT 10]*

Response: The viewpoints noted in this comment fit the criteria for viewpoint selection (as described in Section 3.9.2.3) and are representative of their respective visual environments. Movement of the viewpoint to other nearby areas would not necessarily provide clearer views of the Project due to the nature of the built environment, different viewer perspectives, differences in vegetation, and distance from the Project.

Comment: *The editor of the May 2010 Draft EIS also chose not to present and analyze views #2 (Strawberry Mountain), #21 (Kollock-Knapp and Scoggins Roads), and #22 (Cook-Underwood and King Roads), even though these images, available on the Whistling Ridge Project website, show some of the greatest wind-farm visual impacts in the entire dataset. These examples reinforce the impression that the sponsors of the EIS already know what conclusions they want to reach. Visual Pollution: How Much Is Too Much? [LTR 315, CMT 11]*

Response: Viewpoints 2, 21, and 22 are analyzed in Section 4.2-3 of the Application for Site Certification (Appendix A), which were distributed in conjunction with the release of the May 2010 Draft EIS. The impacts at these viewpoints would be low to moderate, moderate, and moderate respectively. These three viewpoints were not included in Section 3.9 of the EIS due to their representative and repetitive nature and because other viewpoints conveyed impacts more clearly.

Comment: *[T]here are no views from within structures through windows facing Whistling Ridge, from the Columbia River itself or from within the Mark Hatfield Wilderness. [The framing of a scene by a window can induce a particularly strong version of the moon illusion, and in any case eliminates a lot of visual background which might de-emphasize a wind-farm image.] [LTR 315, CMT 12]*

Response: The selection of viewpoints within structures facing Whistling Ridge, from the Columbia River, and from within the Mark Hatfield Wilderness would not meet the criteria for selecting viewpoints as noted in Section 3.9.2.3. However, Viewpoints 8, 11, 12, 13, and 14 provide reasonable approximations of views from the Columbia River. Viewpoint 14, while at a lower elevation, provides a reasonable approximation of the views from the Mark Hatfield Wilderness. And lastly, Viewpoints 4, 5, 7, and 15 are taken in close proximity to private residences which would approximate views from inside dwellings.

Comment: *How much Viewer Sensitivity would one have to show in order to conclude that wind-project visual pollution might suffice to sink this project? The Draft EIS does not discuss a threshold level of visual pollution, avoiding any need to defend such an evaluation and rendering completely arbitrary any decision on this point. Hence, all a critic can do is to invoke the Golden Rule. How much Viewer Sensitivity of visual pollution seen from your front yard would it take for you to conclude that the impact is unacceptable? [LTR 315, CMT 13]*

Response: The EIS measures relative distances from the Project and establishes criteria for establishing viewer sensitivity, visual quality, and levels of visual impact that are consistent with FHWA and USFS guidance. Interpretation and conclusions on the degree of visual impact are subjective and dependent upon the viewer. The EIS's discussion of visual quality and the discussion on visual impacts provide roughly similar terminology for discussions concerning visual pollution.

Comment: *Realistic projections in mountainous and irregular terrain require a complex, three-dimensional program rather than the simple two-dimensional program used in the Draft EIS. [LTR 317, CMT 18]*

Response: Comment acknowledged.

Comment: *If individuals are arguing that they are going to lose value in visual amenities from their property, they are also admitting they are receiving the same amount of value and what would they be willing to pay to keep the value as is? Why does a neighbor's property rights extend to everything they can see from their boundary? [LTR 317, CMT 41]*

Response: Comment acknowledged.

Comment: *The fact that I can see something a long ways out should not affect someone's right to build something. I think turbines are pretty [LTR 317, CMT 50]*

Response: Comment acknowledged.

Comment: *The visual analysis in inadequate…This is one of the most scenic places in the Country. The industrialization of placing wind towers would ruin this unique area of the world. This is not the right place for the project. [LTR 317, CMT 55]*

Response: Comment acknowledged.

Comment: *The wind turbine will be 42 stories tall when the blade is at its highest, to say there is no impact - I disagree [LTR 317, CMT 65]*

Response: Comment acknowledged.

Comment: *Anti-collision lights are strobes you can see for 20 miles…strobes on 50 turbines will not be acceptable. The EIS should come up with another solution (with the FAA) including restricted air space. If the lights can be seen below horizontal, everyone in the Gorge will see them. That is a real problem that needs to be addressed. [LTR 317, CMT 69]*

Response: Turbine night lighting impacts have been discussed in Section 3.9.2.3. The FAA requirements for aircraft safety lighting are mentioned in Section 3.9.3.1. Under these standards there would be far fewer than 50 strobes as noted in the comment. The necessity for night simulations is also discussed in Section 3.9.1. Section 3.9.4, Mitigation Measures, discusses utilizing non-reflective flat neutral gray or light color to reduce visual impacts. The impacts from shadow flicker are discussed in Section 3.6.2.1.

Comment: *Do we have to make the turbines white? Why can't we paint them up like trees to make them less of a visual aspect? [LTR 317, CMT 74]*

Response: Although a brown and/or green turbine color would reduce visual contrast in views where the turbines are seen against the landscape or when the area is covered in snow. It would also accentuate visibility of the turbines where they would be seen against the sky. Section 3.9.4 describes mitigation measures that include the use of non-reflective flat neutral gray or light color since the turbines would most frequently be seen against the sky.

Comment: *Drive a route to see how the turbines will stick up. This will cause visual impact. [LTR 317, CMT 89]*

Response: Comment acknowledged.

Comment: *My suggestion is to say – "The maximum capacity of turbines today is 2.5-MW. If you did that 70-MW, that's 30 turbines. You could eliminate the first 11, A-1 though 11 on this whole procedure and get this project back far enough from the scenic area that a lot of public concerns would be mitigated." [LTR 318, CMT 16]*

Response: The precise number and location of turbines may vary and will not be known until the micrositing process is complete. The EIS describes and analyzes a 650 foot wide wind turbine corridor as a means for allowing some variation of turbine placement to occur during the

micrositing process. The visual impact analysis analyzes the worst case scenario using the tallest possible turbines at the most visible locations as noted in Section 3.9.1.3.

Comment: *People come from all over the world to see the vistas of the Gorge, I don't think they want to see manmade structures. [LTR 318, CMT 36]*

Response: Comment acknowledged. Interpretation and conclusions on the degree of visual impact are subjective and dependent upon the viewer.

Comment: *The EIS states that some comments were made during scoping about concern over viewshed… That is incorrect. During scoping 92% of the written comments were opposed to or had concerns about scenic impacts. They EIS should be very clear and state that most commenter's have raised concern over this. [LTR 318, CMT 43]*

Response: Comment acknowledged.

Comment: *There have been no analysis of the impacts from a number of the key viewing areas and viewpoints within the scenic area. Including Mitchell Point, Columbia River, State Route 141 and 4 in Washington or Oregon Highway 53, or Tom McCaw Point or Panorama Point in Oregon. In addition, there should be analysis of the impacts visible from the Buck Creek Trail to Nestor Peak which is due north of the project area. [LTR 318, CMT 44]*

Response: The criteria used for selecting viewpoints is discussed in Section 3.9.2.3 (DEIS page 3-164). Locations were chosen based upon their representation relative to the Project Area, those that were most accessible to the public, and locations with the largest number of viewers. Mitchell Point, Columbia River, Washington State Routes 141 and 4, Oregon Hwy 53, Tom McCall Point, Buck Creek Trail, and Nestor Peak were not chosen because they are not frequented by the largest number of viewers and the views are only accessible by trail thus minimizing access and the number of visitors. However, Panorama Point was analyzed and appears in Section 4.2-3 of the Application for Site Certification (Appendix A).

Comment: *The wind turbines by Hawker Road own the entire landscape. People talk about jobs, but what about those that no longer have jobs due to the turbines? [LTR 318, CMT 64]*

Response: Comment acknowledged.

Comment: *I would like to ask that the visual analysis be shifted from just key viewing areas to an analysis of what the experience is along the entire key viewing area I-84 or Historic Columbia Highway of Columbia River, for instance. [LTR 318, CMT 66]*

Response: Comment acknowledged.

G.3.10 HISTORICAL AND CULTURAL RESOURCES

Comment: *We have reviewed the recent Draft Environmental Impact Statement (DEIS) complied for the Whistling Ridge Energy Facility. In doing so, we notes under section 3.10.2.2 no mention has been made of the finding of the Yakama Nation Cultural Resources Program study which resulted in the findings of Traditional Cultural Property within the proposed wind project lands. The DEIS states that: "A field investigation by Yakama Nation cultural resources specialists occurred in December 2009. The Yakama Nation's finding, currently in preparation, will supplement the information contained in this EIS." However, the results of the field investigation were reported to SDS Lumber and the Department of Archeology and Historic Preservation in December of 2009, shortly after the site visit was completed. We, therefore, are taking this opportunity to resubmit this report to the Energy Facility Siting Evaluation Council (EFSEC) and the Bonneville Power Administration (BPA). It is our directive that this report be included in the Final Environmental Impact Statement as a portion of the consultation responsibilities held by BPA and EFSEC. [ATTACHMENT: YAKAMA NATION CULTURAL RESOURCE REVIEW AND CONSULTATION FOR THE WHISTLING RIDGE ENERGY PROJECT SEE PDF] [LTR 11, CMT 1]*

Response: Although 40 C.F.R. 1502.25 states that studies should run concurrently if possible, BPA did not have a detailed project description for its APE, and therefore consultation with the Washington Department of Archeology and Historic Preservation Office (DAHP) and with the interested Tribes began after the DEIS was issued. The Tribes that were consulted were The Confederated Tribes of the Umatilla Indian Reservation, The Cowlitz Indian Tribe, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission pursuant to 36 CFR 800.4(a)(4). BPA initiated consultation with the DAHP and with the interested Tribes on August 2, 2010, regarding BPA's interconnection APE. On May 27, 2010, the Yakama Nation provided its cultural resources review and consultation report. On September 10th, 2010, BPA received a letter from the Yakama Nation stating that they did not agree with BPA's interconnection APE and believed that it should include the Applicant's APE as well. A BPA archaeologist spoke with a Yakama Nation archaeologist on March 31, 2011, regarding BPA's interconnection APE. Further, on May 2, 2011, BPA representatives and Yakama Nation representatives met to discuss the Tribe's request for an expanded APE. It was discussed that BPA has no jurisdiction over siting of wind development facilities, a matter left to Washington EFSEC, and that BPA's APE and Section 106 review was limited to the proposed interconnection. BPA's findings that the proposed interconnection

should result in *no historic properties affected* was finalized with the DAHP on June 2, 2011, thus concluding BPA's required consultation process under Section 106 of the National Historic Preservation Act (NHPA).

The Yakama Nation participated in the adjudicative process as an intervenor. During the adjudicative hearing the Yakima Nation formerly withdrew as an intervenor. The applicant is committed to continue working with the Yakama Nation throughout the life of the project. This includes adjusting the number of proposed towers to be located on Chemawa Hill.

Comment: *Also, why have the Yakama Nation not been involved in the DEIS when they, as a sovereign nation, have legitimate cultural resource concerns. Any EIS is required to ensure that there are no impacts to cultural resources. [LTR 74, CMT 5]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *I would like to express concerns about the proposed Whistling Ridge Energy Project's potential impacts on the National Scenic Area and in particular the Historic Columbia River Highway (HCRH), a district listed in the National Register of Historic Places. I have been working with OPRD and ODOT on the restoration of Mitchell Point for several years and in particular the design of several overlooks to be located along the HCRH State Trail. I am concerned that the existing analysis does not adequately address this section of the HCRH Key viewing area. This area is due south of the proposed project and within the Special Management Area of the CRGNSA. The HCRH is a linear scenic and historic resource in Oregon, extending from Troutdale to The Dalles. [LTR 141, CMT 1]*

Response: As described in the response to Comment LTR 179, CMT 84 below: The Historic Columbia River Highway (HCRH), a National Historic Landmark (NHL) lies outside the Area of Potential Effects (APE) as defined for the Project in Section 3.10 of the EIS. For indirect effects, the APE was 1.5 miles out beyond the boundaries of the Project Area and thus does not include the HCRH. Indirect and direct effects to historic properties lying within that area were analyzed in Section 3.10. Views from the historic highway have been simulated (see Viewpoint 19, page 3-172 of the DEIS), and an impact assessment has been completed as a part of the visual resources analysis conducted in Section 3.9 of the DEIS. The visual effects were determined to be low based on the distance from the Project and viewer types. Direct impacts to historic and archeological features were disclosed in the cultural resource section of the assessment; and, visual assessments from these landmarks are included in the Section 3.9. The baseline for the visual analysis includes a landscape that is not historically intact. Past, present, and future foreseeable actions that have changed the historical nature of the area were considered in this analysis. The effects of the Project on the existing conditions of the corridor are the basis for the visual determination.

Comment: *We have reviewed the Draft EIS and would like to bring to your attention Section 3.10, specifically page 3-204 which accurately summarizes our position. Several times, we have reviewed the property where SDS proposes to develop wind energy and have never found any issues related to cultural resources or traditional cultural properties of concern to us as Chiefs of the Klickitat and Cascades Tribes of the Yakama Nation. We provided this information directly to the applicant's specialists who wrote the cultural resources report used for the Draft EIS. This area where SDS Lumber proposes wind energy is within our homeland and we feel that we are uniquely qualified to determine what areas have been traditionally used by our people and what traditional cultural properties for this area are. As knowledgeable individuals with ancestral ties to the Columbia River Gorge in the immediate vicinity of the Whistling Ridge Energy Project, we have been consulted with in the past on other development projects, and have provided information on traditional properties so that they could be avoided. There are no traditional properties within the Whistling Ridge Energy Project area. The site has been in commercial timber production for many years. Prior to timber harvesting on the site, it was heavily forested. The area of the project is surrounded by steep terrain, there are no streams or significant east-facing views and the he land is rocky and rigid with a lot of natural brush. Our people have never used this area as a vision quest site, burial area, resource gathering area, travel route, or for any other significant purposes. [LTR 168, CMT 2]*

Response: Comment acknowledged. The viewpoints of the Chiefs of the Klickitat and Cascades Tribes of the Yakama Nation have been presented within Section 3.10.2.2 of the FEIS under the Tribal Consultation and Traditional Cultural Resources subheading. Under BPA's Section 106 responsibilities, BPA must consult directly with The Confederated Tribes and Bands of the Yakama Reservation. The Tribe's Cultural Resources Department has identified areas that are considered culturally-sensitive areas within the Project Area. Both viewpoints will be considered during the evaluation of this Project. Furthermore, BPA is also undergoing consultation with other interested Tribes as noted in response to Comment LTR 179, CMT 82 below.

Comment: *T3N-R10E-S7 - There is an historic site and there are potential unstable slopes indicated. [LTR 172, CMT 9]*

Response: The site noted was discussed in Section 3.10.2.3 of the EIS.

Comment: *T3N-R10E-S8 - There is an historic site. [LTR 172, CMT 10]*

Response: This site and its eligibility to the National Register of Historic Places were discussed in Section 3.10.2.3 of the EIS.

Comment: *[In reference to DEIS Page] 3-209, "The Haran Farmstead is recommended as ineligible for the NRHP." This statement may or may not be accurate. This site has been listed*

in Dine's GIS FP Risk Assessment Tool as a site that may require protection if there is any potential for disturbance to the site. Any potential impacts to the historic site may require a site protection plan. Request: Contact the Washington State Department of Archaeology and Historic Preservation. Document why there will be no adverse impacts or how such impacts can be mitigated with a site protection plan if necessary. [For further information regarding this comment,] [c]ontact: Joseph L. Blazek office: 509-925-091, cell: 509-856-6465 joe.blazek@dm.wa.gov. [LTR 172, CMT 18]

Response: The FEIS has been updated to reflect BPA's interconnection APE with respect to the Applicant's APE as seen in the revised Figure 3.10-1. Therefore, as stated in the DEIS, "[i]f a resource is determined eligible for the NRHP, then Section 106 of the NHPA (80 Stat. 915; 16 USC 470) and its implementing regulations (36 CFR 800) require that effects of the proposed Project to that resource be addressed. If a property eligible for the NRHP would be adversely affected by the proposed action, the action agency must evaluate alternatives or modifications to the proposed action that would avoid, minimize or mitigate adverse effects." Since the Haran Farmstead is outside of BPA's interconnection APE, it is not being consulted upon as part of BPA's Section 106 responsibilities. The Farmstead was nonetheless evaluated, but found ineligible for the National Register.

Comment: *[In reference to Section] 3.10, HISTORICAL AND CULTURAL RESOURCES, [Section] 3.10.2.2, Cultural Resources Overview, [t]he FEIS should incorporate the results of archaeological field inventory conducted by Yakama Nation's Cultural Resources Department. [LTR 177, CMT 64]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *The DEIS Fails to Adequately Review the Likely Impacts of the Proposed Development on Cultural Resources. 1. The DEIS Fails to Analyze Impacts to Cultural Resources and Fails to Integrate Adequate Consultation with Tribal governments. The DEIS acknowledges that the BPA has an obligation under Section 106 of the National Historic Preservation Act ("NHPA"), 16 USC 470 et seq., to consult with Tribal governments about the likely impacts of the proposal. DEIS at 4-6. The BPA also explains that the "BPA's 1996 government-to-government agreement with the 13 federally-recognized Native American Tribes of the Columbia basin provides the guidance for the Section 106 consultation process with the Tribes." DEIS at 4-6. The Draft EIS explains that the BPA will conduct formal government-to-government consultation. DEIS at 3-204. The DEIS fails to acknowledge that NEPA regulations also require that the BPA must prepare the Draft EIS "concurrently with and integrated with" the required consultation under the NHPA. 40 C.F.R. § 1502.25(a). SEPA requires EFSEC to consult with the Yakama Nation as well. Under SEPA, EFSEC is required to consider the likely impacts to cultural resources. "Cultural preservation" is an element of the environment that must be addressed through the SEPA process. WAC 197-11- 444. [LTR 179, CMT 82]*

Response: At the time of the DEIS, a detailed project description was not yet available for the BPA's interconnection APE, which is limited to the construction of the BPA substation and the associated tap to the North Bonneville-Midway 230-kV transmission line. Once that project description was attained, consultation on the APE was initiated with the Washington Department of Archeology and Historic Preservation office as well as with the Tribes that have an interest in this location as described in the response to Comment LTR 11, CMT 1 above.

Also, BPA has modified Section 4.8 which states that "BPA's 1996 government-to-government agreement with the 13 federally-recognized Native American Tribes of the Columbia River basin provides the guidance for the Section 106 consultation process with the Tribes." This sentence has been replaced with the following: "BPA fully respects tribal law and recognizes tribal governments as sovereigns. BPA consults affected tribes about potential cultural and/or other tribal impacts prior to taking project and program actions. As a federal agency, BPA is responsible for conducting NHPA review and Section 106 compliance activities during NEPA environmental review processes. As necessary, BPA's Tribal Policy of 1996 further commits the agency to policy level government-to-government consultation upon request of tribal policy makers and elected officials to better understand the technical and legal issues necessary to make informed decisions."

Comment: *In addition, the environmental checklist, which must be prepared for proposed actions, requires consideration of impacts to cultural resources. WAC 197-11-315; WAC 197-11-960. SEPA also requires that EFSEC consult with agencies with expertise in the impacted environment. RCW 43.21C.030(2)(d); WAC 197-11-408(2)(a). EFSEC's SEPA regulations also require that EFSEC works with interested agencies throughout the preparation of the DEIS. WAC 463-47-140(5). The Yakama Nation's Cultural Resources Program is an agency with expertise in Yakama Nation cultural resources. Finally, the 1989 Centennial Accord between the State of Washington and federally recognized tribes mandates that EFSEC undertake government-to-government consultation with representatives of the Yakama Nation regarding the measures necessary for adequate environmental review and appropriate mitigation measures. Based on the above-referenced sources of law, both EFSEC and BPA must engage in direct government-to-government consultation with the Yakama Nation. The BPA has already failed to comply with the NEPA requirements to integrate this consultation into preparation of the DEIS. See 40 C.F.R. § 1502.25(a). This consultation should have occurred months ago. Both EFSEC and the BPA have heard testimony from the Yakama Nation explaining that a cultural resources report was submitted in December 2009. There is no legitimate explanation for why this information was not included in the DEIS, which was issued in May 2010, or why government-to-government consultation was not undertaken concurrently with the environmental review process. Industrial wind energy development in Klickitat County that has proceeded without adequate consultation and review for impacts to cultural resources has led to irreparable harm to cultural resources. This harm is evidenced by a media report in the Yakima Herald-Republic on the destruction of cultural resources during the construction of the Windy Point Wind Energy Facility in neighboring Klickitat County, a copy of which is attached hereto. EFSEC and the BPA must not allow this type of mistake to repeat itself. The agencies must perform adequate consultation, analyze likely impacts, and ensure that Yakama Nation cultural resources would not be adversely impacted by the proposal. [LTR 179, CMT 83]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *The DEIS Fails to Demonstrate Compliance With the National Historic Preservation Act. The project would be highly visible from the Historic Columbia River Highway ("HCRH" or "Historic Highway"). This invaluable historic treasure, built between 1913 and 1922, was the first road planned as a scenic highway in the United States. Today, the Historic Highway is listed on the National Register of Historic Places, as a Historic District, as a Scenic Byway, and as a National Historic Civil Engineering Landmark by the American Society of Civil Engineers. Even more significantly, the Historic Highway has been designated by the Secretary of the Interior as a National Historic Landmark for its "exceptional value as commemorating or illustrating the history of the United States." More than other historic places on the National Register, National Historic Landmarks are granted special protection against impacts caused by federal action. Indeed, section 110(f) of the National Historic Preservation Act ("NHPA") requires federal agencies to undertake, "to the maximum extent possible," such planning and actions as may be necessary to minimize harm to these properties. Portions of the Historic Highway are being restored by the Oregon Parks and Recreation Department ("OPRD") and the Oregon Department of Transportation ("ODOT") as part of the Historic Columbia River Highway State Trail. Acting on a 1987 directive by the Oregon Legislature to preserve and restore the Historic Highway, ODOT and OPRD are creating a series of long, narrow parks in the Columbia River Gorge that will be open to pedestrians, bicyclists, children, and people in wheelchairs, and closed to all motor vehicle traffic. More detailed information on the HCRH can be found in the "Historic Columbia River Highway Master Plan: HCRH Segments," a copy of which is attached to these comments. It is important to note that the BPA is under special obligations with regard to protecting this National Historic Landmark. Section 110(f) of the NHPA provides as follows: Prior to the approval of any Federal undertaking which may directly and adversely affect any National Historic Landmark, the head of the responsible Federal agency shall, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to such landmark, and shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. 16 U.S.C. § 470h-2(F). Section 106 of the NHPA and its implementing regulations adopted by the Advisory Council on Historic Preservation entitled "Protection of Historic Properties" (36 C.F.R. Part 800), describe agency responsibilities when an undertaking will affect properties listed in the National Register of Historic Places, including National Historic Landmarks. The Whistling Ridge project would adversely affect views from the Historic Columbia River Highway. The HCRH was built as a scenic highway. Its historic features include design elements that accentuate views of the remarkable scenic landscapes of the Columbia River Gorge. Curves and pullouts in the HCRH were designed to focus the traveling public's attention on scenic landscapes. The highway includes substantial tunneling in numerous places, with tunnels designed to optimize views. The Mitchell Point Tunnel, known as the "Tunnel of Many Vistas," included multiple windows that presented views of the Columbia River, Underwood Bluff, Dog Mountain, the mouth of the Little White Salmon River, and the diverse array of vegetative and geologic textures on these landforms. East of Mitchell Point, the HCRH traversed parallel to Underwood Bluff and crosses Ruthton Point, where the curve of the road presents spectacular views of the Columbia River, Underwood Bluff, and Dog Mountain, along with rural pastoral land above Underwood Bluff. Other important segments of the HCRH include the segment*

between Starvation Creek and Viento State Park, which have the added importance of being part of the Lewis and Clark National Historic Trail. The HCRH segments from Hood River heading east include the Hood River Loops and the Mark O. Hatfield West Trailhead. This segment also includes spectacular views of the Gorge, particularly Underwood Bluff, Chemewa Hill, and Underwood Mountain to the north and northwest. To the east of the Mark O. Hatfield West Trailhead is the fully restored Hood River to Mosier segment of the HCRH. Several tunnels along this stretch have been reopened, fulfilling the plans of the HCRH Master Plan and setting an example for the ultimate goal of restoring the entire Highway for recreation and historical interpretation. While the views from the West Trailhead to Mosier become more distant from the project the views are nonetheless highly important to the HCRH. Impacts from these locations are also likely to be high. While the "Tunnel of Many Vistas" was destroyed during the construction of Interstate 84, segments of the original HCRH are present through this area. The sections that were lost are currently being restored and recreated through ongoing efforts of ODOT, the Oregon State Parks and Recreation Department, and Friends of the Historic Columbia River Highway. The "Tunnel of Many Vistas" will likely be re-created within the next ten years. If the Whistling Ridge Energy Project is constructed, the view from the "Many Vistas" would not include a historically intact landscape. Rather, the vistas would be transformed to include an industrialized skyline with moving parts and flashing lights less than 3 miles away. The impacts to opportunities for historic interpretation and impacts to this National Historic Landmark were not analyzed in the DEIS. The proposed development would directly impact these views and undermine opportunities for historic interpretation. This constitutes a major adverse impact to the environment that needs to be reviewed and addressed. F. The DEIS Fails to Adequately Review the Likely Impacts of the Proposed Development on Recreational Resources. The DEIS fails to adequately review the likely impacts to recreational resources. The project site is centered within a wide array of significant recreational resources, ranging from internationally recognized landmarks to local hikes with epic views. The DEIS fails to inventory all of the recreation resources in the vicinity and fails to adequately analyze the likely impacts to those resources. The recreation resources in the vicinity include numerous locations to the south including the Columbia River Gorge National Scenic Area, The Lewis and Clark National Historic Trail, the Oregon Pioneer National Historic Trail, the Ice Age Floods National Historic Trail, the Historic Columbia River Highway Trail, Starvation Creek State Park, Viento State Park, Spring Creek Hatchery State Park, the Columbia River, the Mitchell Point Trail, Indian Head, and hiking along the Lower White Salmon River near the confluence with the Columbia. Locations to the north include the Lower White Salmon Wild and Scenic River, the Little White Salmon River, Nestor Peak, the Little Buck Creek Trail, the Grassy Knoll Trail, Cook Hill, Little Huckleberry Mountain, and numerous other hiking trails and drive-up viewpoints in and near the Gifford Pinchot National Forest. The DEIS fails to adequately inventory these resources. [LTR 179, CMT 84]

Response: The Historic Columbia River Highway (HCRH), a National Historic Landmark (NHL) lies outside the APE as defined for the Project in Section 3.10 of the EIS. For indirect effects, the APE was 1.5 miles out beyond the boundaries of the Project Area and thus does not include the HCRH. Indirect and direct effects to historic properties lying within that area were analyzed in Section 3.10. Views from the historic highway have been simulated (see Viewpoint 19, page 3-172 of the DEIS), and an impact assessment has been completed as a part of the visual resources analysis conducted in Section 3.9 of the DEIS. The visual effects were determined to be low based on the distance from the Project and viewer types. Direct impacts to

historic and archeological features were disclosed in the cultural resource section of the assessment; and, visual assessments from these landmarks are included in the Section 3.9. It must be noted that the baseline for the visual analysis includes a landscape that is not historically intact. Past, present, and future foreseeable actions that have changed the historical nature of the area were considered in this analysis. The effects of the Project on the existing conditions of the corridor are the basis for the visual determination.

Comment: *Notably, this section of the HCRH are part of a separate multi-agency restoration project that reconnected and restored the HCRH for public enjoyment. Millions of dollars were spent to restore this resource so the public could enjoy pristine and historic views. The DEIS fails to take this context into account. [LTR 242, CMT 6]*

Response: Please see response to Comment LTR 179, CMT 84 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Indian Nation to ensure the protection of cultural resources. The Gorge is priceless. Please help protect it. [LTR 265, CMT 5]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition he BPA and EFSEC have not adequately consulted with the Yakama Indian Nation to ensure the protection of cultural resources. [LTR 265, CMT 5]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *Furthermore, the high cultural and historic values of this area in the early exploration and settlement of this country dating to Lewis and Clark should make any development which affects land use subject to the highest scrutiny which has obviously not been the case with regard to this project. [LTR 267, CMT 2]*

Response: A thorough background review and cultural resources survey for the Project was completed. Please refer to Section 3.10.2.3 for the survey methodology and results.

Comment: *In addition he BP A and EFSEC have not adequately consulted with the Yakama Indian Nation to ensure the protection of cultural resources. As the Gorge Commission has recently held EFSEC must determine if this project would require any road construction or ground-disturbing activities in the National Scenic Area. [LTR 270, CMT 5]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *Thank you for providing an additional opportunity for comment regarding the Whistling Ridge Energy Project Draft Environmental Impact Statement (DEIS). The Whistling Ridge Energy Project is located within the Ceded Lands of the Yakama Nation, the legal rights to which were established by the Treaty of 1855, between the Yakama Nation and the United States Government. The Treaty set forth that the Yakama Nation shall retain rights to resources upon these lands and, therefore, it is with the assistance and backing of the United States Federal Government that Yakama Nation claims authority to protect traditional resources. Yakama Nation's comments are provided by the Cultural Resources Program (CRP) of the Yakama Nation, established by Tribal Resolution T-66-84 as an arm of the Tribal Government. Comments are respectfully submitted by those whom the Tribal Government has designated to speak on behalf of the Yakama Nation regarding the protection of cultural resources in this matter. A Yakama Nation Traditional Cultural Property (TCP) has been identified within project boundaries on Chemawa Hill, the proposed location of turbines AI-A7. At this time, the Yakama Nation Tribal Council is meeting to discuss potential impacts, proper treatment, and recommendations regarding the TCP. These recommendations of the Tribal Council will be available by mid-September. A report identifying the presence of a TCP on Chemawa Hill was provided to the applicant by Yakama Nation CRP in December 2009. However, despite the availability of that information to the applicant, discussion regarding impacts to the TCP were omitted from the DEIS. This omission is highly concerning. The applicant has, on numerous occasions, suggested a willingness to work with Yakama Nation, however, the omission of this important information from the DEIS, does not currently indicate a willingness to consider the Tribe's concerns. Yakama Nation CRP was not the only agency to express concerns regarding construction of wind turbines on Chemawa Hill. Several other organizations and agencies stated similar concerns and were also omitted from the DEIS. The Skamania County Agri-Tourism Association asked that the "A Towers" be re-sited; the USDI National Park Service recommended removing the AI-A7 turbines to alleviate negative visual impacts; Friends of the Columbia Gorge identified sensitive viewsheds that would be affected by the proposal, and the USDA Forest Service Columbia River Gorge National Scenic Area expressed concerns about visual impacts of the project from key viewing areas of the National Scenic Area. Additional comments not fully considered under the DEIS included comments from agencies such as the Washington State Department of Fish and Wildlife, which expressed concerns about impacts to bats and birds, and the Attorney General of Washington Counsel for the Environment, who requested analysis of plant and animal species and habitats. Further comments regarding impacts to the natural and cultural environment included the Washington Department of Archaeology and Historic Preservation, which discussed the TCP identified by the Yakama Nation among other topics; The Seattle Audubon Society, which brought attention to Northern Spotted owls and other avian species; Friends of the Columbia Gorge, which discussed threatened and sensitive animal species, and Save Our Scenic Areas who provided comments regarding a number of important environmental concerns. Given the above listed omissions, the Yakama Nation does not believe that the current information provided in the DEIS has adequately analyzed the environmental impacts associated with development of a wind facility at the proposed location. Furthermore, placement of turbines on Chemawa Hill must be addressed and analyzed with the fair consideration of all concerns submitted through this process. Among*

the concerns identified, Yakama Nation has notified the applicant and EFSEC of the presence of a Yakama Nation TCP on Chemawa Hill. As mentioned above, this issue is currently before the Yakama Nation Tribal Council and a decision regarding the appropriate treatment of this site will be forthcoming. The protection of traditional resources within the Ceded Lands of the Yakama Nation is of utmost importance to CRP and the Tribal Government, which it represents. Diminishing habitat caused by development has greatly increased the scarcity of traditional plant and animal resources, as well as diminished access to and altered traditionally important places. Continued and unchecked development will immeasurably harm the traditional resources enjoyed by tribal members if a true and careful analysis of impacts and alternatives is not practiced. [LTR 271, CMT 1]

Response: Please see response to Comment LTR 168, CMT 2 above.

Comment: *In addition he BPA and EFSEC have not adequately consulted with the Yakama Indian Nation to ensure the protection of cultural resources. [LTR 274, CMT 4]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 287, CMT 5]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *And I believe that the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 288, CMT 5]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 289, CMT 6]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 290, CMT 6]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 291, CMT 7]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 292, CMT 6]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. In the early 1990's the Department of Energy made similar misjudgments when first attempt to site the Environmental Molecular Sciences Laboratory (EMSL) at the edge of the Columbia River in Richland, WA and then were forced to relocate the facility after excavation was started during to the discovery of Native American grave sites. This was a multi-million dollar expense. We should not put this project in the same potential position without serious research and thought regarding its appropriate siting location. [LTR 293, CMT 5]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In addition, the BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 294, CMT 6]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 307, CMT 7]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 308, CMT 7]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *BPA and EFSEC have not adequately consulted with the Yakama Nation to ensure the protection of cultural resources. [LTR 309, CMT 7]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *There is outstanding cultural information - tribal consultation is not complete. This DEIS is incomplete [LTR 317, CMT 37]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *In December of 2009, the cultural resources program did a survey of the project area and generated a report. We found in this report a particular area that is sensitive to the tribe. This has not been included in the draft for consideration and for public review. Please include this in the final EIS. [LTR 317, CMT 43]*

Response: Please see response to Comment LTR 11, CMT 1 above.

Comment: *Because the NPS-administered Lewis and Clark National Historic Trail (Trail) passes through a corridor near the Project, we provided comments concerning potential environmental and scenic impacts to the Trail. The specific comments regarding turbine string A1-A7 were offered as a recommended way to mitigate visual impacts to the Trail. In making these comments, it was not the intent of the NPS or the Department to impose a permitting condition on the Project. The Department notes that the permittee has planned an overall reduction to the number of turbines that will be installed, as well as a reduction along the ridgeline within the southern end of the Project. [LTR 320, CMT 1]*

Response: Comment acknowledged.

G.3.11 TRANSPORTATION

Comment: *I previously worked for a company that did wind farm start-up and have the following information for residents to consider: TRANSPORATION: Trucks transporting wind mills and turbines are regulated and permitted by the State DOT. Segments of each turbine is considered and 'oversized load' in both length and width. They can only be transported during certain times of the day, and require a pilot car in the front as well as the back of the transported section. One of the major concerns you will have to consider is the logistical barriers of the*

actual transport to the generator site. The turning radius of these oversized loads is in excess of standard tractor-trailers. Narrow and/or winding road will prohibit navigation of these over-sized loads. [LTR 64, CMT 1]

Response: See Section 3.11.2.2 (DEIS page 3-233 to 3-234) for details on mitigation for impacts to transportation. Skamania County requires that private individuals and entities proposing to use oversize or overweight vehicles on County roads enter into a road haul agreement with the County. These arrangements are approved by the Board of Commissioners and authorize the County Engineer to issue a county right-of-way use permit. Prior to the issuance of the right-of-way use permit the applicant must submit an acceptable traffic control plan, signing plan, and traffic management plan.

Comment: *CONSTRUCTION: To construct 50 wind turbines you will have to accommodate several, hundred oversized trucks, cranes, transformers and substations, etc. The actual construction of each wind turbine requires a concrete foundation which would ultimately require hundreds of cement truck deliveries on a 24-hour basis, 7 days per week. Once construction commences you cannot stop the pouring process. [LTR 64, CMT 3]*

Response: Comment acknowledged.

Comment: *EIS: It was mentioned that new or improved roads would not be required to the generating site. It is my understanding that the initial draft EIS referenced road construction needs while the new EIS eliminated that segment all together – because it was deemed insignificant. To that I would like to suggest the following: That you provide the community with an honest assessment of the impact that transportation of machinery and equipment will have on the community such as traffic noise, traffic flow interruption and generation of dirt/dust. Staging of trucks and other equipment if there is an interruption in access to the construction site. Is there an alternate route in the project plan or is it just a single access road to the site? [LTR 64, CMT 4]*

Response: The Applicant has considered alternative access routes and determined that the proposed access route from SR 14 to the site using Cook-Underwood Road, Willard Road, and West Pit Road is the only feasible alternative. Please also see response to Comments LTR 64, CMT 1 above and LTR 179, CMT 87 below.

Comment: *Construction traffic will undoubtedly cause some issues for the local residents. But this too will not last forever, and will soon become a distant memory. [LTR 96, CMT 7]*

Response: Comment acknowledged.

Comment: *There was no discussion on the impact to the military flight route VR-1355. The A1-A7 turbines cut across the introduction of the route as the aircraft fly over the Hood River Bridge and make their turn onto this route. Also, helicopters transiting from Fort Lewis to the Yakima proving ground transit the Columbia Gorge, and this would eliminate any impact to their routing. [LTR 124, CMT 3]*

Response: As stated in Section 3.11.2.1 (DEIS page 3-232), all towers would meet Federal Aviation Administration (FAA) regulations regarding lighting and a Determination of No Hazard to Air Navigation would be obtained from FAA prior to construction of the Project. See also Section 4.22 (DEIS page 4-14) which explains that information on the final locations of structures and structure heights would be submitted to the FAA for review and approval because the proposed turbine heights are greater than 200-foot above ground level.

Comment: *The project construction requires: a. 150, 150- ft long, 17.5 ft high, 14.5 ft wide, 55 ton gross wt specialized truck loads of power sections traversing State Route 14 and Cook Underwood Road to the SDS logging roads. It is one thing for an empty log truck to go up onto Whistling Ridge and come down with a load of logs. It is a completely different situation for the large heavy specialized trucks to travel up the steep logging roads. Will this require D-8 caterpillar tractors pushing and pulling the trucks? b. 150, 150- ft. long specialized truck loads of wind turbine blades traversing the same logging roads. c. 5000, 20-ton truck loads of construction gravel. d. 2000, concrete mixer truck loads (5 cubic yards per mixer load). e. 50 20-ton truck loads of construction reinforcing steel for the concrete power bases. f. 2, 500-ton capacity cranes for erecting the power hub, nacell, and turbine blades. g. Many low boy trucks to haul all of the bull dozers, back hoes, front end loaders, etc. h. Many truck loads required for the construction of the supporting structures for the wind farm. Needless to say, all of the thousands of trucks will pass within 50 ft of our house on Cook Underwood Road. [LTR 170, CMT 3]*

Response: Table 3.11-7 (DEIS page 3-228) compared the estimated traffic volumes within the Project to estimated traffic volumes during the peak construction period. As shown in this table, it is expected that at the peak of construction (a period of three to five months) during the morning (a.m.) peak hour, approximately 210 construction vehicles would travel through either junction of SR 14 and Cook-Underwood Road. During the afternoon (p.m.) peak hour, approximately 10 construction vehicles would be expected to travel through this same junction. Also during this construction peak, an increase of up to 275 vehicles total would be southbound on Cook-Underwood Road from the Project Area during the afternoon (p.m.) peak hour.

Comment: *The DEIS must adequately review the likely impacts to the local and regional transportation system. The proposed development would generate thousands of vehicle trips through areas that are predominately used for recreation, agriculture, rural residential, and forest uses. Industrial development and land uses are prohibited in the areas that the proposed haul route would travel through. The transportation impacts would likely be substantial. Impacts would include significant delays due to increased traffic and the size of vehicles*

associated with the use. The vehicles associated with the proposal would also be incompatible with local uses. Whistling Ridge would make thousands of vehicular trips across the proposed haul route, including the hauling of heavy construction materials and equipment exceeding the Washington State Department of Transportation's legal load limit of 52.75 tons. See RCW 46.44.041. There would be more than 1,700 trips using specialized over-sized trucks designed specifically for the industrial purpose of hauling the enormous turbine components. These specialized trucks are up to 150 feet long, 17.5 feet high, and 14.5 feet wide. Since October 11, 2007, trucks longer than 125 feet in length have been prohibited on Washington SR-14 along the haul route. [LTR 179, CMT 87]

Response: All impacts to local and regional transportation systems were analyzed and discussed in Section 3.11 of the EIS. The current Project plan is to install up to 50 wind turbines on the site. Each turbine requires nine truckloads of components, seven of which would be overweight and/or over-length. The total number of over-size loads would be: 150 turbine blade transports, 150 tower section transports, 50 nacelle transports. The route to be used for transporting large components would start at the the Applicant's facilities at Bingen, WA. The loads would move north from the the Applicant's facilities on Maple Street, then west on SR-14, then north on Cook-Underwood Road and Willard Road, and finally, east on West Pit Road. Loads will travel in caravans of no more than six specialized truckloads at one time to minimize traffic flow interruptions. Rolling traffic slowdowns and temporary single lane traffic stoppages would be required to maintain public safety during component transportation. To minimize impacts on traffic flow, transportation of turbine component caravans would not be allowed during the following time periods: 7:00 am to 9:00 am; 11:00 am to 1:00 pm; and 4:00 pm to 6:00 pm.

Comment: *In addition, the DEIS provides internally inconsistent information about the true extent of the traffic impact. At pages 1-29 and 3-233, the DEIS states that traffic flow could be restricted for up to 20 minutes during the construction phase. But at page 3-228, the DEIS states that traffic delays would increase by only six seconds as a result of this project. The agencies should explain the inconsistency. [LTR 179, CMT 90]*

Response: The noted difference is the difference between intersection operations (i.e. Level of Service and average delay per vehicle) and the maximum length of time traffic flow would be restricted on County roads. These are two different ways to describe potential traffic impacts during construction.

Comment: *Transportation Studies. Now that the Oregon Court of Appeals recently upheld the Gorge Commission's right to approve the Broughton Mill development project, new transportation studies should be incorporated in the EIS to address the impact of these two Stevenson family projects, perhaps concurrent, on transportation. [LTR 273, CMT 4]*

Response: See Section 3.14.3.12. The Proposed Action would contribute to cumulative traffic levels in the Project vicinity, but generally only during the construction phase of the Proposed Action. Construction of the Project is scheduled for a one-year period.

Comment: *We feel it is worth mentioning that the wealthy local dynasty mentioned above recently won a decision from the Oregon Court of Appeals that will enable it to construct a major destination resort along SR14 on the site of the old Broughton Mill at Hood, directly south of Underwood. Construction and operation of that resort will significantly impact local traffic as well as recreation uses at the Hatchery State Park, and needs to be considered in the transportation and recreation sections of the DEIS. The transportation section of the DEIS fails to mention the five tunnels between Cook and Underwood on SR 14. It does mention the tunnels at Lyle in its analysis of potential haul routes, but the ones between Cook and Underwood are omitted. Those tunnels are so dangerous that Mill A School doesn't allow its busses to use them when students are being transported. They are so low that there are very few local drivers who haven't witnessed semi trucks crossing the center line inside those tunnels to take advantage of the added height in the center of the tunnel's arc. We were nearly killed by one of these ourselves. We would not have considered that to be a moderate impact. The only viable way for SDS to get those turbines to Bingen would be by barge or rail, in our opinion. Getting them to the proposed project site with "low to moderate impacts," will be far more difficult. Section 4.3 purports to analyze transportation issues associated with the project. Section 4.3.1.1 Regional and Site Area, fails to even mention the community of Underwood. While it is an unincorporated community, we would guess the population at (conservatively) 2500, based on information obtained from the Skamania County Assessor in the early 1990's. Attempts to update that information from several county departments were unsuccessful, but with the new census nearing completion, we would hope that EFSEC would obtain that information for a final EIS. We contest the DEIS's conclusion that impacts to these residents during construction would be low to moderate. Underwood has only one road connecting it to SR14, and there is no viable alternative route to any other state or county road that would get one to White Salmon or Stevenson. Cook-Underwood Road is Underwood's lifeline to the outside world, and any disruption to its use will impact residents, especially in emergency situations. The proposed haul route from Bingen to Underwood over SR14 underestimates the dangers posed by existing local conditions. The DEIS fails to even mention the dangers posed by traffic attempting to enter SR14 at Dock Grade Road. This intersection is the site of many accidents every year, and these will be exacerbated by the presence of many oversized, overweight trucks westbound on SR14. Dock Grade is the main route for folks from White Salmon to SR14, commuting to Hood River or elsewhere for work, shopping and recreation. People take crazy chances there, and sight distances are deceiving. The intersection of SR14 and SR141 is so dangerous that WDOT placed a warning sign with flashing lights just east of the blind corner leading into it. SR141 is the main route to the White Salmon River Valley, and the communities of Husum, BZ Corners, Glenwood and Trout Lake. Population in these places has grown considerably over the past 20 years or so, along with recreation use. Trout Lake is the gateway to Mt. Adams and the Gifford Pinchot National Forest in this area. It is the road to the White Salmon Wild and Scenic River and associated rafting and kayaking opportunities. SR14 is so narrow between these two intersections that it is a challenge for a passenger car, a semi truck and a bicycle to share the road. There is no shoulder whatsoever in many places, and we'd measure the lanes in a couple*

of spots to contest the DEIS's assertion of 12 foot lanes if it wasn't such a dangerous proposition. An Underwood man was killed there a couple of years ago walking his dog. In order to safely move oversized loads through there, we think one-way traffic with flaggers will be needed, but the DEIS does not mention this. Traffic volume through this stretch is heavy by local standards, but the DEIS contains no analysis. It uses "typical rural highway traffic patterns," to reach its conclusions. Is it too much to ask that counters be placed on the roadways to determine actual usage during the proposed construction season?? The mix of traffic is horrendous, especially in the summer and early fall months ... you'll see bicycles, pedestrians (crazy people), long-haul semi's and log trucks, along with RV's of every description, school busses and passenger vehicles. The DE IS generalizes the width of SR14 from SR97 and SR395, and doesn't really talk about SR14 from Bingen to Underwood. This is an unconscionable omission. The analysis of Cook-Underwood is all rosy, too. At the top of page 4.3-5, the DEIS states that "very little as-built information is available regarding existing pavement and base thickness along the proposed haul route." Cook-Underwood Road was built many years ago to accommodate local traffic, agricultural hauling and log trucks. Maintenance has consisted of occasional treatments with chipseal and gravel. There are many sections where the asphalt is already showing some distress, and it runs along a steep, unstable bluff up to 1000 feet above SR14. SR14 runs along the river at almost sea level, and most of Cook-Underwood is 500-1000 feet in elevation. The DEIS doesn't mention the very steep grade coming up from SR14 at both ends, and it doesn't say anything about how slow those big overweight loads will be going, but there will be serious deterioration of LOS going on there, too! Table 4.3-1 indicates 240 commuters will be trying to come up the hill at Underwood at peak pm drive time .. . we'd like to see counters on that, too. Imagine those folks following these slow, giant trucks all the way to their driveways, because many of them will have to. A trucker friend of ours said they would need to hook two semis together to move the heaviest loads up the worst part of the grade ... would there be a delay associated with that practice? Where is the analysis of that? Between Highland Orchard Road and Chenoweth Road is a steep hill with a series of sharp curves and limited shoulder. There will likely be lots of delays for local traffic there, too, but there is no mention in the DE IS. There are many parts of Cook-Underwood which are narrow with little or no shoulder, and as mentioned before, a steep, high and unstable bluff on the south side. What happens to the folks up here if the road just gives way at some point? Our guess is that the LOS would suffer for years to come. It could even cause a home to have to give up its yard to enable the road to be re-routed. The DEIS is silent on this point. If the rest of this DEIS is as deficient as the transportation section, it is a shoddy document indeed! Garbage in; garbage out. EFSEC needs to calculate LOS using real traffic counts and hard data, not HCS+algorithms. It is not unusual to wait 10-30 seconds to enter SR14 from the east outlet of Cook-Underwood Road as it is. Add traffic associated with a major construction project at the old Broughton mill site and oversized loads for windmill construction to the current situation and there will be serious impacts to local transportation. In addition, parts of Cook-Underwood along the bluff are narrow enough that flaggers and one-way traffic would be needed to allow the big loads through, but there is no mention of the LOS impact of that. Kids on school busses in Underwood have a 45 minute ride to Mill A School, and about the same to White Salmon. Traffic delays could mean the difference between arriving at school ready to learn, and missing breakfast and playing catch-up all day long for them. We were struck by the lack of information about the numbers of local people who will be impacted by the construction phase. The economic impact of the jobs generated by the construction phase could well be offset by visitors who will never return after tangling with the traffic nightmare that will ensue. There is nothing in the DEIS speaking to the roads themselves,

about the damage those giant loads are liable to cause. The road being built on SDS land is 60 feet wide. How on earth will our little, old, 24 foot roadways accommodate these trucks and cranes? The DE IS needs to tell us that. The fact that Skamania County has no over-size or over-weight restrictions in place at this time doesn't mean the roads will accommodate these loads ... this county has been through 4 or 5 county engineers in the past few years. The head of the county's Public Works department has no engineering credentials. [LTR 277, CMT 3]

Response: Please see response to Comments LTR 179, CMT 87, and LTR 170, CMT 3, both above as well as LTR 318, CMT 12, and LTR 286, CMT 54 below.

Comment: *I am greatly concerned about what I feel is a very inadequate analysis of the actual impacts to our roads and byways by the transport of the wind turbines and other construction paraphernalia for the Whistling Ridge wind farm project. The "specialized" trucks that are needed would, I believe, create havoc on our roads and there would also be serious damage to our rural, scenic public roads. The whole issue of which roads SDS would actually use if this wind farm is approved, has not been adequately addressed in the DEIS. Skamania County authorities also fail to address impacts to our roads and byways from all the overweight traffic for this wind farm proposal. Waiting to figure it all out after the fact is not good public policy and it certainly is not public disclosure. I needed to educate myself on this issue and the following disturbing information is about what it really takes to transport wind turbine components. My emphasis is in bold red. The following is an article on what makes wind energy possible: http://www.go-explore-trans.orgl2009/nov-dec/wind_turbines.cfm. Trains, trucks, and ships make wind energy possible by Katie Greenwood [For article see PDF page 2-8] In conclusion, some of the issues and disturbing facts about what it really takes to transport and build a wind farm: many turbines come from factories outside of the United States; A single turbine is transported in up to 12 pieces; Each section of the tower is about 120 feet long and weighs up to 70 tons. An empty semi-truck and trailer weighs about 15 tons; Nacelles weigh 50-70 tons; A 3-blade rotor hub can almost cover a football field!; Route planners study several factors including traffic, road construction, surrounding buildings, and environmental issues to detel1nine the best route; assesses the steepness of hills and inclines along the route; Turbines can safely ascend and descend grades of less than 15%. Steeper grades can potentially lead to accidents that damage turbine parts or cause erosion of the soil and structure beneath the road; If the surveyor assesses the grade at greater than 15%, it may be necessary to level the roads or put in erosion control measures for that part of the route; So to build even small wind farms, there are many large loads that must travel long distances; A single train can haul 50-70 cars of wind turbine parts. It costs less to move turbine parts by train because more can be moved at a time, but the train routes must avoid low overpasses; Transporting by truck requires 8-12 trailers for each turbine; Often, trucks have to take a long route to their destination when transporting turbines; Many wind farms are located within crop farmland. This means that these heavy parts travel on narrow, unpaved roads that are not designed to accommodate the heavy loads. Immediately after a wind farm is completed, maintenance workers must repair and level the roads; Highways and interstates can handle about 80,000 pounds. Many turbine loads weigh more than 100,000 pounds, so transporting turbines can cause damage to even these roads over time; When turbine components come from overseas, they are imported in several shipments; When Vestas imported 60 turbines into the Port of Longview in Washington, all the*

components arrived in 5 shipments. The towers arrived in 3 separate shipments followed by 2 shipments of nacelles and blades; One advantage to transporting by ships and barges: they don't have to negotiate tight turns or avoid overpasses like trucks and trains. Analysis on grades and transportation requirements is totally inadequate in the DEIS. The Whistling Ridge proposal involves grades ranging from 5% to 70%. More expert survey data is needed for the DEIS. More analysis and data is needed on just how much the transport trucks and the wind infrastructure material actually weigh and how much damage they might do to our rural roads and byways. And, I think we all need to know just how SDS really proposes to get these huge, heavy, and unwieldy turbines up steep slopes that are prone to erosion and mass wasting! (Mass wasting and soils will be addressed in a separate memo.) The DEIS is totally inadequate on the transport issue. Thank you. [LTR 278, CMT 1]

Response: Please see response to Comments LTR 179, CMT 87 above and LTR 286, CMT 54 below.

Comment: *[In reference to Section 3.1.2.1, Proposed Action, Construction; PDF pg. 8], [h]ow many truckloads of haul material does all this excavation involve? What will be the impacts on roads and byways? Will public money have to be used to re-pave or reconstruct these roads after all this heavy traffic? Where will all the haul material go? [LTR 286, CMT 4]*

Response: Please see response to Comments LTR 64, CMT 1 and LTR 179, CMT 87 above.

Comment: *Some local residents live close enough to the economic edge that many months of impaired transportation could spell financial disaster for them. The special transportation requirements of this project are so extreme that the EIS should be revised to include a detailed quantitative breakdown which allows the public to understand how intensively (and for how long) public use of the Cook-Underwood Road and the affected section of WA14 will be reduced: how many loads per day, how many loads (and days) total, how much closure time is needed for each load over each critical segment of the route. [LTR 315, CMT 24]*

Response: Please see response to Comment LTR 179, CMT 87 above.

Comment: *How is the traffic from construction going to affect local residents and residential traffic? [LTR 317, CMT 78]*

Response: Please see response to Comment LTR 173, CMT 3 above.

Comment: *The transportation plan is unclear about the road transportation component on Cook Underwood Road proper when the large loads are going up and down the hill. It is my*

understanding these things are large and would require closure of the opposing traffic lane. If so there should be some indication to people what this will mean in terms of emergency services and bypasses and precautions to allow emergency situations to pass. [LTR 318, CMT 12]

Response: All impacts to local and regional transportation systems were analyzed and discussed in Section 3.11 of the EIS. The transportation of wind turbine components would be stopped for emergency vehicle passage. Local law enforcement, fire, and ambulance providers would be contacted to ensure a notification protocol is established to facilitate their passage should that need arise during the movement of caravans.

Comment: *ROADS: It is my belief that current roads may be inadequate due to actual road bed construction which was designed to accommodate residential vehicular traffic (need fortified road beds, wider surface areas, and gradual road curves to accommodate the over sized loads). The actual weight of each over sized truck load could be more than double the normal weight of a tractor trailer. [LTR 64, CMT 2]*

Response: As stated in Section 3.11.2.1 (DEIS page 3-226), "Improvements to County roads and private roads between SR 14 and the Project Area would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components." However, according to the County Engineer, Timothy Homann, for Skamania County, the dimensions and alignments of the existing roadway cross-sections of County Roads in the Scenic Area are adequate to accommodate the large specialized trucks that would haul turbine components to the Project Area, provided that oversize and overweight vehicles use the east intersection of SR 14 and Cook-Underwood Road and the east intersection of Cook-Underwood Road and Willard Road (Prefiled Testimony, Exhibit No. 12.00). Please also see Section 3.11.3, Mitigation Measures.

Comment: *In addition, the roads and services necessary to build and service 50 turbines destroy the very rich, abundant and diverse plant and animal life we have here in the gorge. [LTR 104, CMT 4]*

Response: Comment acknowledged.

Comment: *[…] likely increased infrastructure costs associated with building and maintaining a windfarm (including road maintenance and additional fire protection). [LTR 135, CMT 6]*

Response: Comment acknowledged.

Comment: *The project uses existing county roads and infrastructure. The County will have little burden both initially and on and ongoing basis. [LTR 155, CMT 6]*

Response: Comment acknowledged.

Comment: *[In reference to Section] 3.11, TRANSPORTATION, [Section] 3.11.2, Impacts: [t]his section should identify likely haul routes for concrete that will be used for the wind turbine foundations and discuss any associated environmental impacts. [LTR 177, CMT 65]*

Response: As described in Section 2.14.3 of the Application for Site Certification (Appendix A), the use of on-site batch plants are under consideration. However, if concrete needs to be transported to the site, concrete trucks would use the same haul routes used to transport the large turbine components. See Section 1.4.1.6 of the EIS for a description of the proposed haul route.

Comment: *[In reference to] Section 3.4.1.1, [t]he project site contains a network of roads ranging in width from approximately 8 to 20 feet. The 20 ft rd was built specifically for hauling WRE equipment. Roads to support logging activities are 8-10 ft. [LTR 178, CMT 82]*

Response: The existing logging roads to be improved were originally built to allow large trucks and logging equipment to access the Project Area for ongoing commercial logging purposes. These roads are generally 8 to 12 feet wide, although some are currently as wide as 20 feet. Improvements to allow use by wind project construction vehicles generally would involve widening and providing a gravel all-weather surface. Most of the roads used to provide access to the site by construction vehicles would be widened to approximately 25 feet (width of finished road), with an additional 5 feet of shoulder on either side. See Section 2 (DEIS page 2-8).

Comment: *The Application and DEIS are Inconsistent and Incomplete Regarding the Proposed Haul Route through the National Scenic Area. The Application and DEIS are internally inconsistent and incomplete regarding the proposed haul route through the National Scenic Area. The specialized trucks for hauling wind energy turbine components for this project are both massive and heavy; these trucks may have trouble navigating certain intersections and bridges. The application and DEIS do not clearly establish which route is proposed through the National Scenic Area, and whether that route would entail any road construction or ground-disturbing activities within the General Management Area of the National Scenic Area. The information that has been made available about the haul route is internally inconsistent and does not comply with EFSEC's rules for a complete application. EFSEC rules require, among other items, the application to include information about traffic and transportation impacts: (1) Transportation systems. The application shall identify all permanent transportation facilities impacted by the construction and operation of the energy facilities, the nature of the impacts and the methods to mitigate impacts. Such impact identification, description, and mitigation shall, at least, take into account: (b) Access routes for moving heavy loads, construction materials, or*

equipment; (2) Vehicular traffic. The application shall describe existing roads, estimate volume, types, and routes of vehicular traffic which will arise from construction and operation of the facility. The applicant shall indicate the applicable standards to be utilized in improving existing roads and in constructing new permanent or temporary roads or access, and shall indicate the final disposition of new roads or access and identify who will maintain them. WAC 463-60-372. [LTR 179, CMT 42]

Response: See Section 1.4.1.6 for a description of the proposed haul route. Please also see response to Comment LTR 64, CMT 2 above.

Comment: *The original application proposed two alternative haul routes through the National Scenic Area, Routes 1 and 2. The amended application adds a third alternative haul route, Route 3. Amended Application at 2.19-3. The DEIS adopts Route 3 as the haul route for the project. DEIS at 1-12. At page 1-16, the DEIS states that both Routes 1 and 2 have been "eliminated as ... construction roadway access alternative[s]." However, at page 3-172, the DEIS states that Route 1 (the Ausplund Road Route) "would be used to access the [project site] for construction and maintenance." The agencies need to address this inconsistency, and clarify the extent to which Routes 1 or 2 would be used, if at all, for this project. [LTR 179, CMT 43]*

Response: Ausplund Road would not be used as an access route. Section 3.9.2.3 (DEIS page 3-172) has been revised under the heading, "Viewpoint 23: Ausplund Road End (Within Scenic Area)" to delete the phrase "...which would be used to access the area for construction and maintenance."

Comment: *Moreover, a number of unanswered questions remain regarding Route 3, and specifically whether this route would involve any road construction or ground-disturbing activities within the General Management Area of the National Scenic Area. This route includes an aging bridge on Cook-Underwood Road across the Little White Salmon River and within the GMA. In the attached November 6, 2009 letter submitted to the Gorge Commission, WRE freely admits that "[t]he County has not yet determined whether any modifications or repair of [this] bridge would be required" to enable the bridge to be used for the haul route. Furthermore, there is no evidence in the application or in the record, such as engineering schematics or a discussion of the bridge's load-bearing capacity, to establish whether construction work on the bridge will be necessary for this project. [LTR 179, CMT 44]*

Response: Please see response to Comment LTR 64, CMT 2 above.

Comment: *In addition, an intersection of particular concern is the eastern intersection of Cook- Underwood Road and SR-14. WRE's initial application states that road construction, including road widening, "would be required" at this intersection in order to provide a sufficient turning radius for oversized trucks hauling wind turbine components. Original Application at*

4.3-13. WRE provided specific numbers for the necessary width of the inside turning radius. Id. According to WRE, "[w]idening would include removal of guardrail and an engineered fill section on the inside of the turn, and an engineered fill section and a possible embankment cut section." Id. In addition, "[t]he engineered fill and embankment cut sections . . . would require an all-weather driving surface." Id. Finally, "[r]light of way ownership and easement determination would be required." Id. Then, after Appellants filed an appeal with the Gorge Commission of the County's decision on the initial application, WRE abruptly made a 180-degree reversal on whether road construction is required at this intersection. Even though WRE still proposes to use this intersection as part of its preferred haul route, WRE in the amended application has deleted all language discussing the necessary road work and replaced it with language summarily concluding that no road construction will be necessary along the haul route. Amended Application at 4.3-14. When asked to explain the rationale behind these discrepancies, WRE merely stated in its November 6, 2009 letter that "[n]o roadway improvements have been identified as being needed at either the west or east intersection of SR-14 and Cook-Underwood Road." (emphasis added). This unhelpful statement completely ignores, and is in fact contradicted by, WRE's previous statements that road improvements at the east intersection "would be required." Original Application at 4.3-7 (emphasis added). [LTR 179, CMT 45]

Response: Please see response to Comment LTR 64, CMT 2 above.

Comment: *In addition to the specialized trucks, other large and oversized trucks would be needed to haul construction equipment, plus three pilot vehicles for each truck wider than 10 feet, and construction worker vehicles. Although WRE has not yet proposed a total number for all vehicular trips along the haul route, the total number would likely exceed 10,000 trips. The specialized trucks and their frequent, heavy loads are expected to damage the roads along the haul route. Thus, WRE proposes to repair road damage resulting from the industrial hauling. [LTR 179, CMT 88]*

Response: Estimated traffic volumes reported in Table 3.11-7 of the DEIS provided an estimate of all construction related trips, which includes workers and equipment delivery. Additionally, please see response to Comment LTR 286, CMT 54 below for details on the Skamania County Haul Route Agreement and right-of-way use permit.

Comment: *This massive intrusion of industrial construction equipment would run through rural residential, agricultural, and recreational areas. Given the impact to the community, EFSEC and the BPA should study alternative routes that would preclude or minimize the use of Cook-Underwood Road as it runs through the National Scenic Area. [LTR 179, CMT 89]*

Response: Cook-Underwood Road is currently used by large logging trucks and any use of County roads along the proposed access road route would be subject to a County approved haul route agreement and right-of-way use permit.

Comment: *Despite this prohibition, SDS proposes to construct and use more than two miles of roads within the General Management Area for industrial purposes. [LTR 182, CMT 4]*

Response: Please see response to Comment LTR 64, CMT 2 above.

Comment: *In both the National Scenic Area and in Skamania County generally, both the construction and uses of roads must be reviewed. Attached as Exhibit A is a 2002 letter from the Columbia River Gorge Commission discussing the requirement to review roads in the National Scenic Area for their intended uses. A recent federal court decision, Friends of the Columbia Gorge v. United States Forest Service, discusses the same requirements. A copy of that decision is attached as Exhibit B. [LTR 182, CMT 5]*

Response: Please see response to Comment LTR 64, CMT 2 above.

Comment: *Similar to the Scenic Area requirement, Skamania County requires its private roads to be classified "based on their primary functions." The County road system has several different classification categories, ranging from private driveways to commercial development to recreational use. [LTR 182, CMT 6]*

Response: Comment acknowledged.

Comment: *Proposals to change roads from one category to another, such as residential to commercial use, trigger review [LTR 182, CMT 7]*

Response: Comment acknowledged.

Comment: *In the instant matter, the roads proposed within the Scenic Area are proposed specifically for industrial purposes. The applicant proposes to construct new roads and to widen and improve existing public and private roads, converting them to new uses. [LTR 182, CMT 8]*

Response: Comment acknowledged.

Comment: *These roads would be used to haul wind energy turbine components and construction materials-industrial loads that would exceed the WSDOT legal load limit of 52.75 tons. This is an industrial activity. In summary, the proposed road construction and use within the General Management Area are part of the proposed industrial project and are prohibited.*

SDS must modify the proposal to remove all project components from the GMA. [LTR 182, CMT 9]

Response: Please see response to Comment LTR 64, CMT 2 above.

Comment: *[In reference to Section 3.3.2.1, Proposed Action, Surface Water; PDF pg. 40], "Additional roadway widening"? What does this mean? Doesn't SDS know now how much roads would have to be widened? And which roads would actually have to be widened? Determining this during "final design" does not work for me. I want to know now, before this project is approved or not whether and which roads would have to be widened or reinforced since hauling those heavy turbines up narrow roads would require widening and perhaps repaving. SDS should provide information on roads now, not later. [LTR 286, CMT 25]*

Response: Proposed roadway widening is described in Sections 1.4.1.6 and 2.1.3.7. Please also see response to Comment LTR 64, CMT 2 above.

Comment: *[In reference to Section 3.6.3, Mitigation Measures; PDF pg. 122], [t]here are no designated haul routes for Whistling Ridge, as far as the public is aware. I have gone to our Skamania County Road Department and talked with our Larry Douglas, the department head and he stated that they were working on a draft but that it is not available for public disclosure. They are using Klickitat County's Haul Route Agreement as a go-by; this was for the Windy Ridge project in Klickitat. However, Mr. Douglas stated that Klickitat's engineer had expressed that if they had to do it again, they would put in more restrictions on road usage, in the Haul Route Agreement. Since Skamania County is not giving out the draft Haul Route Agreement that they would be implementing for Whistling Ridge, the public doesn't really know which roads are going to be widened, straightened, re-constructed, etc. The public doesn't really know anything specific about the stresses that will be put on the roads, if roads will have to be rebuilt. This is a serious inadequacy of the DEIS and should be addressed prior to any decision on the proposed project. [LTR 286, CMT 54]*

Response: Skamania County requires that private individuals and entities proposing to use oversize or overweight vehicles on County roads enter into a road haul agreement with the County. These arrangements are approved by the Skamania County Board of Commissioners and authorize the County Engineer to issue a county right-of-way use permit. Prior to the issuance of the right-of-way permit, the applicant must submit an acceptable traffic control plan, signing plan, and traffic management plan. Prior to the start of hauling, the roads to be used would are tested and inspected and a pre-haul report documenting the existing condition of the roads is prepared. During the hauling operation, the roads are inspected by the County to monitor the physical condition of the roads, signing, and traffic control. Once the hauling operation is complete, the roads are re-tested and inspected. The permittee is responsible for restoring the roadway to its pre-haul conditions at the permittee's expense.

Comment: *[In reference to Section 3.9.1, Proposed Action; PDF pg. 172], [a]lthough the proposed project is located outside the Columbia River Gorge National Scenic Area (CRGNSA), the haul routes do impact the NSA. And, we really don't know what the tons and tons of materiel—cement trucks, semi-trucks carrying all the wind farm infrastructure materials, etc.—would do to our roads. There will be impacts to the roads but SDS appears to be minimizing any impacts in the NSA because they know that the regulatory requirements for the NSA are more stringent than outside NSA requirements. The DEIS should address the impacts to all the roads that will be used—and these roads need to be named beforehand. There should be no sleight of hand in road usage. SDS and BPA should commit on paper which haul routes they will be using, what the impacts will be to the roads, and what mitigations will take place if the roads are damaged. [LTR 286, CMT 58]*

Response: Please also see response to Comment LTR 64, CMT 2 and LTR 286, CMT 54 above.

Comment: *[In reference to Section 3.11.2.1, Proposed Action, Construction; PDF pg. 219], [t]hese "specialized trucks" would be traveling in the National Scenic Area, on two lane roads that are used by a lot of tourists. Of course there would be impacts to local, tourist, and other truck traffic! What we don't know from this DEIS is how horrible these impacts would actually be. And, we don't know how they would degrade the roads and who would be responsible for fixing these roads. [LTR 286, CMT 64]*

Response: Please also see response to Comment LTR 64, CMT 2 and LTR 286, CMT 54 above. See also the discussion under "Impacts to Traffic Volumes and LOS" in Section 3.11.2.1 (DEIS page 3-227 to 3-229) for an explanation of impacts to local traffic.

Comment: *[In reference to Section 3.11.2.1, Proposed Action, Construction; PDF pg. 227], [w]hat types of "specialized trucks" are we talking about here? How much do they weigh? What is this "staging location" and where is it located? Surely SDS knows where they can or cannot off-load any barged equipment! [LTR 286, CMT 65]*

Response: See Section 3.11.2.1 (DEIS page 3-223) for details on the specialized trucks and potential staging locations (second and third paragraphs).

Comment: *The construction process would require the trucking of a very large number of very large loads to the wind-farm site, over narrow, winding Cook-Underwood Road, which the residents of Mill A, Willard, and Underwood use to get to work, school, shopping, and public services. The same route is used by outsiders to get to work at the Willard fisheries facility. It is quite likely that segments of the affected road would be closed (in both directions) to non-construction traffic as wind-tower components move over them. The traffic obstruction would extend beyond the Cook-Underwood Road. The trucks must get to the Cook-Underwood Road*

from 184 (probably via Boardman) or from a Bingen staging area supplied by river barge or train. [LTR 286, CMT 65]

Response: See the discussion under "Impacts to Traffic Volumes and LOS" in Section 3.11.2.1 (DEIS page 3-227 to 3-229) for an explanation of impacts to local traffic. Due to the size of the loads and the limited width of SR 14, Cook-Underwood Road and Willard Road, rolling traffic slowdowns and temporary single lane traffic stoppages will be required to maintain public safety during component transportation (Transportation Management Plan Whistling Ridge Wind Project - August 2010). Additionally, Section 3.11.3, Mitigation Measures, points out that restricting traffic flow for more than 20 minutes during the construction phase will be avoided.

Comment: *The current version of Section 3.11 of the Draft EIS suggests that local road closures will not exceed 20 minutes at a time and that traffic disruption from component shipping will last no more than 3 months. However, no supporting data are provided for these estimates. A complete EIS also would need to make clear (a) what hours of the day would be used for component movement over roads [presumably nighttime transport would be ruled out by noise regulations in Underwood]; and (b) how large the backups in local traffic could be during component transit. The public also needs to know (a) whether (or where) traffic in both directions would have to be stopped as a tuck passed; and (b) whether empty trucks, themselves quite large, also would require the halting of oncoming traffic. [LTR 315, CMT 25]*

Response: Please also see response to Comment LTR 64, CMT 2 and LTR 315, CMT 23 above. Prior to the issuance of the right-of-way permit to use County roads to haul oversized loads, the applicant must submit an acceptable traffic control plan, signing plan, and traffic management plan.

Comment: *The document is missing alternative roads, they provide one road - Oslund Road. This road doesn't exist. Why is Little Buck Creek Road not an option? We need additional alternatives and rationale. [LTR 317, CMT 35]*

Response: We believe this comment is referring to Asplund Road, which is a private road described on page 2-22 of the DEIS. The Applicant has considered alternative access routes and determined that the proposed access route from SR 14 to the site using Cook-Underwood Road and West Pit Road is the only feasible alternative.

G.3.12 PUBLIC SERVICES AND UTILITIES

No comments were received pertaining to this section.

G.3.13 SOCIOECONOMICS

Comment: *We need clean energy and well-paying jobs in our area… [LTR 10, CMT 2]*

Response: Comment acknowledged.

Comment: *I fully support the Whistling Ridge energy project in Skamania county. We need to have the economic boost to help fund our schools and road department. [LTR 18, CMT 1]*

Response: Comment acknowledged.

Comment: *Not only does it give a alternative source of clean energy, but it also will provide new jobs and tax revenues to our county which has been devastated with so many land set asides and regulations that our children have to leave the area in order to find jobs. [LTR 21, CMT 2]*

Response: Comment acknowledged.

Comment: *The proposed site of these 400+ feet wind turbines is very close to the well populated communities of Underwood, Willard, and Mill A. We have read the concerns and complaints of the people of Bend, OR where a wind farm is already established. They are alarming and serious. People in this area have lived for generations with agriculture and forest production. Tourism and wineries have grown and flourished in the Gorge Scenic area in the past 25 years. The change of having a forest (even with logging) for a neighbor to having the zoning change to Industrial use will have a devastating effect on the whole community. [LTR 26, CMT 2]*

Response: Comment acknowledged.

Comment: *While the winds here can be strong, they are unpredictable and unreliable. We're sure that the temptation of federal dollars for "green energy" is tempting to the state and county - but the few dollars that will trickle down to Skamania County are small when compared to the problems that will most likely arise. The jobs produced will be temporary construction jobs - the maintenance jobs to follow will be few. No tax money will come to Skamania County schools. [LTR 26, CMT 2]*

Response: Comment acknowledged.

Comment: *Siting a wind farm in this area is an intelligent and appropriate compatible land use which will diversity the economic value of these timber lands and help to preserve these lands for timber production for decades to come. [LTR 28, CMT 4]*

Response: Comment acknowledged.

Comment: *Some other reasons that I support this proposal are that it will provide a broader tax base for the community benefitting all property owners and even benefitting those who rent their residences. Additionally, by lowering property taxes for individuals it would make special levies for schools, park districts and libraries more palatable to residents who otherwise might feel overtaxed. Also, this project will provide jobs to many locals who have taken classes at Columbia Gorge Community College specific to the wind energy field in hopes that they could remain in the area and find a family wage job. [LTR 35, CMT 2]*

Response: Comment acknowledged.

Comment: *Besides the jobs and revenue that it will generate… [LTR 37, CMT 3]*

Response: Comment acknowledged.

Comment: *I appreciate what Broughton Lumber Company and its parent SDS Lumber Company have done for many of our communities here in Skamania County over many years, and I consider the Whistling Ridge Energy Project to be yet another way that SDS will be of great benefit to the citizens in our area -- furnishing much-needed jobs and boosting our local economy, and also beneficial to our entire country in their effort to help provide more electricity for all of us. [LTR 38, CMT 2]*

Response: Comment acknowledged.

Comment: *The project would enhance the use of the land and result in direct and indirect positive impacts to our economy. [LTR 40, CMT 3]*

Response: Comment acknowledged.

Comment: *It will create much needed incremental tax revenue for the county and school districts. I support renewable energy, and the Whistling Ridge Energy Project. [LTR 45, CMT 4]*

Response: Comment acknowledged.

Comment: *I have lived in the Gorge for about 10 years and am a big fan of wind power in general. In fact, I LIKE the new array of wind generators out near Maryhill (outside the National Scenic Area). But the reality of the Whistling Ridge project in a residential and nationally protected area will be the following: No change in electrical costs for average taxpayers. A paltry number of construction jobs, most of them temporary and many of those requiring imported specialized labor. [LTR 49, CMT 1]*

Response: Comment acknowledged.

Comment: *No economic benefits to the majority of local residents. Greed of already extremely wealthy land owners and (literal) power brokers. [LTR 49, CMT 7]*

Response: Comment acknowledged.

Comment: *This proposal is likely to have greater impact than any other wind energy facility proposed in the State of Washington to create jobs to a state with an above average unemployment rate. The project would provide industrial development and infrastructure into an area that needs jobs, development, and green energy. I support renewable energy and believe this project will be a short-term and long-term economic boost to this area. [LTR 58, CMT 2]*

Response: Comment acknowledged.

Comment: *Jobs and financial support into the community are always good reasons for these projects to be justified, However as we have learned with the casino issues, not always the primary issues to consider. [LTR 59, CMT 3]*

Response: Comment acknowledged.

Comment: *It will also provide some much needed, high-paying stable employment opportunities for residents of the Columbia River Gorge. [LTR 70, CMT 2]*

Response: Comment acknowledged.

Comment: *We need the economic boost this project will provide for Samania Cnty. Jobs, schools, tourism. [LTR 71, CMT 4]*

Response: Comment acknowledged.

Comment: *This project will have a major role in securing the economic stability of Skamania County and of the SDS family of companies. [LTR 72, CMT 6]*

Response: Comment acknowledged.

Comment: *What guarantee do you give that local people will be hired for both construction and employment? This would not be the 1st company to come here and promise jobs-then not be able to build no permits are issued. Do you have permits? Next meeting people outside of the area should not be able to have an opinion or comment on what happens in our area! As Washougal over time limit, or Portland or Hood River! [LTR 75, CMT 1]*

Response: Please see Section 4: Environmental Consultation, Review, and Permitting Requirements. Section 4.10.1 discusses state and local plan and program consistency requirements as they relate to the proposed Project.

Comment: *What went so terribly wrong? CGAS believes the cozy relationship between project proponents and EIS preparers is what went wrong. Getting a permit opens the spigots to fat state and federal subsidies, without which projects like Whistling Ridge would be unprofitable to develop. [LTR 77, CMT 5]*

Response: Comment acknowledged.

Comment: *Implementation of the Whistling Ridge Energy Project has many benefits, some not yet known, for Skamania County. The initial economic benefits associated with the project construction, such as local procurements and the 100+ family wage jobs are just the boost that we need. [LTR 78, CMT 2]*

Response: Comment acknowledged.

Comment: *The draft emphasizes anticipated monetary benefits derived from the project. It should also describe expected government expenses associated with the proposal. Too, the draft*

should include expected short and long term monetary benefits from continued timber harvest (the No Action alternative) at Whistling Ridge. [LTR 79, CMT 12]

Response: Section 3.13.2.1, County Expenditures, includes a discussion of potential financial impacts to Skamania County as a result of the proposed Project. The Applicant is responsible for government expenses that result from the permit application process, including the costs associated with the SEPA/NEPA process. Income derived from timber harvest is outside the scope of the EIS.

Comment: *[The proposed Project] is good for our economy and for the future need for energy. [LTR 81, CMT 3]*

Response: Comment acknowledged.

Comment: *My husband and I are residents of Skamania County and are also employees of the county. For numerous years, our county has relied on Federal tax dollars to subsidize our county's existence in lieu of logging. Although I am a proponent of environmentally responsible logging, I realize those who live outside of our county continue to control our forests and logging will not sustain our economy. The Whistling Ridge Energy Project is, finally, a light at the end of a hopeless tunnel of poverty and welfare. [LTR 86, CMT 1]*

Response: Comment acknowledged.

Comment: *The project is based on environmentally-safe practices and will improve our community as a whole. Many of the opponents of the project DO NOT live in our county. We are tired of those using our county as a "playground" making decisions for our economy and well-being. Friends of the Gorge and other non-profit groups based on "protecting" the Gorge have done nothing more than continue our economical downturn. My husband and I are very active within the county and enjoy fishing, hunting, kiteboarding, and backpacking. We want nothing more than to protect this incredibly beautiful and unique area. [LTR 86, CMT 2]*

Response: Comment acknowledged.

Comment: *Wind Development, Generally: Addressing Both Economic Recovery and Environmental Objectives. Wind development has become increasingly important to both Washington's economy and achieving environmental objectives. Washington voters expressed this when they approved the Energy Independence Act, Ch. 19.285 RCW, in 2006. [A]ppropriately sited renewable energy facilities… will promote energy independence in the state and the Pacific Northwest region. Making the most of our plentiful local resources will*

stabilize electricity prices for Washington residents, provide economic benefits for Washington counties and farmers, create high-quality jobs in Washington, provide opportunities for training apprentice workers in the renewable energy field, protect clean air and water, and position Washington state as a national leader in clean energy technologies. Securing our energy independence is critical not only to economic recovery, but also to our ability to compete in a global economy in which traditional energy supplies are increasingly difficult to obtain. And, it is Washington's rural counties which will play a critical role in generating that energy. [LTR 93, CMT 2]

Response: Comment acknowledged.

Comment: *Realizing its potential to drive future economic development, Washington legislatures charged the Clean Energy Leadership Council (CELC) "to create a clean energy leadership initiative that will set the path to leverage Washington's energy infrastructure and make Washington a hub for clean energy technology and a leader in the creation of green jobs and the development, deployment, and export of clean energy technologies and services." [LTR 95, CMT 3]*

Response: Comment acknowledged.

Comment: *This privately funded project would mean temporary and permanent local employment. No taxpayer government money will be used to support the construction or maintenance of the project. Economically this project is in a perfect area to help bring desperately needed work dollars into Skamania County. The prime example of this is the money now flowing into neighboring Klickitat County. The many positive aspects of the project far, far outweigh any temporary negatives. [LTR 96, CMT 6]*

Response: Comment acknowledged.

Comment: *Having just returned from the eastern Oregon/Washington area, and having seen first-hand the remarkable success being accomplished with harnessing wind power, it only makes good economic sense to take advantage of the site that SDS is proposing. I have had the pleasure of business relationships with SDS Lumber Company in the past and regard them as a very successful operation. They will install this project in a manner that will certainly benefit this area and the energy needs of the future. [LTR 99, CMT 3]*

Response: Comment acknowledged.

Comment: *I've been a resident of Skamania County for 48 years. I watched the great environmental movement destroy our economy and the economy of our surrounding counties and states. [LTR 100, CMT 1]*

Response: Comment acknowledged.

Comment: *This wind farm will give the Skamania County economy the boost it needs. We are too dependent on timber harvests and federal timber payments. Too many residents are stuck in low-income brackets while unemployment ranks far above the state average. Fortunately, Skamania has another natural resource to develop: wind. Bringing another industry here is exactly what our county needs. It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing? Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I hope the Council approves the SDS application and that the project advances quickly. [LTR 106, CMT 2]*

Response: Comment acknowledged.

Comment: *This wind farm will give the Skamania County economy the boost it needs. We are too dependent on timber harvests and federal timber payments. Too many residents are stuck in low-income brackets while unemployment ranks far above the state average. Fortunately, Skamania has another natural resource to develop: wind. Bringing another industry here is exactly what our county needs. It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing? Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I hope the Council approves the SDS application and that the project advances quickly. [LTR 108, CMT 2]*

Response: Comment acknowledged.

Comment: *In addition to the clear benefits of clean renewable energy, the Draft EIS substantiates the economic benefits that drive our organization's strong support. The Draft EIS found that: There will be considerable economic benefits to the tri-county area of Skamania, Klickitat and Hood River counties. The construction workforce hired to build the wind farm would average 143 workers, with a peak of approximately 265 workers. There will be an estimated $1.3 million in local, non-labor purchases during construction. Annual property tax revenue to the County would increase by $731,500. The White Salmon School District will see an estimated $150,000 annually. 8-9 new permanent jobs will be created. Of the 1,070,080 acres in Skamania County, less than 3% can be developed to grow a tax base to create economic sustainability that provides financial resources to support necessary services to residents and visitors. Due to excessive federal and other public ownership of its land base, Skamania County must take advantage of each opportunity it has to grow its tax base. The Whistling Ridge Energy project is not only a sound economic development opportunity, but also a clean, safe, green,*

renewable energy resource that will provide a better future for generations to come. [LTR 140, CMT 5]

Response: Comment acknowledged.

Comment: *SDS is a very reputable company with strong ties to the community. This wind farm will give the Skamania & Klickitat County economy the boost it needs. We are too dependent on timber harvests and federal timber payments. Too many residents are stuck in low-income brackets while unemployment ranks far above the state average. Fortunately, Skamania has another natural resource to develop: wind. Bringing another industry here is exactly what our county needs. It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing? Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I hope the Council approves the SDS application and that the project advances quickly. [LTR 152, CMT 2]*

Response: Comment acknowledged.

Comment: *Revenue. The Whistling Ridge Energy Project is located in Skamania County, which is very significant for the local and regional economy. Skamania County is largely owned by the Federal Government with over 80% of available lands managed by the USFS. In the decades where Federal timber harvests were high, Skamania County received considerable funding from harvest dollars. Harvest levels and associated receipts to the County have disappeared. The County has spent considerable time and energy trying to maintain and replace this vital source of revenue. The Whistling Ridge Energy Project will contribute significant dollars to the County during the construction phase in addition to providing a large, stable source of annual tax revenue to the County. For this revenue, the County has to provide very little service in return. [LTR 155, CMT 5]*

Response: Comment acknowledged.

Comment: *It has no negative effects that will harm the environment, but will provide much needed energy and revenue for our area. [LTR 157, CMT 2]*

Response: Comment acknowledged.

Comment: *GENERAL COMMENTS. Economic development and job creation As AWB has noted previously, approval of the DEIS and final approval of the application is extremely important for current and future economic development in Skamania County, southwestern Washington, and for the state as a whole. This is particularly important during this historic*

economic recession and during the severe budget shortfalls for the state and local governments. Paragraph 3.13 of the DEIS (Socioeconomics) (summarized in Table 1-1 of Paragraph 1.0) concludes, generally, that "[s]ocioeconomic impacts are expected to be beneficial in the form of additional jobs, increased sales, and increased tax revenues." Specifically, during construction of the project, the DEIS concludes that about 330 full and part-time jobs would be created. Approximately 25-35 percent of the construction workforce would be residents of the area and 65-75 percent of the workforce would be hired from outside of the three-county area. Project construction would also result in 71 indirect and induced jobs. Moreover, indirect value added from the project is approximately $3.9 million. According to Table 1-1, "[f]iscal impacts are expected to be positive, with a total of $150 million in construction expenditures, of which approximately $13.2 million would be spent in the local area." In addition, the DEIS concludes most sales tax revenue would go to Skamania County. With respect to ongoing operation of the site, the DEIS concludes that "[e]conomic impacts would be positive due to increased tax revenues, employment and local expenditures. Sales, use and other indirect business taxes to state and local governments are estimated at approximately $50,000 per year." The estimated value of the project is $87.5 million, which would represent an increase of 6.5 percent in assessed value to the county. The corresponding increase in property tax revenue to the county would be $731,500. On an ongoing basis, the project will employ 8-9 employees, likely hired from the local area. Equally important to the positive economic attributes of the project are the negative consequences for the economy of southwestern Washington if the DEIS and application is ultimately not approved. [LTR 162, CMT 2]

Response: Comment acknowledged.

Comment: *Fifth, the DEIS repeatedly refers to the "economic feasibility" of the project when referring to the minimum output (70 MW) that is acceptable to the applicant. DEIS at 1-14. There is also reference to what utilities might require for the project at page 2-20 (project objectives "include providing a minimum level of generation to be attractive to utilities seeking to fulfill their RPS requirements, as well as providing a return on investment to the applicant."). However, most of this discussion is self-serving conclusions with no backup documentation. If the applicant seeks unilaterally to foreclose alternatives, then it must provide the economic and financial information to support these conclusions. The necessary data consists of costs of each of the various project elements, including labor and materials costs, costs for construction of roads, transmission lines and the substation, all leading to the overall cost and cost per kW or MW. On the other side of the equation, the applicant must produce estimations of sales prices for the energy from the project, as well as actual support for the proposition that there is a minimum output that utilities would require. [LTR 176, CMT 10]*

Response: Socioeconomic analysis is included in the EIS to describe impacts to that resource and is not intended to be used as justification for the economic viability for the Proposed Action. As described in Sections 1.2 and 1.4, the alternatives considered include the No Action alternative and the Proposed Action, and further cost justifications as requested in the comment are not required in the SEPA/NEPA process.

Comment: *In addition, reports indicate that this year 68% of new wind turbine energy will be sold to California. The FEIS should identify whether power from the WR project will be sold and used in California or at any other location outside the state of Washington. Further, analysis should be made as to the capacity of transmission lines to accept the power from the WR project. Any contract or informal commitment between this applicant and public or private utilities should be identified in the FEIS and whether such parties are providing up front costs for this application and construction. If the power from this project is to be sold to out of state public or private consumers, then alternatives should be considered closer to where the power will be consumed. [LTR 176, CMT 17]*

Response: Through the large generation interconnection study process, BPA has determined that there is transmission service in the vicinity of the proposed Project. BPA and EFSEC are not involved in any power purchase agreements that the developer may be negotiating. BPA offers non-discriminatory access to its transmission system.

Comment: *As a resident of Clark County and as one who has been involved in the decisions regarding the Columbia River Gorge since before and after the Columbia River Gorge National Scenic Areas was established, I have a deep appreciation for the Gorge and a deep awareness of what it takes to operate a successful business in the Scenic Area and in the Pacific Northwest. My family and I enjoy visiting the Gorge frequently from our Vancouver home, and we are not interested in seeing the character of the Gorge destroyed or significantly altered. Currently, I am president of the Association of Washington Business (AWB), but I am commenting on behalf of myself. AWB is Washington's state chamber of commerce and manufacturing and technology association. Our 7,000 members employ more than 650,000 workers in our state's private sector. Prior to joining AWB in 1986, I was Washington public affairs manager for Crown Zellerbach Corp. (CZ). At the time, CZ owned and operated the Camas pulp and paper operation just to the west of the Scenic Area boundary and owned thousands of acres of commercial timberlands inside and adjacent to the Scenic Area on both sides of the Columbia River. I was involved in the negotiations with the state of Washington to exchange our Gorge lands with the state of Washington for state timber sale contract relief in 1982, 1983 and 1984. In that process, I learned a great deal about the forest land potential, the forest practices and view corridor considerations and alterations, the productivity of the timberlands, and the people and companies inside and adjacent to the Scenic area who are dependent upon the industry and businesses. I also came to learn that some of our forested sites along the ridge lines had higher potential for other uses such as a wind farm, although generating electricity from the wind was in its development stages. While CZ believed that we could manage those lands and our Camas operations so as to protect the unique features of the Gorge inside and around the Scenic Area, we also worked with those who wrote the legislation establishing the Scenic Area to protect the commercial activities within and around the Gorge. We recognized this would be an ongoing challenge, but we also realized that many of our employees and their families lived in and around the Scenic Area, had jobs and livelihood which depended upon commercial activity. Therefore, it was important to maintain and preserve the commercial viability of private and public lands and the industries and businesses within and adjacent to the Scenic Area. [LTR 185, CMT 1]*

Response: Comment acknowledged.

Comment: *We fully understand the concerns of those who provide private sector jobs and generate the tax revenues for local governments and schools with and around the Scenic Area should be paramount. [LTR 185, CMT 3]*

Response: Comment acknowledged.

Comment: *Further, it seems to me that it makes sense for the State of Washington to lease the adjacent ridge line so as to extent the wind farm and allow our state, which is severely financially strapped, to earn income from the public lands for schools, colleges and universities and rural counties such as Skamania. [LTR 185, CMT 5]*

Response: Comment acknowledged.

Comment: *The point is when opportunities arise to enhance the economy in Skamania County, add much needed renewable electricity to the grid, and provide new family-wage jobs; we should not pass that opportunity up. We are also keenly aware that the last monthly adjusted unemployment figure released for the Portland-Vancouver metro area was 13.3%. Rural counties are also feeling the bite of high unemployment and the Whistling Ridge Energy Project not only brings construction jobs in these recessionary times but ongoing employment maintaining the turbines and transmission system. [LTR 185, CMT 7]*

Response: Comment acknowledged.

Comment: *The Stevenson family and SDS as a company are good people who work hard and provide jobs and tax revenues. They are the kind of citizens and employers that our state and region needs. They are doing the right thing with Whistling Ridge project putting the land to its highest and best use while provided needed power to our business, hospitals, schools, factories and families. [LTR 185, CMT 10]*

Response: Comment acknowledged.

Comment: *SOCIO-ECOMNOMIC VALUE OF UNDERWOOD AGRI-TOURISM. Facts: Agri-Tourism is a reality in Underwood as we sit here today. There are over 30 large scale agricultural operations within the community. Some of these enterprises were started generations ago, and others have broken ground within the last year. In many ways, the*

Skamania County Agri-Tourism Association owes its new found status to the proposal before you. We have formally come together for the first time out of necessity. A necessity borne from the threat that this project poses to our very existence. Although our members have each made extraordinary commitments of time and capital to the common vision of making Underwood the premier agri-tourism destination in the Gorge, until recently, we were working in parallel, rather than in concert. The threat that this project poses to that vision, however, immediately galvanized farm, winery, and vineyard owners across the community. We now stand here with a consensus of opinion, not just on this project, but on future lobbying goals, marketing strategies, and product offerings. [LTR 186, CMT 13]

Response: Comment acknowledged.

Comment: *Mid-Columbia Economic Development (MCEDD) supports the utilization of our renewable energy assets to diversify our economy and stabilize our economic base. [LTR 186, CMT 13]*

Response: Comment acknowledged.

Comment: *The economic benefits of renewable energy projects can provide a base for connecting all these components into a networked system that would generate family-wage employment in a rural, traditionally depressed economy. [LTR 192, CMT 3]*

Response: Comment acknowledged.

Comment: *Over the last five years wind energy cargoes have contributed to the diversification of cargoes at the Port of Vancouver, expanding overall revenues and stabilizing income through the tough economic times. Two large mobile harbor cranes acquired during this time have greatly enhanced the port's ability to attract and support the growth of the wind energy logistics trade. In 2009 alone the port handled 2,700 pieces of wind energy business, generating 55,897 labor hours. Wind energy business means jobs and economic return for our community in southwest Washington. For this reason, the Port of Vancouver intends to continue its active role in the receipt and delivery of component parts for the wind energy business well into the future. [LTR 195, CMT 2]*

Response: Comment acknowledged.

Comment: *Not only does it give an alternative source of clean energy, but it also will provide new jobs and tax revenues to our county which has been devastated with so many land set asides and regulations that our children have to leave the area in order to find jobs. [LTR 204, CMT 2]*

Response: Comment acknowledged.

Comment: *Because the timber industry is on the downward spiral and so much of the local economy depends on its funds I believe wind power is a viable option. There are negative qualities to every solution and there will always be somebody against everything. I have watched Underwood Mountain be clear cut for years now and public outcry was minimal. [LTR 219, CMT 2]*

Response: Comment acknowledged.

Comment: *My main concern is that the power and the revenue generated by the wind farm stay local. I support turbines manufactured in the United States and I support local economies benefiting from the farm. It is very frustrating when the local people push green, green, green, but when it comes to their neighborhood they want it in their neighbor's backyard. I say stay local and keep up with the times because they are a changing'... I would have showed up at the public hearings but I did not receive any literature and was not at all aware of the hearing until my classmate received the pamphlet after the hearings. [LTR 219, CMT 3]*

Response: Comment acknowledged. Please note that BPA and EFSEC are not involved in any power purchase agreements that the developer may be negotiating. BPA offers non-discriminatory access to its transmission system.

Comment *…real estate/property tax dollars will come to the area over the years than will be produced as income from this wind farm. [LTR 220, CMT 3]*

Response: Comment acknowledged.

Comment: *This project will provide much needed jobs for the area and help to increase the tax base for the county. [LTR 223, CMT 2]*

Response: Comment acknowledged.

Comment: *This is a big picture issue that extends beyond the view from the backyard, but still creates local jobs. Let the wind turbines be a sign of progress in our area. [LTR 227, CMT 3]*

Response: Comment acknowledged.

Comment: *I wanted to take the time to comment about this project. I think that the people objecting to this project must be the few people that have steady, good paying, dependable jobs--or are retired and don't care whether anyone else is able to feed their family or not. This county has more than their share of poverty level or lower incomes. What this county needs is more decent jobs, the wind energy industry is the only industry I see wanting to build here. By building here they are providing much needed jobs for this depressed community. We as a community should be rolling out the red carpet to them! I would like to stay in this community, but unless more jobs become available, because I am not independently wealthy, will have to look elsewhere to live. The people opposing this industry, only have their own interest in mind, and as long as they have jobs, wealth or a rich Daddy, don't care that a large portion of their neighbors are going hungry. I am looking at early retirement because of these factors. I want my children and grandchildren to be able to stay living in their homes, if they want. If they do move away, let it be because of other factors, not because there is no way to make a living here. [LTR 229, CMT 1]*

Response: Comment acknowledged.

Comment: *Wind farm derived tax revenues will not be the only economic consequence of a local wind farm. Probable negative consequences include decreased property values, reduced appeal to future tourists and prospective new residents because of diminished attractiveness of the area and likely increased infrastructure costs associated with building and maintaining a wind farm (including road maintenance and additional fire protection). [LTR 230, CMT 3]*

Response: Comment acknowledged.

Comment: *This project contributes to our country's energy independence and county's economy. I appreciate the fact that SDS Lumber is a local sponsor rather than an outfit that does not live or work in the Columbia River Gorge. [LTR 234, CMT 2]*

Response: Comment acknowledged.

Comment: *I very much support the success of this project because our schools and Skamania county really need it. I live in Underwood as did my father and his father since 1903. I believe most of the people in the local area know this project will be good for our community. [LTR 235, CMT 1]*

Response: Comment acknowledged.

Comment: *The analysis of economic impacts of the project is very weak and uninformative. The project will have substantial benefits. These are susceptible to quantification. The analysis does not do the project justice in this respect. [LTR 236, CMT 1]*

Response: The socioeconomic impacts are discussed in detail within Section 3.13.2 of the EIS. Additionally, the economic benefits of the proposed Project are discussed within Section 3.13.1.4 of the EIS. IMPLAN, a model used to analyze regional economics, was utilized for the socioeconomic analyses of this Project. IMPLAN is a computer-based regional economic analysis system. Unlike other economic analysis products, IMPLAN constructs a complete set of regional social accounts. The "Region" can be any combination of Counties that occur within the Project area. Additional information can be found at *http://implan.com/V4/Index.php*.

Comment: *As a general comment, Bonneville is not above the law. It cannot continue to pretend that the Administrator has discretion to violate the law. The law requires that you assess the environmental and socio-economic impacts of Bonneville's activities. The Endangered Species Act and Magnuson-Stephens Act require such consultation. It is irresponsible for Bonneville to continue to develop resources and plan transmission upgrades without considering these factors. [LTR 236, CMT 3]*

Response: As required under NEPA, Section 3.13 discusses the affected environment and environmental consequences of the proposed action and no action alternatives as they relate to socioeconomics. Both BPA and EFSEC are committed to analyzing the impacts of the proposed Project as required of them which is outlined in Section 1.3.1 of the EIS.

Comment: *Wind farm derived tax revenues will not be the only economic consequence of a local wind farm. Probable negative consequences include decreased property values, reduced appeal to future tourists and prospective new residents because of diminished attractiveness of the area and likely increased infrastructure costs associated with building and maintaining a wind farm (including road maintenance and additional fire protection). [LTR 241, CMT 5]*

Response: Comment acknowledged.

Comment: *How can wind power continue on as such a powerhouse if it is economically infeasible? The answer is that the suppliers and builders are taking their profits off of the front end. That is the only place in the process of wind power development that is economically viable. They receive the tax credits, they are protected by the warranties and they get paid while the projects are relatively new and in good shape. The builders realize that the front end is the only place to be on these projects. That is why they usually sell the project even as it is being built. They realize the dangers of long term commitment. This is why we doubt SDS's claim that they want to diversify their holdings. If SDS is as smart as we believe them to be, they will sell*

and collect a handy monthly payment until the buyer pays off the loan and then SDS will continue receiving monthly payments for each machine on their property. [LTR 256, CMT 8]

Response: Comment acknowledged.

Comment: *Decommissioning of this project is a huge environmental issue and will involve a huge expense, and yet the DEIS contains no meaningful discussion about how this will actually occur. No plan is offered for project decommissioning, no commitments are made, let alone secured. How can the environmental impacts of "back end" project decommissioning be considered without a meaningful discussion about who will do what, and when? In fact, no environmental impacts of decommissioning can be considered without this information. We believe decommissioning is ignored because the proponent does not want to pay their fair share of decommissioning fees. Typically proponents "flip" (sell) their projects as soon as they can, but they retain legal right to the project until the buyers make their last payment. The proponents like to put off consideration of decommissioning plans until the buyer becomes the responsible party. This may be good for the proponent, but it is poor planning because it shifts decommissioning responsibilities to the back end of the project, where the profit margin is decreasing and the expenses are rising. If this is allowed to continue, it is very likely that the public will get stuck with the decommissioning expenses of thousands of NW wind power machine. This should not be allowed to occur. Bonding should be secured that will be sufficient to cover all of the decommissioning expenses and the bulk of the payments should be paid in the first half of the machines life, when the profits are the highest, and the expenses are the lowest. [LTR 256, CMT 23]*

Response: Project decommissioning is discussed in Section 2.1.7. In addition, the Project would be subject to all EFSEC rules concerning decommissioning and site restoration as set forth in the Site Certification Agreement. The Initial Site Restoration Plan required by EFSEC, before construction could begin, must include financial assurances in the form of a performance bond, guaranty or a letter of credit sufficient for decommissioning costs. In addition, a Detailed Site Restoration Plan would need to be approved by EFSEC at least 90 days before decommissioning began.

Comment: *The only good that would come out of this is more money for a few people who have more money than they know what to do with; the damages and the costs would be equally distributed among the rest of us. It is time - past time really - to say no to yet another wind power project, and to place a moratorium on further wind power development until the environmental impacts of so many projects and machines can be properly considered. [LTR 256, CMT 28]*

Response: Comment acknowledged.

Comment: *The Port of Vancouver is an active participant in regional and national associations promoting alternative energy, particularly wind energy. We support alternative energy credit programs and state and national alternative energy standards. In addition, the port advocates for the expansion of the wind energy grid in the Pacific Northwest and nationwide. Over the last five years wind energy cargoes have contributed to the diversification of cargoes at the Port of Vancouver, expanding overall revenues and stabilizing income through the tough economic times. Two large mobile harbor cranes acquired during this time have greatly enhanced the port's ability to attract and support the growth of the wind energy logistics trade. In 2009 alone the port handled 2,700 pieces of wind energy business, generating 55,897 labor hours. [LTR 258, CMT 1]*

Response: Comment acknowledged.

Comment: *Wind energy business means jobs and economic return for our community in southwest Washington. For this reason, the Port of Vancouver intends to continue its active role in the receipt and delivery of component pmts for the wind energy business well into the future. [LTR 258, CMT 2]*

Response: Comment acknowledged.

Comment: *Mid-Columbia Economic Development (MCEDD) supports the utilization of our renewable energy assets to diversify our economy and stabilize our economic base. [LTR 259, CMT 1]*

Response: Comment acknowledged.

Comment: *In establishing the Columbia Gorge Bi-State Renewable Energy Zone, we took into consideration a variety of factors, all linked by the regional economy. These include the renewable energy resource itself (wind, solar, hydro, geothermal, biofuels, and biomass), financial investment in those resources by renewable energy industry, existing transportation networks (roads, rail, river and air), high-speed telecommunications networks, education and workforce training capacity, public utilities, resident workforce, transmission capacity, industrial lands base, and quality of life. [LTR 259, CMT 3]*

Response: Comment acknowledged.

Comment: *The economic benefits of renewable energy projects can provide a base for connecting all these components into a networked system that would generate family wage employment in a rural, traditionally depressed economy. [LTR 259, CMT 4]*

Response: Comment acknowledged.

Comment: *I wanted to submit the attached article and my comments, below, to the public comments for WRE DEIS. Not identified or discussed in the DEIS is the fact that the Columbia River Gorge, and by overflow, Skamania County, are hotbeds of entrepreneurs. Insitu, one of the largest employers in the central gorge was founded by three people who moved here for the quality of life, the natural beauty of the Gorge. Still, to this day, this spirit lives. This area attracts and retains those educated innovative people who, partly out of necessity, create a living for themselves and as a result for others to continue living in this fabulous area. Destroying the natural beauty which attracts well educated entrepreneurs is not going to help the Gorge or Skamania County in the long run. Not stated is that MOST of the construction workers, if not nearly all, will be by people from out of the area. Just travel through the trailer parks in eastern Washington and Oregon where the turbines are becoming more common than cows, and take a gander at the license plates. This project will not solve the chronic unemployment problem that Skamania County has. The DEIS FAILS to address EXACTLY what jobs are to be filled and how many FTE's will be performed for each job. Educational or skill status is not given, nor the pay scale they will be hired into. The 8-9 or so called longer term jobs are likely technical. The uneducated unemployed are NOT going to qualify for those jobs. Given the choice, I think the jobs produced by Insitu and other entrepreneurs are what the Gorge needs for its long term economic health, not jobs based on deforestation of our timber producing areas and scenic degradation of the Columbia Gorge National Scenic Area. Additionally, this project is being subsidized by a Sales Tax exemption to the tune of approximately 7%. This amounts to roughly 7-10 million dollars. Eight OJ nine longer term jobs for the State of Washington at a cost of 7-10 million dollars does not sound like a good deal for Washington or the public. A lot of economic development agencies consider a public investment cost of $5,000 dollars per full time employee a good deal. WRE would cost $1 M dollars per long term employee. This is approximately 200 times more expensive than traditional goals of economic development. Perhaps instead we should be putting those dollars toward a state in need rather than a corporation in want. [see PDF for newspaper article] [LTR 263, CMT 1]*

Response: Section 3.13.2.1 of the EIS describes where the construction work force is likely to be hired.

Comment: *We fully understand the concerns of those who provide private sector jobs and generate the tax revenues for local governments and schools with and around the Scenic Area should be paramount. So, that is why I agree that SDS lumber, a long held family-owned business, should be allowed to move forward with its Whistling Ridge Energy Project. Further, it seems to me that it makes sense for the State of Washington to lease the adjacent ridgeline so as to extent the wind farm and allow our state, which is severely financially strapped, to earn income from the public lands for schools, colleges and universities and rural counties such as Skamania. [LTR 269, CMT 1]*

Response: Comment acknowledged.

Comment: *Those of us in Clark County are aware of the onerous requirements imposed by the Act. While much of Clark and Multnomah counties only have a peripheral stake in the Gorge, 6% of Skamania's land mass is privately held, and much of that falls within the Scenic Area. The point is when opportunities arise to enhance the economy in Skamania County, add much needed renewable electricity to the grid, and provide new family-wage jobs; we should not pass that opportunity up. We are also keenly aware that the last monthly adjusted unemployment figure released for the Portland-Vancouver metro area was 13.3%. Rural counties are also feeling the bite of high unemployment and the Whistling Ridge Energy Project not only brings construction jobs in these recessionary times but ongoing employment maintaining the turbines and transmission system. [LTR 269, CMT 1]*

Response: Comment acknowledged.

Comment: *SDS has an excellent reputation as a supporter of our community, citizens, our fire departments, schools, etc., and they go out of their way to allow public use of their lands and conduct their business with consideration of us as their neighbors. Surprise, industry working side-by-side private homes in the wilderness, it works! [LTR 282, CMT 3]*

Response: Comment acknowledged.

Comment: *The concept that one developer's desire to achieve "economic diversity" at the expense of the impact of the project to Gorge wildlife, residents and tourists of both Washington and Oregon is selfish at best, arrogant at worst. The concept of this proposed project is fatally flawed and siting of this proposed industrial facility should be denied. [LTR 283, CMT 6]*

Response: Comment acknowledged.

Comment: *It is also common knowledge that a high percentage of the smaller wind energy facilities themselves are sold to out of state buyers, or are under contracts for sale to such buyers who frequently employ their own in-house employees, not resulting in local permanent jobs. [LTR 283, CMT 17]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.3.2.1, Proposed Action, Decommissioning; PDF pg. 43], [t]hese plans should not be left for later. They should be in the DEIS now so that we can all comment on them. I think it is very important to know HOW a project will be decommissioned and who will be responsible for removal and costs. Is there some type of bond that the project*

proponents have to put up so that we the taxpayers don't get stuck with having to decommission wind farms?? [LTR 286, CMT 28]

Response: Please see response to Comment LTR 256, CMT 23 above.

Comment: *SDS Lumber's wind farm will employ 5 people when all is said and done, and maybe contribute a miniscule amount of money to Skamania County's $50,000,000 yearly budget. [LTR 286, CMT 62]*

Response: Information concerning both project employment and projected property and sales tax revenues is provided in Section 3.13.2.1 of the EIS. As discussed in this section, during operation, the Project would create about 7 direct jobs and about 4 or 5 indirect or induced jobs. Project operation also would be expected to increase annual property tax revenues to the County by about $731,500. In addition, sales, use, and other indirect business taxes to state and local governments attributable to project operation are estimated at approximately $50,000 per year.

Comment: *[In reference to Section 3.12.2, Impacts, Proposed Action; PDF pg. 237], [t]here is no real, data-based socio-economic analysis in the DEIS. SDS and BPA have failed to do any analysis on the socio-economic cumulative impacts to Skamania County as a result of this proposed project. During the public scoping period, SDS Lumber presented that a total of FIVE permanent jobs (some technical and others as watch personnel) would result from this project. As far as I can determine, pillaging 1000+ acres for five jobs is not a good return on our environmental investment!! [LTR 286, CMT 66]*

Response: See Section 3.14.3.14 of the EIS for a discussion of cumulative impacts to socioeconomic resources as a result of the proposed action alternative.

Comment: *[In reference to Section 3.12.4, Unavoidable Adverse Impacts; PDF pg. 242-245], [w]hen SDS first proposed this project, Mr. Jason Spadaro, SDS's president held a couple of community meetings in the area. I attended one of these meetings and took notes. These are my notes from the Mill-A meeting held on Aug. 11th, 2007: My notes from the SDS August 11th, 2007 presentation on the Mill-A Wind Generation project called "Saddleback": Audience questions are italicized. Jason Spadaro, SDS president gave the presentation and he had a representative from Puget Sound Energy, Brian Lentz (sp?) their partner in this project. Jason/Skamania County has too much federal land base so it won't benefit from wind energy as much as other counties. [Why can't wind turbines be on Federal lands? There are cattle, sheep, miners, etc., using Federal lands! Why not wind turbines?] Some questions that came to my mind as he spoke: What about migration routes for animals? Danger from blades? (Wasco just this week, of 27 August, had a fatality from a broken blade.)? View shed? Visibility?? Water issues?? Transmission lines—how will the generated electricity get to market? Power stations? Jamie Tolfree, Skamania County Commission for District 3, said that the county will get less*

timber dollars in the next 5 years; down by 30% by 2011. Jason/We want to keep the power local. But he makes no promises. Jason said that tax rates for Mill-A residents could be lower. Jobs would be produced? But, would tax rates actually go down for Mill-A residents only? Or would the tax rate decline (if there is one) be spread out over the whole county and its residents?? Costs to public?? Are there any EPA regs for wind turbine noise?? Are there tax credits given to start up wind energy companies? Jason spoke of "turbine flicker" where sunlight flickers as it the sun shines through the blades. [It can be very annoying as anyone who has ever had outside branches "flickering" in the afternoon sun, can attest to!]? FAA requirements?? Affect on bats, owls, night-flying animals? Jason has 4 years of data on sensitive, threatened, or endangered species for the project area. According to him, this is not an area where they would be in great numbers. [I think the Jason's survey may not be accurate!] The turbines are 80 meters tall (approx. 240 feet.) Jason stated that BPA's transmission lines go through the property and that they would hook up with those lines. There are two types of transmission lines up there, 115 KV and 230 KV. Clyde Leach, one of three Skamania County Public Utility District Commissioners, said that he would like to see SDS's project connect to the 115 KV line in order to improve PUD's service. [There are, apparently, transmission problems on the 115 KV line and there are power fluctuations.] Leach also said that the demand for turbines for wind energy production has created a backlog of in turbine production. Jason said that they are working on a 2010 timeline. Roads/Jason—will necessitate year-round roads. Some will have to be upgraded. County roads may require upgrades and "we've talked to the county about this." (Too bad the county hasn't talked to the rest of us!)? Who would pay for these upgrades? Environmental reviews? SEPA? Johanna asked about lightning strikes and possible fires. Jason/The towers are grounded and there is a 50 foot radius gravel area around each tower. [The fire issue is a very big concern for residents in Mill-A.] Mildred Boucher asked if the view shed from I-84 would be affected. Jason/The turbines could possibly be seen from Mosier. LeeLynn asked how much would the local schools get. What would be the benefit to the county? Jason/State schools would get $171,000. We want economic benefit for Willard and Mill-A, but there's no tax mechanism to benefit these schools directly. The project area is actually in the White Salmon school district? How are utilities taxed? What basis? One member of the public suggested that SDS subdivide their land around Mill-A and Underwood so people could build more houses. Lots of loud disagreement from the group!! Jason/We could help you form a fire district and then we could pay into your fire district. BUT everybody else would also have to pay into the fire district—which they don't do now. A fireman in the audience spoke up: Could expand Underwood fire district except that Underwood has hit their levy limit. Johanna/What kind of people are you going to need to upkeep the towers? Jason/This is specialized work. A concrete 50-60 jobs during construction and 5-10 people to keep things going once the project is done. In Dayton, there are 83 towers and it takes 15 people to upkeep them. The technicians have to have knowledge about hydraulics and not be afraid of heights, etc.? Can SDS provide scholarships for trainees? Apparently there is a college program in The Dalles specifically geared toward wind power work? What is the guarantee that those 50-60 jobs will be local?? How much of your project is being subsidized? Jason/We would get a production credit of 1.98 cents/kwh for ten years. [This is a pretty good subsidy considering we pay less than 5 cents/kwh!] Jason/The substation and a maintenance building would be within a fenced area and would not be visible. Neal/What type of permitting process do you have to do? Jason/We have a pre-application conference with the county at the end of this month and next month. This project may require an EIS. May have to have scoping meetings. We estimate that the talks with the county could last 2-3 months. We're looking at 6-8

months on the low end and at least two public meetings. There might already be a record of certain environmental studies and we might not need to do a SEPA or NEPA. Jason is delusional if he thinks that this project would not require a SEPA or an EIS! It is interesting that Jason has been talking to Skamania county but there has been no public record of any meetings and this subject has not been on the commissioners' agendas. Comment continued: There are no indications in this presentation that Skamania schools would get any benefits from this proposal. The $171,000 that Jason Spadaro talks about would go to the STATE school system to be distributed to all the school systems; the project area is actually in the White Salmon-Bingen, WA school district. There would not be, apparently, any benefits for the local fire district, either. Also, Jason did not speak to the amount of tax revenue that Skamania County would actually get from this proposal. The county's yearly budget is approximately $50,000,000, with less than $3,000,000 coming from property taxes. Since we don't have the data as to how much property tax this proposed wind farm would generate, there can really be no data-based cost-benefit analysis done on this proposal and any assumed benefits to Skamania County. [LTR 286, CMT 67]

Response: Siting of this proposed Project is discussed in Section 1.2.3, Applicant-Identified Needs. Wildlife issues are discussed in Section 3.4, Biological Resources. View sheds and visual resources are addressed in Section 3.9, Visual Resources. Lastly, socioeconomics are discussed in Section 3.13, Socioeconomics.

Comment: *[In reference to Section 3.13.1.1, Affected Environment, Demographics; PDF pg. 247], [t]his information on minority populations shows a need for a full Environmental Justice portion to this DEIS. BPA, as a Federal agency is certainly required to prepare a environmental justice analysis for this DEIS. Why hasn't it been done? Just talking about environmental justice is not doing the research to see how rural communities and residents are being impacted by the proliferation of wind farms in the West; it is not analyzing the cumulative impacts of transmission lines and other energy production facilities on the health and welfare of these rural communities. Environmental justice must also apply to the environment and the flora and fauna that occupy it. What are the environmental cumulative impacts to flora and fauna? This is another fatal flaw of this inadequate DEIS. I will address Environmental Justice in a separate comment memo. [LTR 286, CMT 68]*

Response: Environmental Justice is addressed in Section 3.13 of the EIS. The DEIS discussed Minority and Low-Income Populations under Section 3.13.1.3, Employment. However, the FEIS has been updated and this discussion has been moved under Section 3.13.1.1, Demographics.

Comment: *[In reference to Section 3.13.1.3, Affected Environment, Employment; PDF pg. 252], [s]o, where is the Environmental Justice analysis for the region and the cumulative impacts to the region from the energy production activities of BPA and SDS Lumber and all the other energy producers in the region? Environmental Justice not only addresses impacts to populations but it addresses environmental impacts. Why are wind farms being located in low*

population, rural areas when the energy they produce mainly benefits large, urban areas that are not even located in the region? Where is the environmental justice in using and abusing rural areas that produce food, clean water, and other resources for energy production for urban areas? There is no environmental justice in this! [LTR 286, CMT 69]

Response: Please see response to Comment LTR 286, CMT 68 above.

Comment: *[In reference to Section 3.13.1.4, Public Finance and Fiscal Conditions; PDF pg. 258], [s]o, Skamania County wouldn't really benefit. It's the metro areas that would get the lions share of benefit. What are these "other areas in the Northwest"? How would the nation benefit from wind turbines scattered along the NSA? SDS cannot make such a blanket statement about the nation benefiting, without a lot of supporting environmental and economic data— that is not included in the DEIS. [LTR 286, CMT 70]*

Response: Please see Section 3.13.2.1 for a discussion of anticipated socioeconomic impacts of the proposed action and no action alternatives.

Comment: *[In reference to Section 3.13.1.4, Public Finance and Fiscal Conditions; PDF pg. 261], [i]t is not EFSEC's job to "provide another means of diversifying the holdings of SDS" by condoning or approving this proposed wind farm! Throughout this DEIS, SDS has inserted the economic benefits to itself and its business model. There is very short shrift given to the environmental impacts and cumulative impacts from this proposal and all the other energy production actions that are ongoing in the region. This does not make for an adequate DEIS! [LTR 286, CMT 71]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.13.1.4, Public Finance and Fiscal Conditions; PDF pg. 265], [a]lthough a previous table purports to show 12 permanent jobs resulting from this proposed wind farm, in the statement above "the addition of five residents" would appear to support the number of permanent jobs as just FIVE, as stated by Mr. Spadaro, SDS's president and chief proponent for this project, in several meetings. Which number is correct? Why the discrepancy? [LTR 286, CMT 74]*

Response: As presented in the EIS, the estimated number of permanent jobs is 8 to 9 full or part time (see Section 3.13.2.1), and indirect induced employment is expected to total 11. There is an error in the narrative associated with the Table 3.13-9. The sentence that states "In addition to the direct employees, project operation would result in indirect and induced employment, for an estimated total of 12 permanent jobs resulting from the proposed Project (Table 3.13-9)." This sentence has been changed to read, "In addition to the direct employees,

project operation would result in indirect and induced employment, for an estimated total of 11 permanent jobs resulting from the proposed Project (Table 3.13-9)."

Comment: *[In reference to Section 3.18, Adverse Impacts; PDF pg. 294], [w]ithout a socio-economic impacts analysis, the statement "Long-term socioeconomic impacts are considered to be beneficial" is baseless and not supported by any data or analysis. There is nothing in the DEIS to show just how much Skamania County would benefit, or not, from this proposed wind farm. What is clear, from previous statements, is that Klickitat County stands to reap most of the benefits for their school district. [LTR 286, CMT 85]*

Response: Skamania County economic impacts are discussed throughout Sections 3.13.1.4 and 3.13.2.1 of the EIS.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. As a native and resident of the Gorge, I find the proposed construction crazy. The wind blows all over Eastern Washington and Oregon, so there is no shortage of alternative sites. Further, tourism in now the only real hope for towns like Hood River, White Salmon and The Dalles. To destroy the natural beauty that draws tourists is to doom the only real growth engine this region has. [LTR 294, CMT 1]*

Response: Comment acknowledged.

Comment: *Hello Energy Facility Site Evaluation Council, I would like to voice my strong support for the Whistling Ridge Energy Project. This wind farm will give the Skamania County economy the boost it needs. We are too dependent on timber harvests and federal timber payments. Too many residents are stuck in low-income brackets while unemployment ranks far above the state average. Fortunately, Skamania has another natural resource to develop: wind. Bringing another industry here is exactly what our county needs. It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing? Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I hope the Council approves the SDS application and that the project advances quickly. [LTR 299, CMT 1]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. This wind farm will give the Skamania County economy the boost it needs… It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing?*

Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I hope the Council approves the SDS application and that the project advances quickly. [LTR 303, CMT 1]

Response: Comment acknowledged.

Comment: *An area which I thought got very short shrift and not enough in-depth analysis, in the DEIS, was the subject of Environmental Justice (EJ). [LTR 314, CMT 1]*

Response: Please see response to Comment LTR 286, CMT 68 above.

Comment: *The "No Action" Alternative for the Whistling Ridge DEIS was also not adequately explored in the EJ section. [LTR 314, CMT 5]*

Response: Please see response to Comment LTR 286, CMT 68 above.

Comment: *In conclusion, the environmental justice section of the Whistling Ridge DEIS, p. 3-250+, is not adequately address by BPA, a Federal agency. Nor is it adequately addressed by SDS, the co-proponent of this wind farm project. Rural areas are being disproportionately impacted by these Federally-subsidized wind farms, and thorough, data-rich, regional cumulative impacts analyses have not been done, to date, by BPA or SDS. [LTR 314, CMT 8]*

Response: Please see response to Comment LTR 286, CMT 68 above.

Comment: *Environmental justice practices demand a complete analysis of cumulative impacts on human health and the environment. [LTR 314, CMT 9]*

Response: See Section 3.14 of the EIS for a discussion of cumulative impacts that will result from the proposed action. Please also see Section 3.6 of the EIS for discussions related to public health and safety.

Comment: *Environmental Justice The section of the May 2010 Draft EIS on environmental justice is completely inadequate. [LTR 315, CMT 18]*

Response: Please see response to Comment LTR 286, CMT 68 above.

Comment: *It ignores the low-income part of the criterion and dismiss the possibility of environmental injustice because no significant minority populations exist in the vicinity of the proposed project. [LTR 315, CMT 19]*

Response: Please see response to Comment LTR 286, CMT 68 above.

Comment: *The separate Socioeconomic section treats the entire three-county area affected in any way by the project, ignoring the unevenness of income distribution (and project impact) across the area. However, it is clear that Willard and Mill A will feel any environmental impact of the Whistling Ridge Project much more than any other community or neighborhood, thanks to a combination of nearness to the turbines, exposure to the largest number of turbines, dependence on the road needed to supply the construction site, and population density. [LTR 315, CMT 20]*

Response: Please see response to Comment LTR 286, CMT 68 above.

Comment: *The WEFSEC needs to conduct an economic survey of the entire Willard and Mill A populations. [LTR 315, CMT 21]*

Response: The socioeconomics of Skamania County are discussed throughout Section 3.13.

Comment: *The Draft EIS concentrates on the effects of the completed project. Its treatment of the impact of the construction process on the surrounding communities, especially the economically disadvantaged communities of Mill A and Willard, is inadequate. [LTR 315, CMT 22]*

Response: Comment acknowledged.

Comment: *There will be considerable economic benefits to the tri-county area of Skamania, Klickitat, and Hood River Counties. [LTR 317, CMT 3]*

Response: Comment acknowledged.

Comment: *This project will have a major role in securing the economy of Skamania County and the SDS family of companies. [LTR 317, CMT 6]*

Response: Comment acknowledged.

Comment: *We need an alternative source of revenue to support schools, law enforcement, courts, and everything else. We need to project to substitute the dwindling federal funds. [LTR 317, CMT 12]*

Response: Comment acknowledged.

Comment: *The document falls short in assessing the value of visual amenities that Whistling Ridge currently provides to the Gorge area. It would be helpful if the Draft EIS estimated the financial value of the visual amenity that SDS currently provides. [LTR 317, CMT 40]*

Response: Section 3.9, Visual Resources, presents the visual impact assessment conducted for the proposed Project. The visual assessment used the Scenery Management System defined in Landscape Aesthetics, A Handbook for Scenery Management (USFS 1995) and the Visual Impact Assessment for Highway Projects (FHWA 1988). These two methods portrays the differing viewer groups and their sensitivity to visual change, defines distance zones portray (foreground, middle ground and unseen areas) and evaluates the contrast between pre- and post-Project conditions as seen from the different viewpoints, by different viewer groups, and from different distances. Neither method includes an estimate of the financial value of visual amenities.

Comment: *This project will benefit the county and the revenue will directly benefit the citizens. The view shed is a downside, however the project would benefit citizens in so many ways - better schools, hospitals, and fire protection. [LTR 318, CMT 10]*

Response: Comment acknowledged.

Comment: *The EIS falls far short in the economics section. You need to look at the two-county area. They benefits are significant, but the can't be assumed. You have to do a serious analysis. It has to have detail… You need to look at the benefits, the tax revenues, and also recognize that there will be impacts on the community infrastructure, government services, and so on. [LTR 318, CMT 54]*

Response: The socioeconomics of Skamania County, WA, Klickitat County, WA, and Hood River County, OR, are discussed throughout Section 3.13.

Comment: *Where is the special economic analysis and social impact analysis for this document? [LTR 318, CMT 60]*

Response: See Section 3.13, Socioeconomics, which includes discussion of the affected environment as well as the environmental consequences anticipated for the proposed action and no action alternatives.

Comment: *Consider the trickle down effects that will continue at completion of the project - $731,000 in annual tax revenue, small business growth due to increased local spending, which in turn leads to business success, job growth and more. [LTR 78, CMT 3]*

Response: Comment acknowledged. Please see Section 3.13.2 for a discussion of potential tax and employment impacts as a result of the proposed action.

Comment: *[The proposed Project] will benefit the residents of Skamania County through increased property tax revenue. [LTR 138, CMT 3]*

Response: Comment acknowledged.

Comment: *The White Salmon Valley School District Board of Directors understands that wind energy farms are potentially divisive, particularly in the Underwood portion of the school district. However, the Whistling Ridge Wind Project would have the effect of broadening the tax base when paying for school levies and bonds. This project would add approximately $100-$150 million of new taxable value to the school district. It would lower the levy rate for everyone in the district considerably, thereby reducing everyone's taxes, possibly enabling the district to pass future levies more readily. Using 2010 levy rates, the amount of reduction per thousand dollars of assessed valuation would range from 16 cents to 23 cents. A homeowner with a home assessed at $250,000 would save between $38.00 and $55.00 per year. A homeowner with a home assessed at $500,000 would save between $76.00 and $111.00 per year. Due to unique characteristics of our school district, we have recently lost important statewide levy equalization funds. As a result of this, and the general reductions in statewide education funding, the approval of levies might be an increasingly important source of revenues to our district in the future. Economically this project has the potential to benefit the community and the school district by adding revenues, without creating additional demands for services or impacts on the school system. [LTR 174, CMT 1]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.13.1.4, Public Finance and Fiscal Conditions; PDF pg. 264], Skamania County collects less than $3,000,000 per year in property tax. What does the $9.6 million in property tax, above, refer to? What is the turbine depreciation over time? How*

much would the property tax revenue decrease over the 30 year predicted lifespan of the turbines and the project? [LTR 286, CMT 72]

Response: The information provided within Section 3.3.13.2.1, Page 3-260 of the EIS, under "Property Tax Revenue" has been updated to reflect the information provided within Table 3.13-5, Skamania County Revenues and Expenditures. The revised portion of this paragraph should read, "This would represent an annual revenue increase of 2.9% compared to the $2.8 million in property tax collected in calendar year 2008." A discussion regarding the extent of property tax revenue depreciation with respect to turbine depreciation would be speculative and is outside the scope of this EIS.

Comment: *[In reference to Section 3.13.1.4, Public Finance and Fiscal Conditions; PDF pg. 264], Skamania County's school districts are #2 and 303. Whose district are they talking about when they talk about School District 405? Is that White Salmon and Binger, in Klickitat? [LTR 286, CMT 73]*

Response: As discussed in Section 3.12.1.4 of the EIS, the Project occurs within Taxing District 109. School District 405, as referenced within Table 3.13-6, is the White Salmon School District.

Comment: *What percentage of the tax dollars generated will actually go to our community and going to give us a little tax relief that we've been paying in our property taxes? [LTR 317, CMT 79]*

Response: The benefits that will be seen by the local communities are discussed within Section 3.13.2. Sales Tax Revenues and Property Tax Revenues were discussed on DEIS pages 3-259 and 3-260, respectively.

Comment: *I also think that, with appropriate planning, a fully operational wind farm could serve as an educational tourist attraction as we move toward sustainable alternative energy sources. This particular project does not significantly impact the natural beauty or public enjoyment of this scenic wonderland as many other proposals have and offers Skamania County a long-overdue boost. [LTR 43, CMT 3]*

Response: Comment acknowledged.

Comment: *I oppose the construction of an industrial installation of wind turbines on Underwood Mountain, whistling ridge. As a small business owner I am concerned with the negative impact on our tourism-based business, white salmon Boatworks, many people come to*

our town for the natural beauty. The installation will be harmful to the visual ambiance of our region. This project is too large. [LTR 62, CMT 1]

Response: Comment acknowledged.

Comment: *Not the scenic view our multi-million $ tourist industry thrives on, [LTR 67, CMT 3]*

Response: Comment acknowledged.

Comment: *People come from all over the world to enjoy the majestic natural vistas the CRG has to offer not manmade ones. I don't think very many people would like to see wind turbines at Yosemite, Yellowstone or the Grand Canyon. Neither should they at this National Scenic Area, one of only 2 in the whole United States of America. [LTR 74, CMT 7]*

Response: Comment acknowledged.

Comment: *At this point, many people would like to believe that a growing tourism base will carry us through these dark economic times. Some would even say that tourism can sustain Skamania County. I argue this concept by noting the lack of developable commercial land available within Skamania County. I would further note that while tourism is important to our communities, we need development that provides jobs and increases tax revenues without relying on the ebb and flow of tourists. [LTR 78, CMT 4]*

Response: Comment acknowledged.

Comment: *Right now, wind power seems to make sense only because of the tax credits. It is only profitable for the company building the wind farm. The long term economic effect here in the Gorge would be negative because tourism would be hurt! Scenery equals money. Ruined scenery doesn't equal money or tourists. [LTR 104, CMT 2]*

Response: Comment acknowledged.

Comment *…reduced appeal to future tourists and prospective new residents because of diminished attractiveness of the area… [LTR 135, CMT 5]*

Response: Comment acknowledged.

Comment: *No evidence of negative impact on tourism. [LTR 140, CMT 4]*

Response: Comment acknowledged.

Comment: *Another stated reason was the Gorge's "[g]reat potential for 'agritourism and geotourism.'" The Gorge has long been considered a special area. In 1915, the U.S. Forest Service ("USFS" or "Forest Service") established Eagle Creek as the first Forest Service Recreation Area in the nation. The following year, the Gorge was proposed as a National Park. Continuing development pressures led to the establishment of the National Scenic Area in 1986. [LTR 179, CMT 8]*

Response: Comment acknowledged.

Comment: *The DEIS Fails to Adequately Analyze the Likely Impacts to Agricultural Tourism. The DEIS's analysis of potential impacts to agritourism is limited to a superficial comparison to wind energy development that has occurred in area between Walla Walla and Kennewick. [LTR 179, CMT 86]*

Response: Please see response to Comment LTR 177, CMT 54 above in the Land Use and Recreation Section of comment responses.

Comment: *Tourism is the lifeblood of the Gorge. Facts: Skamania County is more dependent on tourism than any county in the State of Washington. (See Appendix 1). In 2007: 47% of all retail and lodging tax collections in the county came from visitors. The highest percentage in the state. Almost 11% of all spending in Skamania County was travel related. Over 58 million dollars. The highest percentage in the state. Where do these figures come from? In December of 2008, the State of Washington, through the Department of Community Trade and Economic Development, which also employs the staff of this Council, released these findings in a report on the importance of Travel Impacts to the economy of this state. The state concluded that the travel industry: Generates tax benefits for Washington residents. Generates job opportunities for Washington residents. And benefits all regions of the state. This study found in particular that rural counties, including Skamania County, have a greater number of travel-generated jobs in relation to total employment. And that we are more dependent on the travel industry. They determined that over 10% of Skamania County's jobs are generated by tourism. Maybe this is no great surprise since we live in one of the most beautiful places on earth. The State of Washington also released a report in 2002 titled "Travel Industry Employment." (See Appendix 1 to our DEIS Scoping Comments. All other references to appendices in these comments refer to the appendices attached to our Scoping Comments.). It was released by the Washington Department of Business & Tourism Development. They reached the same conclusions and found specifically that "[t]his is because some rural areas are recreation destinations and/or have little employment in manufacturing or other industries…."*

Once again topping the list are counties in the Columbia River Gorge. Two key conclusions of this study: The travel industry develops and thrives "to the extent [it] has comparative advantages in the Northwest relative to other locations in the U.S. "[H]igh-quality, natural, and outdoor recreation resources" are an example of such an advantage. Why does this all matter in the DEIS? Because any development proposal that has the potential to cut off the life blood of our economy needs to be closely monitored, carefully studied, and mitigated in a manner that eliminates damaging impacts. [LTR 186, CMT 8]

Response: As of July 2010, Council staff are employees of the Utilities and Transportation Commission.

Comment: *Agri-tourism drives Hood River and Eastern Skamania County. Facts: Hood River is a tourist mecca just like Skamania County. The Hood River Valley is famous worldwide for the breathtaking beauty of its farms, orchards and vineyards. In fact, Hood River is a case study in the economic power and sustainability of agri-tourism. You need look no further that the front page of the Hood River County Chamber of Commerce website. (See Appendix 2). The image of Hood River IS agri-tourism. It is plastered everywhere: pictures, events, festivals and links to other sites dedicated to agri-tourism in its many forms. [LTR 186, CMT 9]*

Response: Comment acknowledged.

Comment: *Why is Hood River important to consider? Because Underwood, which is in Eastern Skamania County, and which is the site of this proposal, sits directly across the Columbia from Hood River and is inextricably tied to Hood River: topographically, economically, and evolutionarily. Although our county seat is 30 miles away in Stevenson, we have a uniquely different set of issues and opportunities. Issues and opportunities that county government has failed to understand. This is evident in light of the county's decision to publically endorse this project without consideration of the impacts to Underwood agri-tourism. Agri-tourism that holds the key to Underwood's economic future… if it is responsibly cared for. [LTR 186, CMT 11]*

Response: Comment acknowledged.

Comment: *Underwood agri-tourism is growing quickly. Facts: The primary driver of agri-tourism in Underwood is its far reaching reputation as one of the premier wine producing regions in the world. (See Appendix 3). Amazing as it may sound, the new Columbia Gorge Wine Appellation was recently recognized as one the best emerging regions in the world along with Paso Robles, California and the Maule Valley in Chile. The same accolades were earned in Seattle Magazine. In fact the Washington wine industry is now ranked as the second largest premium wine producer in the U.S. Washington Winery of the Year in 2009 was Maryhill Winery, located here in the Gorge. Winery of the Year in 2007 was Cathedral Ridge Winery in*

Hood River, also located directly across the river from Underwood, and often touting Underwood wines. (See Appendix 3). Even more to the point, Celilo Vineyards in Underwood, is consistently ranked as one of the Top 10 vineyards in Washington, which as mentioned, is ranked second nationally in the production of premium wines. The entire south slope of Underwood Mountain is considered the cream of the crop. If any question remains regarding the value of the wine industry in Underwood, we need look no further than the seal of approval of SDS Lumber who recently informed the community that it has purchased potential vineyard land in Underwood. The DEIS naively accepts the proponents claim that "Wine and Wind" projects are de facto compatible because the uses co-exist in Walla Walla. The problem with this claim is that it ignores the fact that the wind projects in Walla Walla (like State-Line) are many miles from the vineyard and winery sites. The proposed A Towers, on the other hand, directly border the heart of Skamania County agri-tourism. No one argues that they will not dominate the landscape from upper Underwood. Resiting or elimination of Towers A1-7 eliminates all such impacts. [LTR 186, CMT 12]

Response: Comment acknowledged.

Comment: *The Association has two primary marketing strategies: Promote the "Underwood Agri-Tourism Loop" in a manner similar to the Hood River Fruit Loop. The Hood River Fruit Loop is considered a national model for successful agri-tourism See Appendix 2 (Fruit Loop) and Appendix 4 (Underwood Agri-Tourism Loop). Establish the Underwood Vineyard Trek as a "can't be missed" one-of-a-kind opportunity to hike through 12 of the country's premier vineyards while sampling world class wines and views. Nowhere else in the U.S. have 12 contiguous vineyards collectively developed a private trek situated in the heart of a National Scenic Area. See Appendix 4 (Underwood Vineyard Trek) Underwood Agri-Tourism is not just about wine. Other members offer produce, free-range organic livestock, lavender viewing, and organic herbs. One of the original visionaries in Underwood is Hank Patton, who founded World Steward which is located in the Upper Underwood Agri-Tourism Loop, and is committed to environmental stewardship, sustainable farming, research and education. (See Appendix 4). In addition, three wineries are already in operation in Underwood. One of those wineries is now considered by many to be the premier commercial events site in the Columbia Gorge. A number of other vineyards located in the Upper Loop have future winery plans which have been put on hold as a result of the potential negative impacts of this proposal. As set forth in Appendix 4 to our comments, the economic and socioeconomic value of the existing Underwood Agri-Tourism industry is significant and quantifiable. It is diverse and sustainable and benefits citizens and governments throughout the region. The tremendous future potential is also quantifiable and dwarfs the tax benefits of the seven A Towers as projected by SDS Lumber. (See Appendix 1, 2, 3 & 4 - Economics of Wine in Underwood). [LTR 186, CMT 12]*

Response: Comment acknowledged.

Comment: *AGRI-TOURISM & 40 STORY TURBINES DON'T MIX. Facts: SDS once told the Underwood community that wind turbines are "beautiful." We are all welcome to our*

personal opinions, but in these proceedings facts should rule. And the fact is that tourists, and especially tourists in the Gorge, don't want to see industrial development. This fact is set forth clearly in studies conducted by the U.S. Government, and the State of Oregon which are attached to our comments as Appendix 5 and Appendix 6. These facts are undisputed and need no further discussion. As set forth above, the DEIS naively accepts the proponents claim that "Wine and Wind" projects are de facto compatible because the uses co-exist in Walla Walla. The problem with this claim is that it ignores the fact that the wind projects in Walla Walla (like State-Line) are many miles from the vineyard and winery sites. The proposed A Towers, on the other hand, directly border the heart of Skamania County agri-tourism. No one argues that they will not dominate the landscape from upper Underwood. Resiting or elimination of Towers A1-7 eliminates all such impacts. [LTR 186, CMT 15]

Response: Comment acknowledged.

Comment: *We are very thankful that the Council brings to this process a broad perspective of the benefits and impacts of wind development. A perspective that is understandably missing from a county government in financial crisis. We are also confident that this council will use its broad mitigation powers, its depth of experience and basic common sense to draw a line in the sand. A line that will make it clear to people throughout the country that in the Northwest, turbines don't have a right to dominate every ridgeline just because the wind blows. We feel fortunate. Fortunate that each of you has visited the Gorge, and fortunate that during your site visit, you were able to experience the extraordinary beauty of our agricultural community and understand why it is a priceless resource in and of itself…not just to those of us who live Underwood, but to people throughout the Gorge who benefit economically from its snowballing reputation as one of the premier wine producing destinations in the United States. [LTR 186, CMT 17]*

Response: Comment acknowledged.

Comment: *To conclude that wind turbines will promote eco-tourism is wishful thinking at best. I request that you reject this DEIS and not allow the project to continue in its current form. The impact it will have on tourism and residents will far outweigh any benefits. A handful of jobs created in Skamania County will not offset the long-term losses to economic growth in The Gorge. [LTR 190, CMT 5]*

Response: Comment acknowledged.

Comment: *Our economy on both sides of the Gorge is largely dependent on tourism due to the scenic beauty of the area. These turbines would negatively affect this industry in both Oregon and Washington. [LTR 206, CMT 2]*

Response: Comment acknowledged.

Comment: *However, this development strikes at the core of the Scenic Act and would negatively impact the key tourist and scenic value of several communities within the heart of the gorge. [LTR 210, CMT 2]*

Response: Comment acknowledged.

Comment: *More tourist dollars. [LTR 220, CMT 2]*

Response: Comment acknowledged.

Comment: *I do not believe that the local tourism and local residents deserve this impact. [LTR 237, CMT 5]*

Response: Comment acknowledged.

Comment: *Many people travel to the area to experience the Gorge. Introduction of the 'view' to the Gorge, where will it end? Tourists spend money in the area. [LTR 317, CMT 8]*

Response: Comment acknowledged.

Comment: *The tourist industry is important in the Columbia River Gorge. Conclusions from other projects show that these things are not a distraction to people coming to your area. People come to see the Bonneville dam. The same will be true for rain or wind energy projects like windmills. [LTR 317, CMT 13]*

Response: Comment acknowledged.

Comment: *I disagree with the DEIS's position on the economic effect. The future is not at the expense of our environment, it is ecotourism. [LTR 317, CMT 64]*

Response: Comment acknowledged.

Comment: *People in opposition are asking that you sacrifice the economic stability of Skamania for their view. I do not think that the turbines will be detrimental to tourism. Furthermore, I don't think we can survive on tourism alone. [LTR 318, CMT 2]*

Response: Comment acknowledged.

Comment: *Land values in the surrounding area will decrease because of the visual pollution of 426 foot wind turbines and the noise, which studies have shown is a potential health hazard. We ask you to please reject this SDS project. [LTR 30, CMT 3]*

Response: Property Values are discussed within Section 3.13.2.1 (see page 3-258 of the DEIS). Five difference studies were analyzed and there was no statistical evidence found that wind development has a harmful effect on property values within the viewshed. Additionally, as stated in the EIS, property values are therefore not expected to be impacted as a result of the proposed Project.

Comment … *and destroy property values in surrounding areas, but they would also harm the scenic beauty of our area and along with that tourism that we depend on for our livings. Please do not allow this company to destroy more of the gorge than it already has. [LTR 32, CMT 3]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *Because this project is in my backyard. I have been an Underwood, Washington resident for over 15 years. [LTR 45, CMT 3]*

Response: Comment acknowledged.

Comment: *Regarding impacts to property values: it is inappropriate to merely list/itemize the results of studies, without considering the details. For example, if these studies did not have any homes as close to the projects as this will be, those studies are not applicable. If the studies did not have homes and property of comparable value (i.e. shacks verses million dollar homes), then the studies are not applicable. If these areas did not have property of comparable value, then the studies are not applicable. If the areas under study do not have comparable "visual" appeal (i.e. in the scenic area), then the studies are not applicable. I expect, due to the locations of the referenced studies, that they are generally not comparable to this situation. Your DEIS needs to be updated with property value studies that represent this project and this neighborhood, for undeveloped land, developed land, and land with homes. [LTR 60, CMT 10]*

Response: Please see response to Comment LTR 30, CMT 3 above. Please also see page 3-259 of the DEIS for a summary of the Renewable Energy Policy Project's *The Effect of Wind Development on Local Properties*, which analyzed how property values changed over time in the viewshed and in the comparable community and found no statistical evidence to claims that wind development impacts property values.

Comment: *The Draft EIS offers a thorough and commendable discussion of visual impacts. One area where the document falls short is in assessing the value of the visual amenities that Whistling Ridge currently provides to the Gorge area. The project opponents assert that SDS, by building a windfarm on its property will spoil the value of their property. This concern should can only be fully analyzed if both sides of the coin are examined. It would be helpful to this discussion if the Draft EIS estimated the financial value of the visual amenity that SDS currently provides - a value, that members of SOSA and the Agri-Tourism Association now enjoy for free. We can only imagine how the authors of the EIS would calculate the value of this free amenity that is so dear to SDS' neighbors. Would any of them pay to keep things as they are? And, since when does a neighbors' property rights extend to everything he or she can see from their boundaries? Since when was the Scenic Act written to control what can be seen from within the boundaries of the Scenic Area? [LTR 61, CMT 2]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *White Salmon and Hood River are known for the famed double mt. views. All of our property values will drop when the area becomes known for its multi-turbine views. [LTR 102, CMT 2]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *Economics. While proponents of the Project have correctly emphasized that it could bring some welcome jobs and tax revenues to the area, our Members are quite concerned that if the Project adversely affects our homes, our property values will also be adversely affected. The EIS should evaluate all financial effects of the Project, including specific estimates of diminished property values (region wide) due to reasonably foreseeable adverse effects of the Project. [LTR 119, CMT 8]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *Eliminating the A1-A7 turbines will virtually eliminate impacts to property values since no turbines are close to residences. [LTR 124, CMT 9]*

Response: Please see Section 1.4.3.1, Alternatives Project Locations, and Section 1.4.3.2, Larger or Smaller Generation Facility Size, for a discussion of alternatives that were eliminated from further consideration.

Comment: *Wind farm derived tax revenues will not be the only economic consequence of a local wind farm. Probable negative consequences include decreased property values… [LTR 135, CMT 4]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *Further, actual land costs, by way of leases or property purchase, should be compared with other sites. Given the representations of the applicant, and the investment to date in the permitting, this "pro forma" type financial material should be readily available. [LTR 176, CMT 11]*

Response: Financial disclosures related to the Project Applicant are outside the scope of this EIS.

Comment: *The DEIS also fails to mention the impact on property values in the area. I own a home in Underwood. I would not consider buying there again if large wind turbines are nearby. [LTR 190, CMT 4]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *Calling in opposition of the Whistling Ridge power project. He believes it will degrade the values of the property and the ecology of the gorge. [LTR 216, CMT 1]*

Response: Comment acknowledged.

Comment: *Another impact may be on property values, which would result in a decrease of income from this source, to the county. [LTR 237, CMT 6]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *Wind power proponents dismiss the notion that wind power projects might decrease the value of people's properties. In fact, they claim that studies show that the value of your land does not decrease when wind power moves into your neighborhood. Perhaps if you are a large land owner and it is likely that you will be approached about having a wind farm on your property, the value of your land might not decrease. But if you own a smaller property that is or could become residential property, the value of your property is likely to diminish, especially if your property is view property, as most of the residential property within sight of this proposal is. [LTR 256, CMT 18]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *In a discussion with a Klickitat County assessor we learned that they are having a difficult time estimating land values in areas where new wind power development has occurred because there have been no new sales in those areas. We have been told that at least one man let the county take his land - not because he could not pay the taxes - but because he could not sell his land and was tired of paying taxes on land that he could not sell. If you cannot sell your property for any price, how much is it worth? Can you really believe the notion that wind towers would not negatively impact residential properties within sight of wind power towers? We just do not believe that a reasonable person could come to that conclusion, unless you were paid to do so. [LTR 256, CMT 19]*

Response: Please see response to Comment LTR 30, CMT 3 above.

Comment: *Property values were old studies and were not comparable to the situation here. They were all talking about more rural situations in land and property values that are much lower than exist here. Please look at those studies and try to do some comparison so we can understand the impact to our type of neighborhood. [LTR 317, CMT 30]*

Response: Comment acknowledged.

Comment: *Also, regarding economic impact. I doubt other areas of the nation have the housing prices tied to the view surrounding them the way we do. [LTR 318, CMT 56]*

Response: Please see response to Comment LTR 30, CMT 3 above.

G.3.14 MITIGATION MEASURES

Comment: *Almost all the mitigation measure introductory statements end with the phrase "...to the extent feasible." It is not always specifically stated who ultimately determines what is "the extent feasible." The appropriate responsible agency, entity or statute should be provided in the text, in the relevant paragraph, so that it can be more easily evaluated. This lack of clarity regarding responsible parties is also seen in Section 3.4.3 "Mitigation Measures"; it also resorts to "the extent feasible" phrase apparently with no one in mind. [LTR 76, CMT 4]*

Response: BPA and EFSEC provide a list of mitigation measures that are expected to be followed as best they can. However, due to the nature of any construction-related project, delays and mishaps do occur. Nevertheless, a mitigation action plan is included with the Record of Decision which serves as a guidance matrix and allows for flexibility of any delays to the construction-related work.

Comment: *WDFW is in agreement with the following excerpt from Section 3.0, Affected Environment: "For permanent impacts to vegetation and habitat, the Section 8.2 of the Wind Power Guidelines (WDFW 2009) recommend mitigation be tailored to specific classifications. The project is located within the classification for "Forestry," which are those commercial forested areas defined and regulated under the Forest Practices Act. Minimization of conversion of forested areas is suggested, and consultation with WDFW is the only recommended mitigation. No form of acquisition, restoration or conservation of lands is suggested by the guidelines." However, we would like to further discuss the proposal as it relates to the table in Section 8.2 of the 2009 WDFW Wind Power Guidelines mitigation for both temporary and permanent impacts. [LTR 94, CMT 2]*

Response: The Applicant is currently working with WDFW to identify an acceptable mitigation parcel consistent with the WDFW Wind Power Guidelines. The intent of the proposed mitigation is to provide for conservation and protection of habitats and species affected by the proposed Project development.

Comment: *More importantly, the potential negative impacts to a resident's health and well-being are not adequately mitigated. [LTR 139, CMT 4]*

Response: Mitigation measures related to public health and safety are outlined in Section 3.6.3.

Comment: *[In reference to Page] 3-11. The potential for landslides is described with building of the wind towers. On 3-12, it is stated that there will be no impact to drainages and on 3-12 and 3-13 are mitigation measures. Request: Acknowledge that unstable slopes with potential to deliver to public resources would require appropriate protection under forest*

practices rules to minimize impacts to any unstable areas and associated public resources and/or public safety. This mitigation requirement is not noted. [LTR 172, CMT 15]

Response: As discussed in Section 2.1.2, final siting of the wind turbines and associated facilities would be done following completion of the EFSEC Site Certificate. Prior to this final siting process, as a condition of the Site Certificate and as discussed in Section 3.1.3, a detailed geotechnical investigation of the specific locations of all wind project elements would be conducted. If this investigation indicates the potential for slope instability at turbine sites or other project facilities such as access roads (including improvements to West Pit Road), these facilities will be redesigned or relocated to avoid this risk. The mitigation measures described in Section 3.1.3 adequately address the commenter's concerns regarding the potential for landslides and unstable slopes.

Comment: *Discussion of mitigation measures should be included which describe alternatives of reduction or relocation of turbines as well as alternative site locations. [LTR 175, CMT 4]*

Response: Alternatives related to turbine siting are discussed in Chapter 2, specifically in Section 2.3 - Alternatives Considered but Eliminated from Further Study. Mitigation measures for alternatives that are not being considered in the EIS are not included for further analysis.

Comment: *[In reference to Section] 3.1.2.2, Mitigation Measures, [t]his section should describe containment and remediation measures that will be taken in the event contaminated soils are found during construction. The scope of the mitigation measures should be expanded to address geologic hazards associated with the access road and address how the project will be accessed if the proposed access road is damaged or destroyed by a catastrophic geologic event. The project is located in the vicinity of several volcanoes and the access road traverses land designated as a Class II landslide hazard. This section should describe and discuss mitigation measures designed to protect the environment and human health and safety in the event of a catastrophic geologic event. [LTR 177, CMT 28]*

Response: In the event that contaminated soils are encountered during construction, the Applicant will notify EFSEC and Ecology as soon as possible. The Applicant will manage, handle, and dispose of contaminated soils in accordance with applicable local, state, and federal requirements. The Applicant will be required to prepare an Operations Emergency Plan to provide for employee safety in the event of emergencies, including catastrophic geological events.

Comment: *Construction Monitoring: Mitigation measures during construction should include retaining an independent environmental monitor to ensure that all Best Management Practices and other mitigation measures are fully observed during the course of construction. [LTR 177, CMT 45]*

Response: The use of environmental monitors will be specified in the mitigation action plan that is released with the Record of Decision.

Comment: *Mitigation for Lost Habitat: Arrangement should be made to mitigate for the permanent and temporary habitat losses caused by the project. Mitigation for permanent loss of habitat should be made on a one to one basis as provided for under the WDFW Wind Power Guidelines and should be developed in conjunction with WDFW and EFSEC. [LTR 177, CMT 46]*

Response: Please see response to Comment LTR 94, CMT 2 above.

Comment: *[Regarding Section] 3.6.3, Mitigation, [e]quipping the turbines with fire suppression equipment should be considered as a possible mitigation measure. [LTR 177, CMT 49]*

Response: A Fire Protection and Prevention Plan is outlined in the Mitigation Measures found in Section 3.6.3.

Comment: *[Regarding Section] 3.7.3, Mitigation, [i]f warranted, mitigation measures should include removal or reconfiguration of turbines to minimize impacts on residential receptors. If warranted, mitigation measures should include maintenance of vegetative buffers between the project and residential receptors to minimize sound impacts. [LTR 177, CMT 52]*

Response: Please see response to Comment LTR 175, CMT 4 above.

Comment: *[Regarding Section] 3.8.4, Mitigation Measures, [t]his section should discuss reconfiguration or removal of turbines to minimize visual impact on scenic area as a mitigation measure. [LTR 177, CMT 57]*

Response: Please see response to Comment LTR 175, CMT 4 above.

Comment: *[In reference to Section] 1.6, Table 1-1, [c]onvene a Technical Advisory Committee to evaluate the mitigation and monitoring program…. If created, this Committee should be much more than just Advisory. If just advisory, then it must answer to some entity other than the Applicant, that can rule and enforce mitigation actions. The composition of such a Committee and Authority should be composed of the Applicant, government agencies, and identified stake-holders in the interest of the environment. As such, organizations like the state*

and regional Audubon societies, The Friends of the Columbia Gorge, and others should be ongoing participants in the review and development of appropriate mitigation measures. Furthermore, a Committee or Authority without juristictional authority to limit operating hours is useless, and does not further the dynamic balance between human and envirornmental needs which will occur over the life of this Project (and beyond..). Remedy - The EIS should include fine details, outlining the structure and authority of a Committee that is not just advisory, but one that could implement any level of mitigation and operation restrictions if deemed appropriate. EFSEC Decision-makers should have a clear idea of the likely protections which could be applied during Project Operations, in the event actual impacts and deaths exceed estimated impacts and deaths. [LTR 178, CMT 51]

Response: The purpose of the TAC is to ensure that monitoring data is reviewed in a forum in which independent and informed parties can collaborate with a project operator. The TAC may include representatives from various federal, state and local government agencies. EFSEC, at its discretion, may add additional representatives from local interest groups. The TAC makes recommendations to the EFSEC Council if it deems additional studies or mitigation are needed. The ultimate authority to implement additional mitigation measures, including any recommended by the TAC shall reside with EFSEC. The TAC is described in Section 3.4.3.

Comment: *[In reference to Section] 3.1.3, [the] entire section no mitigation measures can be identified because of the above deficiency. [LTR 178, CMT 80]*

Response: The lead agencies believe that the commenter is referring to Project Decommissioning, which was described in detail in Section 2.1.7.

Comment: *MITIGATION MEASURES. The DEIS listed several wind turbine design features as mitigation measures, including: Use of tubular tower to minimize perching; Minimize use of turbines lighting to minimize the chance of disorienting birds and bats; and, Install newer generation up-wind turbines. However, all three of these design features are pursued for economic reasons having nothing to do with mitigating wildlife impacts, and there is no empirical evidence that any of these features have anything to do with bird and bat fatalities. These design features do not in any way mitigate for the impacts of bird and bat collisions. Conducting a raptor nest survey prior to construction would unlikely mitigate project impacts. How could it, other than influencing the timing of installation to minimize disturbance caused by construction activities? [LTR 181, CMT 39]*

Response: Extensive avian surveys were conducted for this Project and the results of these surveys are outlined in Chapter 3, Section 3.4 - Biological Resources. Additionally, the methodology and data collected from these studies can be seen in Appendix C. Mitigation measures outlined in Chapter 1 (Table 1-1) and in Chapter 3.4 (Section 3.4.3) are sufficient and meet the minimum requirements needed with respect to disturbance on any raptors within the Project Area.

Comment: *I agree that a Technical Advisory Committee (TAC) should be established, but EFSEC and BPA should impose minimum standards for TAC membership, including scientific credentials and experience with issues relevant to avian and bat impacts caused by wind projects. The TAC should be clearly authorized to select the fatality monitor, to require additional mitigation, and to change the monitoring. However, this measure should refrain from giving the impression that additional mitigation measures are readily available. [LTR 181, CMT 41]*

Response: The TAC is an EFSEC requirement only. Members of the TAC typically include representatives from various federal, state and local agencies with expertise in avian and bat impacts. Please also see response to Comment LTR 178, CMT 51 above.

Comment: *Unless the TAC is formed long before project construction, I do not believe mention should be made of adaptive management. To be true adaptive management, the measures would need to be formulated ahead of time, along with thresholds of success and alternative prescriptions. The TAC should work together with stakeholder groups to formulate an adaptive management plan, and the plan should be informed by adequate, directed pre-construction surveys. The currently available surveys are not adequate for informing adaptive management. [LTR 181, CMT 43]*

Response: Adaptive management as implemented by the TAC is commonly used and allows for the consideration of knowledge regarding activities and impacts and the option to make changes and adjustments based on that knowledge. This includes the option of adjusting the implementation of mitigation measures. The TAC is described in Section 3.4.3.

Comment: *The DEIS listed several design features of the proposed wind turbines as preventive mitigation measures, but these features have not affected fatality rates and so are misleading. [LTR 181, CMT 58]*

Response: New studies (see E.B. Arnett et al., 2010) have shown that changes in operational controls for wind turbines can prove to be effective in reducing bat mortalities. This research states that "Currently, most wind turbines in the U.S. are programmed to begin rotating and producing power once wind speed has reached approximately 8 to 9 miles per hour (mph) -- the wind speed at which turbines begin generating electricity to the power grid is known as the cut-in speed. Wind turbines with a low cut-in speed run more frequently than those set at higher cut-in speeds since they begin rotating at lower wind speeds. The researchers found that, by raising the cut-in speed to roughly 11 mph, bat fatalities were reduced by at least 44 percent, and by as much as 93 percent, with an annual power loss of less than one percent. That is, programming the turbines to rotate only when the wind reached approximately 11 mph or higher caused the turbines to rotate less frequently and, therefore, killed significantly fewer bats. Because this was performed during months with seasonably low wind speeds already, the overall energy loss was marginal when the researchers calculated the annual power output."

Comment: *Minimum standards are needed for Technical Advisory Committee membership, and the TAC should be given authority to select the monitor, make changes to the monitoring program, and to require additional mitigation measures. [LTR 181, CMT 60]*

Response: Please see response to Comments LTR 181, CMT 41 and LTR 181, CMT 43 above.

Comment: *In closing, WDFW would like to acknowledge that the applicant has submitted a preliminary mitigation plan that we are currently reviewing. The preliminary mitigation plan encompasses approximately 100 acres in Klickitat County 12 miles due east of the project site. The mitigation site is forested with Oregon White Oak with some Douglas fir and Ponderosa pine and shares a portion of its northern boundary with 40 acres of WDNR land and. This mitigation site provides habitat for several PHS entries including Western gray squirrels. Additionally, the site includes the fish-bearing Silva Creek, a tributary to the Klickitat River. [LTR 183, CMT 6]*

Response: Comment acknowledged.

Comment: *The DRAFT states on page 1.24 – Mitigation Measures – Biological Resources; "Use of tubular turbine towers, avoiding the lattice type towers which creates areas where birds may congregate and perch thus decreasing the potential for turbine collisions. Use of un-guyed meteorological towers, reducing the potential for bird collision with wires". [LTR 193, CMT 1]*

Response: We believe that the commenter is assuming that there might be some avian issues associated with lattice met towers as there were associated with lattice turbines towers in the past. This is not the case. First, the permanent lattice met towers are smaller in diameter than the lattice towers that historically were used for wind turbines. Second, these permanent lattice met towers in the vicinity of the Project would provide no greater perching potential for birds than existing trees in the vicinity of the Project. Industry standard practice is to use lattice met towers because they do not require multiple guy wires for support. Tubular towers are available for use, but they would require nine or more guy wires to support them from blowing down and require frequent tightening and maintenance. In the case of the forested Whistling Ridge site, if tubular towers were used with guy wires it will increase the amount of cleared area that would be required for the Project because trees cannot be allowed to grow in a large radius around the met tower. The cleared area is necessary to prevent tree interference with the guy wires. Lastly, permanent lattice met towers would be located in the Project vicinity but not immediately adjacent to the wind turbines or in a location where they can cause interference or cause an elevated risk of avian strikes.

Comment: *Mitigation. The project would entail approximately 384 acres of forest land being developed for wind turbine foundations, connecting roadways, overhead and underground*

transmission lines, operation and maintenance yard, and substation. (DEIS p. 1-9, 2-4) This includes the permanent loss of 60.7 acres of habitat, as well as the temporary loss of another 53.6 acres of habitat. (DEIS p. 3-73) In addition, there would be significant additional acres impacted by a corridor of up to 500 feet from the base of the turbines that would have a height restriction on trees. (DEIS p. 2-4, 2-15) Despite this noted loss or degradation of habitat, the DEIS does not include any mitigation measures related to these habitat impacts. (DEIS p. 3-82) The Wind Power Guidelines recommend mitigation for permanent habitat impacts by either acquisition of replacement habitat or "By Fee" option, or a combination of both. (WDFW, p. 9, 12) The Guidelines also recommend mitigation for temporary impacts to habitat, including a WDFW approved restoration plan and some acquisition of suitable replacement habitat. (WDFW, p.11-12) The FEIS should include an explicit evaluation of the impacted habitat (both temporary and permanent) and identify the specific level of mitigation that will be required of the applicant. SEPA provides the authority to impose reasonable conditions to mitigate impacts from a proposed action. While the project lands are not pristine wildlife habitat, they do provide valuable habitat for numerous bird and other species as well as ecosystem services that would be adversely impacted by the project. This habitat provides foraging and breeding opportunities for different species as well as vegetative cover for wildlife. The project proponent, SDS Company, LLC, touts the importance of its forest lands for wildlife and biodiversity, stating that its timberlands "provide habitat for various species of plants and wildlife, they protect watersheds, they emit oxygen into the atmosphere and consume carbon dioxide, and they provide beautiful spaces for recreation." (see http://www.stevensonlandcompany.com/) Permanently converting 60.7 acres of this habitat, as well as temporarily impacting an additional 53.6 acres of habitat, requires acquisition of replacement habitat. Seattle Audubon recommends a ratio of at least 1:1 for replacing permanently impacted habitat and of 0.1:1 for temporarily impacted habitat, as the project lands appear to fit the Wind Power Guidelines' description of Class III habitat – lands with lesser numbers of associated Species of Greatest Conservation Need but that are not currently cultivated, developed or disturbed by an active road or other corridor that eliminates natural habitat. (WDFW p. 9) SDS manages numerous land parcels in the general vicinity of the projects that are like-kind and/or of equal or higher habitat value than the areas which would be impacted by the project. There are numerous SDS-owned sites in the Columbia River Gorge National Scenic Area and the White Salmon River Wild and Scenic River corridor that meet the criteria identified in the Wind Power Guidelines as being at risk of development or habitat degradation; these or other lands in the areas could serve as appropriate replacement habitat by donation to a land trust or given permanent legal protection through a conservation easement or other enforceable means. (WDFW, p. 9-10) A detailed mitigation package should be developed prior to project approval, not left to be determined after the fact. In addition to inclusion of mitigation for impacts to habitat, the FEIS should also explicitly include mitigation for any direct impacts to at-risk species. As noted above in our comments above regarding NSO, olive-sided flycatcher and Vaux's swift, the FEIS should include details of the specific actions that will be required of the applicant to avoid, minimize and mitigate for any mortality of ESA-listed and other sensitive species. [LTR 196, CMT 9]

Response: Please see response to Comment LTR 94, CMT 2 above.

Comment: *Adaptive Management. We appreciate the requirement for a Technical Advisory Committee (TAC) to evaluate and coordinate the mitigation and monitoring program, including potential adaptive management activities. (DEIS p. 3-82) Unfortunately the DEIS contains no information detailing the authority of and resources available to the TAC to carry out those responsibilities. As the Wind Power Guidelines point out, the range of potential adjustments the TAC could make to potential mitigation and monitoring requirements should be clearly stated in the project permit. (WDFW p. 6) In addition, the proposed composition of the TAC does not include any stakeholders from environmental groups, landowners or Native American tribes. (WDFW p. 6) The FEIS should identify an expanded TAC that includes representatives from these other stakeholder groups, as well as clearly identify TAC funding and authority. As noted multiple times above, Whistling Ridge would be one of the first wind power projects to be considered for a forested landscape in Washington state. In light of this, there are several important environmental issues for which there is limited or no applicable comparative data for use in evaluating wind power projects in forested landscapes. In recognition of this type of challenge, the Wind Power Guidelines specifically call for research oriented studies that look at issues such as species displacement or cumulative impacts that could provide important information for understanding wind energy / wildlife interactions. (WDFW p. 7) The FEIS should identify specific research oriented studies that would directly relate to the proposed Whistling Ridge project, as well as the role of the TAC in determining the need for further studies. Potential studies include: a) A robust analysis of pre- and post-construction avian use study data at the project to better understand direct and indirect impacts to specific avian species, including changes to density and nesting success of targeted species. b) As noted in our cumulative impact comments above, an analysis focused on the Pacific Northwest region, including forested landscapes, of the potential cumulative impacts of a "full build-out" of wind power on avian species. c) As noted in our climate change comments above, a Pacific Northwest-specific study comparing the annual bird fatalities caused by wind farms versus those caused by fossil fueled power stations, similar to the 2009 Sovacool study. (DEIS p. 3-276) d) As noted in our monitoring comments above, the use of canine detection of carcasses in the post-construction avian mortality study. While funding for these and/or other research oriented studies should be solicited from multiple sources (WDFW p. 7), the FEIS should explicitly identify the level of funding to be provided by the project proponent. [LTR 196, CMT 11]*

Response: Please see response to Comments LTR 181, CMT 41 and LTR 181, CMT 43 above. Additionally, the Post Construction Avian Monitoring Plan along with other monitoring data is reviewed by the TAC to better understand the effectiveness of the monitoring data and to recommend additional mitigation measures if warranted. Funding for TAC activities is provided by the certificate holder, but it is outside the scope of this EIS. Furthermore, the TAC is described in Section 3.4.3.

Comment: *My biggest concern is that there be a guaranteed set aside fund to remove the turbines once they have reached the end of their useful life and stopped generating power. There should absolutely be a provision to restore the area once they stop generating power. It is inevitable that at some point a newer technology will replace wind and when it does please make sure that we don't have to look at something that we are not deriving benefit from. [LTR 214, CMT 3]*

Response: Before Project construction begins the certificate holder must provide to EFSEC documentation showing that adequate financial resources are available to provide for Project decommissioning and site restoration. Project decommissioning is described in Section 2.1.7.

Comment: *Also, we have noticed that mitigation measures are often worded in a manner that allows the proponent the choice of whether or not the mitigation measure will actually be implemented. And, we have noticed that proponents often ask that mitigation measures be quietly withdrawn once the permit is in hand, and very often that is exactly what happens. [LTR 256, CMT 22]*

Response: BPA and EFSEC provide a list of mitigation measures that are expected to be followed as best they can. However, due to the nature of any construction-related project, delays and mishaps do occur. Nevertheless, a mitigation action plan is included with the Record of Decision which serves as a guidance matrix and allows for flexibility of any delays to the construction-related work.

Comment: *[In reference to Section 3.1.2.1, Proposed Action, Construction; PDF pg. 9], [a]s far as I could find, the DEIS does not list what these Best Management Practices (BMPS) are. They should be listed, so we could evaluate if they are adequate for this project which proposes to move a lot of earth and has a high potential for erosion and land movement. [LTR 286, CMT 6]*

Response: BPA and EFSEC do not list BMPs in their environmental documents. However, mitigation measures are outlined to serve as guidance to contractors (please see Table 1-1) and the contractors are required to meet certain specifications as outlined in a mitigation action plan that is released with the Record of Decision.

Comment: *[In reference to Section 3.1.3, Mitigation Measures; PDF pg. 12], [a]ll of the above should be part of the DEIS now, not later. There are all valid questions that should be answered PRIOR to the start of any construction or earth movement. Once a proposal is approved, then the proponent can almost do anything to make sure that it gets done. We should use the PRECAUTIONARY PRINCIPLE and know all the details and facts that it is possible to know PRIOR to any construction and excavation. The detailed geotechnical investigational ensuring that design of these facilities includes proper engineering; [possible] relocation of the facilities; the Stormwater Pollution Prevention Plan (SWPPP), Erosion and Sedimentation Control Plan and Environmental Protection Control Plan; and, the seismic design provisions should all be part and parcel of the DEIS, not done after the fact when the public has no recourse for further input and comment. [LTR 286, CMT 9]*

Response: Prior to any construction or excavation, EFSEC requires an Applicant to submit construction plans, specifications, drawings and design documents that demonstrate the Project

design will be in compliance with the conditions of the Site Certification Agreement which will incorporate mitigation measures identified in the FEIS. The plans will include overall Project Area plans, foundation drawings, equipment and material specifications, and vendor guarantees for equipment performance as appropriate. The Applicant cannot begin construction prior to obtaining EFSEC approval of the construction plans and specifications. Prior to construction, EFSEC also requires an Applicant to submit a Construction Stormwater Pollution Prevention Plan (Construction SWPPP) that meets the requirements of the Ecology stormwater pollution prevention program (WAC 173-230) and the National Pollutant Discharge Elimination System and State Waste Discharge General Permit for Stormwater Discharges Associated with Construction Activities issued by the Department of Ecology on November 16, 2005 or as revised. An Applicant cannot begin Site Preparation prior to obtaining EFSEC approval of the Construction SWPPP. EFSEC also requires an Applicant to submit a Temporary Erosion and Sediment Control (TESC) Plan for EFSEC approval prior to the beginning of Site Preparation. An Applicant cannot begin Site Preparation without prior approval of the TESC Plan by EFSEC. As an alternative to submitting a separate TESC Plan, an Applicant may include measures for TESC in the Construction SWPPP. An Applicant must also submit an Operations Stormwater Pollution Prevention Plan prepared in accordance with the guidance provided in the applicable Ecology Stormwater Management Manual prior to beginning commercial operation. An Applicant must periodically review the Operations SWPPP against the guidance provided in the applicable Ecology Stormwater Management Manual, and make modifications as necessary to the Operations SWPPP to comply with current requirements for BMPs.

Comment: *[In reference to Section 3.3.2.1, Proposed Action; PDF pg. 40], [w]hat are these "standard construction BMPs" and where are they located in the DEIS? [LTR 286, CMT 26]*

Response: Typical BMP's were listed in the 2nd, 5th and 6th bullets on DEIS Page 3-13 and the 1st bullet on DEIS Page 3-14.

G.3.15 CUMULATIVE IMPACT ANALYSIS

Comment: *The evaluation of cumulative impacts is inadequate. Under SEPA, EFSEC is required to consider whether multiple incremental impacts when considered together may cumulatively result in a significant adverse impact. WAC 197-11-792(2)(c)(iii). Unfortunately, the cumulative impacts analysis done for the Whistling Ridge DEIS only considered the impacts of 10 existing wind projects and three proposed wind projects. In fact, there are at least a dozen major wind projects constructed or proposed in Klickitat County alone, and more than 40 major wind projects constructed or proposed along the Columbia River east of Whistling Ridge. The pace and scale of wind turbine construction in this region has been unprecedented. Only five years ago, an EIS prepared by Klickitat County (which lies immediately to the north and east of the Whistling Ridge site) predicted the construction of four major wind projects, with a total*

installed capacity of 1,000 megawatts, over a 20-year period. In actuality, 10 major wind projects with a total installed capacity of more than 1,100 megawatts have already been constructed in Klickitat County, and permits are pending for another 500 megawatts. In other words, Klickitat County has seen twice as much wind development in five years as was predicted for 20 years. Besides the many projects in Klickitat County, the BPA's interconnection queue shows approximately 35 additional projects in other nearby counties that are either permitted or awaiting permits. Other projects are proposed but not yet shown in the BPA queue. From Whistling Ridge to Walla Walla, wind developers are erecting (or proposing to erect) strings of turbines that stretch for more than 100 miles along the ridges on both sides of the Columbia River. [See PDF for footnotes] In Klickitat County, almost every inch of ridge-top land above the Columbia from Dallesport eastward is already under lease to wind developers. [See PDF for footnotes] Additional projects are proposed but not yet shown on this map because permit applications have not been filed. The environmental impacts analysis for Whistling Ridge must consider the regional impacts of more than 40 major projects within the Columbia Plateau ecoregion. The scale and sprawl of this wind development has significant cumulative impacts on wildlife, habitat, scenic values and other natural resources. [LTR 36, CMT 3]

Response: EFSEC believes that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with SEPA requirements by cataloguing cumulative projects in the region, considering the aggregate effects of relevant past projects in the region along with the potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects. However, in order to address the commenter's concerns related to the number of projects evaluated and the proximity to the Project Area, the lead agencies have updated the following: Sections 1.8.1.1 and 1.8.1.2 as well as Sections 3.14.1 and 3.14.2. These changes remove the Middle Mountain project from further consideration in this EIS as well as include new wind projects that have come online since the DEIS. Additionally, Figure 3.14-1 has been updated to show these changes.

Comment: *The notion that projects in eastern Klickitat County are "too far away ... to result in cumulative impacts" is mistaken. Many birds and bats travel long distances during migration, foraging, and other components of their life cycle. Also, genetic exchanges between individuals of any given species are essential for maintaining population viability. More important, the notion that projects are too far away to have cumulative impacts is mistaken because significant adverse impacts typically occur at the population level, rather than at the level of individual animals affected by a particular wind project. While different wind projects may affect different individuals, the cumulative effect of combined mortalities at many contiguous sites can be population-level impacts-and perhaps even local extinctions over time. [LTR 36, CMT 3]*

Response: The sentence on cumulative impacts and distance between projects in which the commenter is referencing was taken out of context. This sentence actually is referring to other elements of the environment, such as visual, water quality, noise and earth, and is not in reference to birds and bat species. As described in Section 3.14.3.5 of the DEIS, the cumulative impact analysis for birds and bat species considered the added impacts of the Whistling Ridge Energy Project to the overall cumulative biological impacts of all wind energy projects in the

region. It relied heavily on data from 11 wind-energy facilities in the Columbia Plateau Ecoregion (CPE) where facility monitoring has occurred. The cumulative impacts analysis for Klickitat County was updated in 2010 and is included as an appendix to the FEIS (Appendix C-11).

Additionally, based on the avian point count data, bird use in the Project Area is considered too low to identify the site as a flyway or concentrated migration route. Birds are migrating through the Project Area, but not using it as a primary route. Additionally, bat mortality at wind developments is categorically correlated with pre-construction bat pass density, and because the fall monitoring (period of highest mortality of bats) was low relative to other wind developments, it is possible that the proposed wind development also will have low mortality during this period. During summer, higher bat pass density was documented, but as noted in the DEIS (page 3-80), many sites have higher summer bat populations but low summer bat mortality. The elevated Anabat units deployed in 2009 would have picked up migratory bats, and although an in-depth migratory study was not conducted, these elevated units recorded low call density so migration is likely light in the area of the proposed Project.

Comment: *The DEIS erred in relying on a cumulative impacts analysis published in 2007 for the Mid-Atlantic Highlands. Not only is the Mid-Atlantic region completely different from the Whistling Ridge site in habitat and species composition, but the 2007 study was published before the pace of wind development began to rapidly accelerate. It is inappropriate to base any cumulative impacts analysis for Whistling Ridge on a study done under very different circumstances and in a very different place. [LTR 36, CMT 3]*

Response: The Mid-Atlantic Highlands (NRC 2007) study was mentioned in the DEIS because at the time of writing it was widely considered the most thorough, objective and "best available science" regarding fatality estimates for birds and bats over a large geographic area. The DEIS relied more on the findings of a similar cumulative impact study on avian and bats conducted for the Klickitat County Planning Department (WEST, Inc. 2010). The WEST study summarized results of fatality monitoring studies at operational wind-energy facilities within the Columbia Plateau Ecoregion, and then used those results to estimate impacts for all constructed and proposed wind-energy facilities within the same ecoregion. In comparison to the Columbia Plateau Ecoregion, the site proposed for the Project is in a different ecoregion, the Eastern Cascades ecoregion, which to date has not experienced any wind energy development that could provide similar monitoring results. Section 3.14.3.5 of the EIS has been revised to include additional discussion of the potential for cumulative impacts to birds and bats associated with wind energy development in the Eastern Cascades.

Comment: *It is also inappropriate to dismiss the cumulative impacts of wind turbines on wildlife because of other man-made effects such as mortalities from buildings and cats. These mortalities don't necessarily affect the same species as wind turbines do: For example, cats do not kill golden eagles, and skyscrapers do not kill species that make their homes in remote rural areas. More important, these man-made impacts do not justify placing additional pressures on*

sensitive bird and bat populations from new man-made structures in more remote areas where wind projects may be the leading source of avian and bat fatalities. They merely illustrate the importance of minimizing any additional mortalities caused by wind projects. Two wrongs do not make a right. [LTR 36, CMT 3]

Response: The reference to other potential causes of mortality for bird and bat populations in a given region, including collisions with buildings, transmission lines and vehicles, habitat loss, and predation by domestic cats was mentioned to provide a context within which to view the potential threat posed to these populations by wind generation facilities. The study referenced in the DEIS, Erickson et. al. (2005), reported that recent research estimated that mortality threats to these species from these sources were many times larger than those from wind energy generation (Erickson et al. 2005; 2008).

Comment: *The WEST report prepared for the Klickitat County Planning Department is not applicable to the proposed Whistling Ridge Energy Project, and cannot be relied on to evaluate cumulative impacts. The report prepared by Western EcoSystems Technology, Inc. (WEST) purports to be a cumulative impacts analysis for Klickitat County. [LTR 36, CMT 4]*

Response: EFSEC and BPA recognize that the WEST report was developed for the more arid shrub-steppe lands, rather than the coniferous forests found within the proposed Project Area. The conclusion from their report remains pertinent for the proposed Project, because avian mortality from wind developments is far less significant than the effect from traditional energy development or climate change. There are no other projects in coniferous forests in the Eastern Cascades for comparison, so the Klickitat study was used. In fact, with the exception of the Grayland project in Pacific County (a very small 4-turbine wind energy facility) there are no other existing wind energy facilities in forested habitats of western Washington or Oregon. To date, only three other projects have been proposed in this entire area, including the Middle Mountain Project in Hood River County, Oregon, the Coyote Crest project in Pacific and Lewis Counties, Washington, and the Radar Ridge project in Pacific County, Washington. The only other project proposed in the Eastern Cascades, Middle Mountain, is no longer being pursued by Hood River County, as the County Commission decided to cease efforts to pursue this community scale project of around 10 MW at its meeting on May 17, 2010. An updated version of the study prepared by WEST has been included as Appendix C-11 in the FEIS and the cumulative impacts analysis for bird and bat species in Section 3.14.3.5 has been revised to include additional information on the potential for cumulative impacts on these species associated with wind energy development in the Eastern Cascades.

Comment: *Unfortunately, this report sheds little light on the cumulative impacts of wind power development on wildlife in Klickitat County, and it is even less relevant to a project proposed for Skamania County. As the WEST report's title suggests, the Columbia Plateau Ecoregion is located in eastern Washington and Oregon, which have completely dfferent plant and animal communities than the western Washington site proposed for the Whistling Ridge wind project. All of the projects evaluated in the WEST report are located in arid and un-*

forested lands, whereas Whistling Ridge is located in a coniferous forest that receives much more precipitation and has a much different plant and animal population. Impacts of wind projects on birds and bats are extremely site-specific, and because of that the WEST study has little applicability to the Whistling Ridge proposal. It is no more applicable than studies from the Altamont Pass Wind Resources Area in California, where significant population-level impacts on birds have been documented; or from the forested Mountaineer wind project in Appalachia, where significant population-level impacts on bats have been documented. The WEST report contains fatality monitoring data from 12 projects around the Columbia Plateau Ecoregion. Only one of those projects, Big Horn, is actually located in Klickitat County-and the results from Big Horn show much higher raptor fatality rates than anywhere else in the Pacific Northwest. In other words, the WEST report underestimates the impacts of wind projects in Klickitat County by merging the Big Horn data with results from less lethal projects elsewhere in the region. The WEST report also looked at 24 projects in the Pacific Northwest for which preconstruction estimates of avian use are available. Here too, the results from Klickitat County show a much higher likelihood of avian impacts than elsewhere in the region. Of the 24 projects evaluated in the report, the seven projects located in Klickitat County had much higher estimated use by both raptors and by birds of all types. For example, the highest raptor use estimated anywhere in our region is at the Linden Ranch in Klickitat County. Raptor use there is estimated to be 2.5 times the average for the Columbia Plateau ecoregion. In other words, the WEST report does not give an accurate picture of cumulative impacts from expanding wind power here in Klickitat County, much less any indications of cumulative impacts to be expected in Skamania County. To the contrary, the WEST report uses data from projects in other parts of Oregon and eastern Washington to underestimate how many birds-especially raptors-are likely to be killed here. The WEST report has another fundamental flaw. To arrive at a prediction of cumulative fatalities, the report's authors averaged existing fatalities in the region and then compared those averages with estimates of regional population size based on breeding bird surveys provided by the Partners in Flight North American Landbird Conservation Plan. However, the Partners in Flight estimates include relatively large standard errors, and are not accurate enough to serve as reliable population indicators. The estimates used in the WEST report were designed for detecting long-term population trends but not for estimating population size. As Dr. K. Shawn Smallwood, an ecologist who is one of the nation's leading experts on the interactions between wildlife and wind turbines, points out in a review of the WEST report, the estimates from Partners in Flight are "unsuitable for the use that Johnson and Erickson made of them." Other researchers have pointed out this flaw but WEST continues to rely on these unsuitable estimates. Smallwood further writes: "No studies or monitoring programs have been designed or implemented in the US to document wind energy-related population declines of any bird species. Most fatality monitoring programs have been much too brief to document declines, lasting one or two years. All monitoring programs have been too crude to document declines, and the majority of post-construction studies have not been designed to estimate population size of any bird species. Therefore, Johnson and Erickson's statement about wind energy impacts was misleading." [LTR 36, CMT 5]

Response: The Wildlife Society, in a landmark publication on wind energy and wildlife, concluded that fatalities of passerines from wind turbine strikes generally are not significant at the population level (Arnett et al. 2007). Also, the National Academy of Sciences (NAS 2008) recently reviewed wind energy impacts on birds, and came to the following conclusion: "At the current level of wind-energy development (approximately 11,600 MW of installed capacity in

the United States at the end of 2006, including the older California turbines), the committee sees no evidence that fatalities caused by wind turbines result in measurable demographic changes to bird populations in the United States, with the possible exception of raptor fatalities in the Altamont Pass area." The available information suggests that the project would be unlikely to have population impacts on birds.

Additionally, regarding the WEST report used in the DEIS, EFSEC and BPA recognize that the WEST report was developed for the more arid shrub-steppe lands, rather than the coniferous forests found within the proposed Project Area. The conclusion from their report remains pertinent for the proposed Project, because avian mortality from wind developments is far less significant than the effect from traditional energy development or climate change. There are no other projects in coniferous forests in the west for comparison, so the Klickitat study was used. In fact, with the exception of the Grayland project in Pacific County (a very small 4-turbine wind energy facility) there are no other existing wind energy facilities in forested habitats of western Washington or Oregon. To date, only three other projects have been proposed in this entire area, including the Middle Mountain Project in Hood River County, Oregon, the Coyote Crest project in Pacific and Lewis Counties, Washington, and the Radar Ridge project in Pacific County, Washington. The only other project proposed in the Eastern Cascades, Middle Mountain, is no longer being pursued by Hood River County, as the County Commission decided to cease efforts to pursue this community scale project of around 10 MW at its meeting on May 17, 2010.

An updated version of the study prepared by WEST has been included as Appendix C-11 in the FEIS and the cumulative impacts analysis for bird and bat species in Section 3.14.3.5 has been revised to include additional information on the potential for cumulative impacts on these species associated with wind energy development in the Eastern Cascades.

Comment: *The DEIS fails to estimate the direct and cumulative impacts of this project on the Northwest power grid. The breathtaking pace of wind development along the Columbia River has created serious challenges for BPA and the regional energy grid. There are limits to the amount of wind power that can be integrated into the grid, and we are already at or near these limits. BPA has expressed concerns about how it can integrate more than 6,000 megawatts of wind power into the grid, yet the DEIS fails to analyze these constraints and how they will be affected by the construction of yet another wind project. Adding more wind power capacity to the grid requires not only new transmission lines but also new storage capability, because wind is an intermittent power source. Typically wind projects operate at only about 30 percent of their total generating capacity, which means that 70 percent of the time a backup power source must be available. The DEIS has failed to analyze the environmental impacts of the proposed backup power source for Whistling Ridge. For example, if hydropower will be the backup, the DEIS must consider the indirect impacts of this project on fish, irrigation, navigation and other drawdown impacts. If backup power will be provided by a natural-gas-fired power plant, the impacts of that power plant should be considered along with the impacts of the wind project. Williams is proposing a new gas line for the Whistling Ridge area, and the substation and transmission inter-tie lines proposed for the Whistling Ridge area could signal the advent of additional power plants in the area. These must be evaluated along with impacts of the infrastructure currently being proposed. A recent study in Colorado found that wind power's*

supposed carbon emissions benefits are not being realized, because of the requirement for conventionally-generated backup power. [LTR 36, CMT 10]

Response: BPA's transmission studies for the proposed Project have shown there to be sufficient transmission capability available on BPA's existing transmission system to provide transmission service for the proposed Project. No upgrades of the existing BPA transmission system (other than the proposed interconnection substation already considered in the EIS) would be required, and there would be no detrimental effect on this system for this particular interconnection. BPA does not build nor own any power generation facilities whatsoever. However, BPA is committed to finding innovative solutions to meet the renewable resource objectives of the Pacific Northwest by reliably and cost-effectively extending the integration capability of the BPA Balancing Authority while honoring our statutory obligations to our preference customers and the operational limitations on the Federal hydroelectric system. Currently, BPA uses the hydro-system to balance wind generation and cannot speculate whether increased wind generation will require the construction of other facilities in the reasonably foreseeable future. See *http://www.bpa.gov/corporate/WindPower/* for more information on balancing loads in the region. Lastly, the potential for wind projects to result in cumulative impacts to Columbia River fish species due to the interplay of the hydrosystem operations used for balancing during certain conditions are discussed further in Section 3.14.3.5 of the EIS and in other responses within this section.

Comment: *Considering these and related concerns, the Washington Department of Fish and Wildlife's recommendation for a comprehensive cumulative effects analysis should be required for this or any wind turbine application, especially when proposed in a forest setting. [LTR 79, CMT 18]*

Response: The level of effort conducted for pre-construction exceeds the industry standard level of effort for a proposed Project of this scale, and accommodates the unique forested habitat not currently present at other Washington wind developments. Statistically defensible use estimates were calculated for birds, to estimate the relative mortality that could be expected following construction. Bat pre-construction surveys were conducted, and the level of presence was compared with the levels observed at other wind developments. The cumulative effects section includes analysis of known proposed wind developments in the region.

Comment: *These are my preliminary comments and questions. I will be making further comments during the public comment period. Let me be blunt: in reading the Cumulative Impact Analysis section in the DEIS, 3.14, p. 3-264, I was perturbed to find that there have not been any cumulative impact analyses done. There are statements made about cumulative impacts but no analyses. The basic refrain appears to be that, in the past, bad environmental things happened in the project area, bad things will happen in the present because of the project, and this will lead to more bad things happening in the future! This is not cumulative impact analysis. The NEPA process must use critical analyses for Federal projects and this one qualifies because of BPA's interest. [LTR 82, CMT 1]*

Response: The lead agencies believe that the EIS provides a reasonably thorough discussion of potential cumulative impacts associated with the proposed Project. Based on the past, present and reasonably foreseeable future actions identified in Sections 3.14.1 and 3.14.2 of the EIS, the overall cumulative impact from these actions and the additional incremental impact of the proposed Project are analyzed by resource in Section 3.14.3 of the EIS. For each resource, relevant cumulative actions and projects with potential or actual impacts on that resource are identified, and the cumulative effect of the proposed Project coupled with these relevant cumulative actions and projects is discussed. As indicated in other responses to comments, the cumulative impact analysis in Section 3.14 of the EIS has been updated to include a more current cataloguing and analysis of relevant cumulative projects.

Comment: *The Council on Environmental Quality's Considering Cumulative Effects: Under the National Environmental Policy Act Handbook gives pretty clear methods on analyzing cumulative effects. Table 5.3, p. 56, Primary and special methods for analyzing cumulative effects, gives seven primary methods and four special methods for analyzing cumulative effects. (I submit the Handbook into the record.) For example, what I did not see in the DEIS was a Trends Analysis, which is #6, in Table 5.3 of the CEQ Handbook – Trends analysis assesses the status of a resource, ecosystem, and human community over time and usually results in a graphical projection of past or future conditions. Changes in the occurrence or intensity of stressors over the same period can also be determined. Trends can help the analyst identify cumulative effects problems, establish appropriate environmental baselines, or project future cumulative effects. I saw no environmental baselines data in the DEIS. Where is it? Without baseline data, cumulative impacts/effects are very hard to quantify. Another example, #5, Modeling, under Primary Methods, states "Modeling is a powerful technique for quantifying the cause-and-effect relationships leading to cumulative effects, can take the form of mathematical equations describing cumulative processes such as soil erosion, or may constitute an expert system that computes the effect of various project scenarios base on a program of logical decisions." The strengths of this method are: it "can give unequivocal results; addresses cause-effect relationships; quantification; can integrate time and space." Weaknesses are: "need a lot of data, can be expensive, intractable with many interactions." [LTR 82, CMT 1]*

Response: BPA believes that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with NEPA requirements by cataloguing cumulative projects in the region, considering the aggregate effects of relevant past projects in the region along with the potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects. The CEQ handbook cited by the commenter, while a potentially useful reference document in certain circumstances, is neither formal CEQ guidance nor legally binding on federal agencies preparing EISs under NEPA.

Comment: *Just two examples, and there are many more, from the DEIS, I believe, show its inadequacy, especially in cumulative impacts analysis: In 3.14.3.4, Vegetation and Wetlands, p. 3-272, the proponent states: "Past and present land development, timber harvest, and*

agricultural uses have resulted in a cumulatively significant change in the composition of vegetation and habitat types in the project vicinity. In general, land development and agricultural uses have resulted in conversion of forested areas to non-forested areas, and timber harvests have resulted in a mosaic of forest ages, with average stand age declining over time from relatively short stand rotations. Changes in stand structure and complexity, patch size, and species distribution also have occurred. Few large, old-growth conifers or late-successional stands exist [my questions: how many, where are they located, is there a map, etc?] in the general project vicinity. Accordingly, past and present uses have resulted in cumulative habitat conversion and an ongoing pattern of habitat fragmentation. [my questions: how much fragmentation, what kind of fragmentation, affecting which species, etc.] Reasonably foreseeable future actions, such as ongoing land development and timber harvests, would continue this trend." [my emphasis] And, it goes on to say: "Project construction would take place in the context of the existing use of the project vicinity generally for commercial forestry, which includes regular cycles of clear cutting and reforestation. Nonetheless, by removing trees and other vegetation in the wind project area for the life of the project, development of the Proposed Action would contribute incrementally, though in a relatively minor way, to these cumulative impacts." This is not a cumulative impact analysis, wherein all the past, present, and future habitat fragmentation would have to be quantified, and then a cumulative impact analysis done on the project area. And then this project would also have to look at habitat fragmentation in the geographical areas surrounding the project in order to get a total picture of all the habitat fragmentation. Cumulative impacts are not done on a project by project basis with no additive analyses. Regional cumulative impacts matter. [LTR 82, CMT 1]

Response: The depiction of past, present, and future conversion of forested areas to non-forested areas is considered adequate for the purposes of this cumulative effects analysis. Section 3.14.3.5 in the DEIS acknowledged that "The proposed Project would impact terrestrial wildlife habitat through the permanent improvement of approximately 56 acres now in grass/forb, field/shrub, managed coniferous or mixed deciduous-coniferous forest from within the wind Project Area."

Comment: *In the same section, p.3-273, Wetlands, the DEIS states: "Incremental losses and degradation of wetlands over time have cumulatively depleted [my questions: how much, maps, species affected, etc.] wetland resources in the United States. In the project vicinity, wetlands likely were previously impacted by construction of a variety of activities, including development of roads and railroads, agricultural activities, and past timber harvests. [my questions: what are the cumulative impacts on the wetlands from all this past and present activity? How will your project affect these cumulative impacts?] Reasonably foreseeable future actions may also affect wetlands in the project vicinity, but it is expected that these future projects would be required to avoid, minimize, and compensate for any potential impacts to wetlands from filling or other activities as part of project Section 404 permitting requirements. Regardless, because construction and operation of the proposed wind project would not impact wetlands, implementation of the Proposed Action would not contribute to cumulative impacts to wetlands." [my emphasis] I'm sorry, we're supposed to take their word for it that their project would not impact wetlands??? Where is the cumulative impact analysis of the wetlands in the area? This*

is not cumulative impacts analysis. It is wishful thinking. And wishful thinking doesn't get the project okayed. [LTR 82, CMT 1]

Response: As discussed in Section 3.4 of the EIS, there are no wetlands or wetland buffers located within areas that would be affected by the proposed Project. The proposed Project therefore would not be expected to affect any wetlands. Accordingly, the Project would not be expected to contribute to any cumulative impacts to wetlands in the Project vicinity from other cumulative actions or projects. Given this lack of project impact to this resource, BPA and EFSEC believe that the discussion of cumulative wetland impacts provided in Section 3.14.3.4 of the EIS is sufficient.

Comment: *I will be submitting further comments on the cumulative impacts at a later date. We have not even touched upon Carrying Capacity Analysis, which should be applied to a wide range of resources to address cumulative effects. From the CEQ Cumulative Effects handbook: "Cumulative effects are a more complex problem for whole ecosystems, because ecosystems are subject to the widest possible range of direct and indirect effects. Analyzing the cumulative effects on ecosystems requires a better understanding of the inter-workings of ecological systems and a more holistic perspective. Specifically, ecosystem analysis entails new indicators of ecological conditions including landscape-scale measures. In addition to these two special methods, analyzing cumulative effects on human communities requires specific economic impact analysis and social impact analysis methods." Where are the special economic impact analyses and social impact analyses for this project? Cumulative economic impacts don't just mean the impacts to the local area. Cumulative economic impacts are and should be regional in nature and it is prudent to ask what the cumulative impacts of this wind farm will be on our region. Will the impacts be harmful or beneficial? No one can answer that because there is no in-depth analysis in the DEIS. [LTR 82, CMT 1]*

Response: Environmental resources, such as soils, air quality, water resources, biological resources, and other aspects that help define ecosystems are addressed in Chapter 3 of the DEIS. Additionally, cumulative effects related to these resources are discussed in more detail within Section 3.14, Cumulative Impacts Analysis. Additionally, socioeconomic impacts of the proposed Project are discussed and analyzed in Section 3.13 of the EIS. This analysis covers the potential regional socioeconomic effects of the proposed Project, as we as more localized effects. Section 3.14.3.14 of the EIS also provides a cumulative analysis of potential socioeconomic effects related to the proposed Project.

Comment: *The DEIS erred in relying on a cumulative impacts analysis published in 2007 for the Mid-Atlantic Highlands. Not only is the Mid-Atlantic region completely different from the Whistling Ridge site in habitat and species composition, but the 2007 study was published before the pace of wind development began to rapidly accelerate. It is inappropriate to base any cumulative impacts analysis for Whistling Ridge on a study done under very different circumstances and in a very different place. [LTR 161, CMT 3]*

Response: As discussed in the DEIS, the reference to the Mid-Atlantic Highlands (NRC 2007) was addressed in the Cumulative Impacts Analysis section for the Whistling Ridge Energy Project because the National Academy of Sciences National Research Council estimated the Mid-Atlantic Project to depict the best and worse case fatality estimates for birds and bats based on a regional "full-build" scenario in 2020. This study is considered the most thorough, objective and "best available science" on the topic of cumulative impacts from wind energy projects, and made use of a real world example (although from a different region of the country from Whistling Ridge). This study concluded that it is unlikely that the predicted level of fatalities would result in measurable impacts to migratory populations of most species, although for rare and local populations, the cumulative impacts when combined with all other man-made sources of mortality could affect population viability. Please refer to Section 3.14.3.5, page 3-274 of the DEIS for further discussion of the National Research Council's study. Additionally, the FEIS has been updated with more information regarding the cumulative impacts to "Bird and Bat Species" within Section 3.14.3.5.

Comment: *It is also inappropriate to dismiss the cumulative impacts of wind turbines on wildlife because of other man-made effects such as mortalities from buildings and cats. These mortalities don't necessarily affect the same species as wind turbines do: For example, cats do not kill golden eagles, and skyscrapers do not kill species that make their homes in remote rural areas. More important, these man-made impacts do not justify placing additional pressures on sensitive bird and bat populations from new man-made structures in more remote areas where wind projects may be the leading source of avian and bat fatalities. They merely illustrate the importance of minimizing any additional mortalities caused by wind projects. Two wrongs do not make a right. [LTR 161, CMT 3]*

Response: Comment acknowledged. The lead agencies believe that the commenter has taken the National Resource Council's reference to other man-made sources of mortality out of context. Nevertheless, as mentioned in the previous comment response, the FEIS has been updated with more information regarding the cumulative impacts to "Bird and Bat Species" within Section 3.14.3.5

Comment: *The DEIS provides no evidence to substantiate the applicant's assertion that the proposed Whistling Ridge wind project will not cause mortality to birds and bats in sufficient quantities to affect population viability. The analysis does not include any reasonable estimates of current population levels of sensitive species, nor of the threshold population levels required to maintain viability. [LTR 161, CMT 3]*

Response: The Wildlife Society, in a landmark publication on wind energy and wildlife, concluded that fatalities of passerines from wind turbine strikes generally are not significant at the population level (Arnett et al. 2007). Also, the National Academy of Sciences (NAS 2008) recently reviewed wind energy impacts on birds, and came to the following conclusion: "At the current level of wind-energy development (approximately 11,600 MW of installed capacity in the United States at the end of 2006, including the older California turbines), the committee sees

no evidence that fatalities caused by wind turbines result in measurable demographic changes to bird populations in the United States, with the possible exception of raptor fatalities in the Altamont Pass area." The available information suggests that the Project would be unlikely to have population impacts on birds. Additionally, the revised report, "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (WEST 2010) prepared for Klickitat County, does not suggest the possibility of cumulative population impacts on birds.

Comment: *The DEIS fails to estimate the direct and cumulative impacts of this project on the Northwest power grid. The breathtaking pace of wind development along the Columbia River has created serious challenges for BPA and the regional energy grid. There are limits to the amount of wind power that can be integrated into the grid, and we are already at or near these limits. BPA has expressed concerns about how it can integrate more than 6,000 megawatts of wind power into the grid, yet the DEIS fails to analyze these constraints and how they will be affected by the construction of yet another wind project. Adding more wind power capacity to the grid requires not only new transmission lines but also new storage capability, because wind is an intermittent power source. Typically wind projects operate at only about 30 percent of their total generating capacity, which means that 70 percent of the time a backup power source must be available. The DEIS has failed to analyze the environmental impacts of the proposed backup power source for Whistling Ridge. For example, if hydropower will be the backup, the DEIS must consider the indirect impacts of this project on fish, irrigation, navigation and other drawdown impacts. The applicant has hinted at possible plans to construct a natural-gas-fired power plant, perhaps as a backup power source for when the wind is not blowing at Whistling Ridge. The applicant should be required to disclose those plans now, so that the impacts of a natural-gas-fired power plant can be considered along with the impacts of the wind project. Also, Williams is proposing a new gas line for the Whistling Ridge area, and the substation and transmission inter-tie lines proposed for the Whistling Ridge area could signal the advent of additional power plants in the area. These must be evaluated along with impacts of the infrastructure currently being proposed. A recent study in Colorado found that wind power's supposed carbon emissions benefits are not being realized, because of the requirement for conventionally-generated backup power. (How Less Became More... Wind, Power and Unintended Consequences in the Colorado Energy Market, Prepared by Bentek Energy LLC for the Independent Petroleum Association of Mountain States, April 16, 2010.) Because all coal-fired power plants and some natural-gas-fired power plants produce greater emissions when they act as backup systems for wind power, thanks to inefficiencies associated with cycling on and off, the benefits of wind power in reducing carbon emissions are reduced. Contrary to what the DEIS states, there is no evidence that the Whistling Ridge project will have a beneficial impact on air quality in the Columbia Gorge vicinity. No fossil fuel-fired projects will be taken offline as a result. In fact, backup power from fossil-fuel fired projects may be required for those times when the wind is not blowing. [LTR 161, CMT 11]*

Response: Please see response to Comment LTR 36, CMT 10 above.

Comment: *[In reference to Section] 3.14.3, CUMULATIVE IMPACT ANALYSIS, [Section] 3.14.3.5, Habitat and Wildlife Bird and Bat Species, p. 3-274: This section provides: "Erickson et. al. (2005) concluded that these sources of mortality [i.e., other anthropogenic sources] are likely much larger than the potential impacts of wind power development." This statement of relativism is misleading and is not consistent with the intent of a cumulative impacts analysis. While on its face the statement is likely true, the question is whether wind energy, by adding incrementally to mortality, would be enough to negatively impact bird or bat species. [LTR 177, CMT 66]*

Response: The reference to other potential causes of mortality for bird and bat populations in a given region, including collisions with buildings, transmission lines and vehicles, habitat loss, and predation by domestic cats was mentioned to provide a context within which to view the potential threat posed to these populations by wind generation facilities. The study referenced in the DEIS, Erickson et. al. (2005), reported that recent research estimated that mortality threats to these species from these sources were many times larger than those from wind energy generation (Erickson et al. 2005; 2008).

Comment: *The West report does disclose that this species could be at risk from wind energy facilities, and suggests that exclusion zones around core habitats might be warranted. In light of the current plight of this species, the "no impact" conclusion needs to be re-evaluated. Another problem with the West report is that it focuses solely on impacts from the full build out of all anticipated wind development projects in the Columbia Plateau Ecoregion. While informative, this analysis misses the point of a cumulative impacts analysis, which is to evaluate the impact of the current project (in the West report, all anticipated wind energy development) in conjunction with all other reasonably foreseeable stresses on the resource - the analysis should have been wider ranging and not restricted to wind energy development. Cumulative effects result from spatial (geographic) and temporal (time) crowding of environmental perturbations. The effects of human activities will accumulate when a second perturbation occurs at a site before the ecosystem can fully rebound from the effect of the first perturbation. [LTR 177, CMT 68]*

Response: The lead agencies believe that the EIS provides a reasonably thorough discussion of potential cumulative impacts associated with the proposed Project. Based on the past, present and reasonably foreseeable future actions identified in Sections 3.14.1 and 3.14.2 of the EIS, the overall cumulative impact from these actions and the additional incremental impact of the proposed Project are analyzed by resource in Section 3.14.3 of the EIS. For each resource, relevant cumulative actions and projects with potential or actual impacts on that resource are identified, and the cumulative effect of the proposed Project coupled with these relevant cumulative actions and projects is discussed. As indicated in other responses to comments, the cumulative impact analysis in Section 3.14 of the EIS has been updated to include a more current cataloguing and analysis of relevant cumulative projects. Also, Section 3.14.3.5 has been revised to include new information on the potential for cumulative impacts to birds and bats associated with wind energy development in the Eastern Cascades and other coniferous forested portions of western Washington and Oregon.

Comment: *Fragmentation and habitat degradation are two of the major problems in the shrub-steppe. Development, land conversion, fire, incompatible grazing practices, and weed invasion are all driving mechanisms. The question of whether wind energy development in the Columbia Plateau Ecoregion could add synergistically to these sources of stress is not addressed in the West report. The DEIS mentions that climate change is not evaluated as a source of stress. Climate change projections for Washington and the Pacific Northwest suggest dramatic changes in East-slope forests (as well as shrub-steppe), and these changes should be discussed in the context of cumulative impacts. [LTR 177, CMT 69]*

Response: EFSEC and BPA recognize that the WEST report was developed for the more arid shrub-steppe lands, rather than the coniferous forests found within the proposed Project Area. The conclusion from their report remains pertinent for the proposed Project, because avian mortality from wind developments is far less significant than the effect from traditional energy development or climate change. There are no other projects in coniferous forests in the west for comparison, so the Klickitat study was used for comparison purposes. Additionally, the WEST report has been updated and added to Appendix C-11. Also, Section 3.14.3.2 has been updated with new information from the U.S. Global Change Research Program with specific issues related to the Pacific Northwest.

Comment: *General Comment on DEIS - Speculation here, but such efforts could be explained by the future "relative" ease of proposing a Natural Gas Energy Plant on adjoining lands, given a number of factors, the least of which is the NG pipeline running thru the currently proposed Wind project. Remedy - If any knowledge of plans for additional development at or near the proposed site of WRE, the impacts from such must be addressed at this time. [LTR 178, CMT 142]*

Response: The Applicant has no plans for additional development at or near the Project Area.

Comment: *The Environmental Impact Analysis in the DEIS is Seriously Deficient. A. The DEIS Fails to Give Adequate Consideration to Cumulative Effects. The consideration of cumulative effects in the DEIS is inadequate. A cumulative impact is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.7. NEPA requires that an EIS assess cumulative impacts in sufficient detail to be "useful to a decision maker in deciding whether, or how, to alter the program to lessen cumulative impacts." City of Carmel-By-The-Sea v. U.S. Dep't. of Transp., 123 F.3d 1142, 1160 (9th Cir. 1997). The cumulative impacts analysis for a proposed project must examine past, present, and proposed/reasonably foreseeable actions in the same area. 40 C.F.R. §§ 1508.7, 1508.25, 1508.27(b)(7); Tomac v. Norton, 433 F.3d 852, 864 (D.C. Cir. 2006). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. 40 C.F.R. § 1508.7. "To consider cumulative effects, some quantified or detailed information is required. Without*

such information, neither the courts nor the public, in reviewing [an action agency's] decisions, can be assured that the [agency] provided the hard look that it is required to provide." Neighbors of Cuddy Mountain v. U.S. Forest Service, 137 F.3d 1372, 1379 (9th Cir. 1998). The cumulative effects of the proposed action, combined with the cumulative effects of other proposed actions, must be described in detail. Muckleshoot Indian Tribe v. U.S. Forest Service, 177 F.3d 800, 810 (9th Cir. 1999). Broad and general statements "devoid of specific, reasoned conclusions" are not sufficient; neither are one-sided cumulative impact statements. Id. at 811. [LTR 179, CMT 47]

Response: The lead agencies believe that the EIS provides a reasonably thorough discussion of potential cumulative impacts associated with the proposed Project. Based on the past, present and reasonably foreseeable future actions identified in Sections 3.14.1 and 3.14.2 of the EIS, the overall cumulative impact from these actions and the additional incremental impact of the proposed Project are analyzed by resource in Section 3.14.3 of the EIS. For each resource, relevant cumulative actions and projects with potential or actual impacts on that resource are identified, and the cumulative effect of the proposed Project coupled with these relevant cumulative actions and projects is discussed. As indicated in other responses to comments, the cumulative impact analysis in Section 3.14 of the EIS has been updated to include a more current cataloguing and analysis of relevant cumulative projects.

Comment: *As an initial matter, the geographic scope used in the DEIS to examine cumulative impacts is internally inconsistent and arbitrary and capricious. On the very same page (1-36), the DEIS contains two different geographic standards for measuring cumulative impacts. First, under Existing Development, the DEIS properly sets the geographic scope for wind power development as extending from Cascade Locks to the intersection of I-84 and I-82. Then, on the very same page, under Reasonably Foreseeable Future Development, the DEIS arbitrarily limits itself to projects within 20 miles from the Whistling Ridge project site. This internal inconsistency is arbitrary. Many of the existing wind projects more than 20 miles away contribute to adverse cumulative effects in conjunction with the proposed Whistling Ridge project. For instance, these existing wind projects can be seen in same viewshed as the Whistling Ridge site, as viewed from locations within the Gifford Pinchot National Forest such as Little Huckleberry Mountain. The arbitrary limit of 20 miles also means that certain pending projects such as Windy Flats West, which may have similar impacts on the National Scenic Area to those of Whistling Ridge, but which is 26 miles away, are being improperly excluded from the impacts analysis. [LTR 179, CMT 48]*

Response: Please see response to Comments LTR 36, CMT 3 and LTR 177, CMT 16 above.

Comment: *The attempt in the DEIS at identifying and evaluating the cumulative impacts is sorely lacking. The DEIS fails to consider adequately the past, present, and reasonably foreseeable future impacts of other projects in the area. First, the DEIS does not adequately catalogue or discuss the impacts of past projects on the area, as it is required to do under NEPA.*

City of Carmel, 123 F.3d at 1160. Rather, it arbitrarily limits itself to considering only other wind projects, and even then relies on a rough and incomplete list of existing wind projects that discusses generalities, without providing the information necessary to complete the reasoned analysis that NEPA requires. [LTR 179, CMT 49]

Response: The impacts of past projects in the area, in addition to wind projects, are discussed and considered extensively throughout the cumulative impact analysis in Section 3.14 of the EIS. For example, the cumulative impact from various past activities such as land conversion and logging activities on terrestrial wildlife species is discussed in Section 3.14.3.5 of the EIS. The EIS thus includes the current aggregate effects of past actions without extensively delving into the details of each individual past action. This aggregate approach is consistent with CEQ's Guidance on the Consideration of Past Actions on Cumulative Effects Analysis, which provides that federal agencies "are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions combined."

Comment: *Second, the DEIS fails to catalogue or analyze the impact of numerous planned or ongoing development projects, including wind projects and other types of projects. For example, the DEIS fails to consider the cumulative impacts of the proposal in relation to the following planned and ongoing projects: The DEIS, at pages 1-36 and 3-265–266, relies only on a wind power map and list found at http://www.nwcouncil.org/maps/power/Default.asp. The map relied on by the DEIS is severely incomplete, missing multiple wind energy projects within the project study area, including but not limited to Windy Flats West, Windy Flats, Windy Point II, Miller Ranch, Hoctor Ridge, Imrie, Linden Ranch, Miller North, Windtricity, Harvest Wind, School Section, Golden Hills, Golden Hills Addition, Golden Hills 2, Golden Hills 3, Biglow Canyon 2, Biglow Canyon 3, Nook Wind, Star Point, Shepherds Flat, Shepherds Flats 2, Shepherds Flat 3, Shepherds Flat 4, Shepherds Flat 5, Pebble Springs, Willow Creek, Montague I, Montague II, Condon Wind, Summit Ridge, Baseline, Saddle Butte, Echo Wind, and PaTu. The DEIS fails to consult multiple other maps and lists of wind projects in the region, let alone the documents pertaining to those projects such as environmental impact statements. As a result, the cumulative impacts of this project in conjunction with other wind projects in the region is grossly underestimated. Maps and lists of other wind projects can be found at http://www.klickitatcounty.org/planning/FilesHtml/windprojects.pdf, http://www.oregon.gov/ENERGY/SITING/review.shtml, and http://www.transmission.bpa.gov/PlanProj/Wind/documents/BPA_wind_map_2010.pdf and are being filed as Exhibits herewith. [LTR 179, CMT 50]*

Response: Figure 3.14-1, which depicts Existing and Proposed Development from Troutdale to Arlington, Oregon, along I-84, has been updated. This new figure is believed to capture all existing and proposed projects along this corridor.

Comment: *The Broughton Lumber Company has proposed a 250-unit housing development and recreation resort at the site of its defunct lumber mill in Skamania County, Washington. The*

site is in the same viewshed as the proposed Whistling Ridge Project. A casino is proposed in Cascade Locks, Oregon. If built, it would induce unprecedented amounts of traffic through the National Scenic Area. The cumulative impacts of this project, including the high volumes of casino traffic in conjunction with the heavy and oversized load truck traffic potentially travelling along I-84 for the Whistling Ridge project, was not considered. [LTR 179, CMT 52]

Response: In reference to the commenter's statement that the Broughton Lumber Company plans to develop a 250-unit housing development and recreation resort at the site of its former lumber mill, the statement is not accurate. The Columbia River Gorge Commission amended its Commercial Recreation zoning designation to encourage a recreation resort on former industrial property such as the Broughton Mill site. While the zoning was amended to encourage the re-use of this site, there currently is no proposal or application by Broughton Lumber Company, or any other applicant, to proceed with the re-development. Any response related the scope, timing or potential for redevelopment of the former Broughton Lumber Mill would be entirely speculative. The casino is proposed to be located in Cascade Locks, off of I-84 on the south side of the Columbia River. Cumulative traffic impacts with the proposed casino would be short term (two to three months) during the Whistling Ridge Project construction, and limited to only a portion of the transports (those primarily using I-84).

Comment: *Every year, multiple residential dwellings are approved in the same viewshed as the proposed Whistling Ridge Energy Project. This cumulative scenic impact is not even mentioned, let alone estimated, by the DEIS. [LTR 179, CMT 53]*

Response: Existing residential development is characterized in Section 3.14.1 of the EIS. Additional text has been added to Section 3.14.3.10 of the EIS address the potential cumulative visual effects of future residential development. This additional text describes how any new residential development would be required by the CRGNSA Management Plan to either be not visually evident or visually subordinate. The combination of the Project with future residential development, therefore, would not be significant.

Comment: *The DEIS acknowledges that the footprint of the project is within working timber lands, but fails to discuss the cumulative impacts of clearcutting forest in conjunction with permanently converting forest land for industrial use. Washington DNR Forest Practice applications in the vicinity of the project include FPA 2702000, FPA 2702622, FPA 2702784, FPA 2702862, FPA 2703252, and FPA 2704427. The DEIS does not address the cumulative impacts of the massive clearcutting that has occurred or the impacts of those forest practices in conjunction with converting forest land to non-forest use. In addition to the forest practices in the immediate vicinity of the project, the DEIS must include evaluation of impacts of the project in conjunction with forest practices in the region. [LTR 179, CMT 53]*

Response: The text in Section 3.14.3.4 correctly points out that construction and operation of the Whistling Ridge Energy Project would take place in the context of the existing use of the Project vicinity generally for commercial forestry, which includes regular cycles of clear-cutting

and reforestation. It should be noted that the Project would permanently affect only approximately 56 acres of the 1,152-acre proposed Project Area.

Comment: *The Blue Bridge Pipeline has been proposed to be constructed in the vicinity of the project. This proposal is currently under review by the Federal Energy Regulatory Commission under Docket No. PF09-10-000. The project could involve permanent linear clear cuts in the vicinity of the project. [LTR 179, CMT 55]*

Response: The Blue Bridge Pipeline Project is no longer an active Project. Williams Northwest Pipeline asked federal regulators to terminate the regulatory process for the Blue Bridge Pipeline Project in August 2010.

Comment: *Three towns in the Columbia River Gorge National Scenic Area have proposed expansions of their urban area boundaries into Scenic Area lands. These are Hood River, The Dalles, and Lyle. If approved, these urban expansions would result in population growth, more traffic, loss of farm land, forest land, open spaces, and likely adverse effects to scenic, natural, cultural and recreation resources. These projects and others not analyzed in the DEIS will have cumulative impacts on environmental and socioeconomic factors. In order to adequately evaluate the impacts of the proposed project, the DEIS must consider these current projects. Failure to do so means that the DEIS lacks sufficient detail to allow a decision maker to meaningfully evaluate the full impacts of the proposed project or to decide how to alter the proposal to lessen cumulative effects. [LTR 179, CMT 56]*

Response: A search was made in the fall of 2009 of the web sites of the surrounding counties, the Columbia River Gorge Commission, and state and ports to identify reasonable and foreseeable potential projects. The expansion of urban area boundaries was not listed on any of the sites. A similar search was made on April 11, 2011, including on the Columbia River Gorge Commission website (*http://www.gorgecommission.org/default.cfm*), and no information was found on proposed expansions of the mentioned urban area boundaries. Cumulative impact analysis typically considered the physical impacts of known or reasonably forseeable projects in context with each other. A boundary expansion may result in future projects, however until those projects are known, it would be speculative to identify potential cumulative impacts with the Whistling Ridge Project.

Comment: *Also, as explained in the attached expert analysis by Dr. Shawn Smallwood, the cumulative impacts analysis in section 3.14.3.5 of the DEIS is methodologically flawed and the conclusions are misleading. [LTR 179, CMT 57]*

Response: The baseline avian use study was conducted in compliance with the Washington Department of Fish and Wildlife (WDFW) Wind Energy Guidelines (WDFW 2009); and, the WDFW has stated that the baseline studies were done in compliance with their guidelines.

However, many of these fatality estimates were made several years ago, when there was little available fatality data to inform predictions. For example, the baseline study for the Klondike project was conducted in 2001 and early 2002. No estimates were made for raptor fatalities at Klondike, except the baseline report stated that they would be "nonexistent to low" based on the raptor use data. Raptor fatalities at Klondike I and III were actually 0 as predicted. We're not sure how the raptor fatality estimate of 0.11 for Klondike II was considered 11 times higher than "low." In addition, the inflated estimates of raptor mortality calculated by Smallwood are flawed and he used these estimates to compare to predictions. The fatality rate independently estimated by Smallwood for Whistling Ridge was 33 raptors/year, or 0.44 raptors/MW/year. Raptor fatality rates at 13 facilities in the Pacific Northwest have ranged from 0 to 0.29 and averaged 0.09/MW/year. The raptor use data collected at the Whistling Ridge site do not suggest raptor mortality would be higher at Whistling Ridge than other projects with similar raptor use estimates, and not as high as what Smallwood predicted. Smallwood states that bird and bat fatality rates are underestimated due to a bias in the estimator used by the Applicant's consultant (WEST), which is known as the Shoenfeld estimator (Shoenfeld 2004). Also, one of the projects Smallwood selected to show how fatality rates were underestimated was the Bighorn project. That project was analyzed by another consultant (Northwest Wildlife Consultants) who used a different estimator, known as the Huso estimator (Huso 2010). Huso (2010) has demonstrated that that estimator is generally unbiased. Hugo also has shown that the Hugo estimator and the Shoenfeld estimator give similar results when the search intervals are large (e.g. 14 - 28 days), which is the case for most of the studies in the Pacific Northwest. Smallwood did not elaborate on what estimator was used or what the bias was, but it is assumed Smallwood used a "novel" approach as outlined in Smallwood et al. (2010). One likely assumption in the use of the estimator that Smallwood presumably used assumes that a carcass, if missed by a searcher during the first search, no longer has any chance of being found during subsequent searches. It has been demonstrated in studies that fatalities that are missed the first time have a good chance of being picked up in subsequent searches (Arnett et al. 2009). Not accounting for this probability of finding carcasses during multiple searches leads to an overestimate of fatality rates in Smallwood's estimator.

There is a growing body of data available to compare pre-construction avian use estimates with post-construction mortality, and the pre-construction use estimates show a positive correlation with avian mortality. The methods used to show a disparity between pre-construction estimates and elevated post-construction mortality are being contested as not accurate. The proposed Whistling Ridge Project is located in Skamania Co., rather than Klickitat Co., so estimates of wind development for Klickitat Co. were not considered. The American Wind Energy Association reviewed human-caused sources of bird mortality in 2001, and determined that only 0.01 to 0.02 percent of the mortality was from wind developments.

Finally, regardless of what the actual versus predicted mortality was, all of these projects used for comparisons had low raptor mortality compared to many projects in California noted for having high raptor fatality levels, and the baseline studies all predicted that raptor mortality would be relatively low based on raptor use, as was the case.

Comment: *Similarly, the cumulative impacts analysis of visual resources in section 3.14.3.10 of the DEIS is methodologically flawed and the conclusions are in error. Landscape architect and expert in visual resource assessment methodologies Dean Apostol has analyzed the DEIS and found the visual analysis woefully lacking and not up to professional standards. For example, the scenic resources cumulative impacts analysis evaluates only impacts to travelers on Interstate 84. While it underestimated the impacts to these views, it completely ignores the impacts to travelers on the Historic Columbia River Highway, the Columbia River, and other recreational resources in the vicinity. The cumulative impacts portions of the EIS are woefully inadequate and do not meet NEPA's or SEPA's requirements to conduct a rigorous and thorough analysis of cumulative impacts. [LTR 179, CMT 57]*

Response: The lead agencies believe that the EIS provides a reasonably thorough and sufficient analysis of the potential visual effects of the proposed Project, as well as potential cumulative visual impacts. For potential cumulative visual impacts, Section 3.14.3.10 of the EIS assesses these impacts from a variety of viewpoints, and considering a wide variety of past, present and reasonably foreseeable future development that could contribute to cumulative visual impacts. This section has been revised to clarify this assessment.

Comment: *The DEIS fails to consider the direct and cumulative impacts of the proposed development on the energy grid and its infrastructure, and resulting impacts to natural resources. Under SEPA, the elements of the environment include the built environment, which in turn includes public services and utilities. WAC 197-11-444(2)(d). The energy grid is part of the built environment and impacts to the grid must be considered during the SEPA process. The DEIS failed to adequately analyze impacts to the grid. The DEIS discusses the need for the project to interconnect to the BPA transmission system, but fails to analyze the indirect and cumulative effects of new wind energy development on the grid and the need for new transmission facilities. DEIS at 3-87-92, 3-278. The DEIS states that the "proposed project would not be expected to affect the operation of the BPA's transmission system." DEIS at 3-92. The cumulative impacts section of the DEIS makes no mention of the grid or how the project would affect demand for new transmission facilities. Wind energy production in the region will ultimately be limited by the capacity of the Bonneville Power Administration to integrate new wind energy resources into the BPA electricity grid. Recently, BPA expressed concern about how it will reliably integrate over 6,000 MW of wind energy by 2013. Northwest Power and Conservation Council, Sixth Power Plan, at 12-11 (available at http://www.nwcouncil.org/energy/powerplan/6/default.htm). By adding more energy to the grid, the project increases the need for more capacity and more transmission lines and other infrastructure. [LTR 179, CMT 58]*

Response: Please see response to Comment LTR 36, CMT 10 above.

Comment: *These significant changes warrant preparation of a comprehensive cumulative impacts analysis. The DEIS must be substantially revised to reflect the project's contributions to the regional impacts of wind energy development. [LTR 179, CMT 63]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *On page 3-83, the DEIS stated, "The proposed project would cause mortality to birds and bats through turbine collisions. However, the level of mortality is not anticipated to be sufficient to negatively affect the population viability of any single species." This conclusion was offered in the absence of any population viability analyses (PVAs) or any other defensible risk assessments. There is no scientific basis for this conclusion. [LTR 181, CMT 24]*

Response: Please see response to Comment LTR 179, CMT 57 above.

Comment: *ADDITIONAL COMMENTS ON THE DEIS. Cumulative impacts analysis in App. C-12 (page 1) identified dryland agriculture, CRP, and rangeland to be more suitable for wind power development on the Columbia Plateau than the surrounding mountainous areas that are more forested. I agree with this assessment. While developing a screening tool for siting wind energy facilities in California, I discovered that forested sites pose greater hazards to more bird species, including special-status species. [LTR 181, CMT 37]*

Response: EFSEC and BPA recognize that the WEST report was developed for the more arid shrub-steppe lands, rather than the coniferous forests found within the proposed Project Area. The conclusion from their report remains pertinent for the proposed Project, because avian mortality from wind developments is far less significant than the effect from traditional energy development or climate change. There are no other projects in coniferous forests in the west for comparison, so the Klickitat study was used. Only one other wind development is currently proposed, suggesting cumulative effects in this habitat type will remain very limited compared with other habitats. However, a revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon" (WEST 2010) prepared for Klickitat County has been included as an appendix in the FEIS. A revised cumulative impacts analysis that takes into consideration wind energy development within forested habitats of western WA has been added to Section 3.14.3.5 of the FEIS.

Comment: *A new cumulative impacts analysis is needed for this project, and it needs to include the potentially unique impacts of siting wind turbines in the forested environment of Skamania County. [LTR 181, CMT 57]*

Response: A revised cumulative impacts analysis, which takes into consideration proposed wind energy development in forests of western Washington and Oregon, has been added to Section 3.14.3.5, under the subheading of Bird and Bat Species.

Comment: *Cumulative Impacts. The DEIS' evaluation of cumulative impacts makes only passing reference of the most significant incremental impacts this project would likely contribute to – wind power development in a forested landscape. There is no mention of either the proposed Radar Ridge or Coyote Crest wind projects, both in forested landscapes within the range of NSO. The DEIS lacks any analysis of either the impacts to bird habitat or avian collision mortalities that could reasonably be expected from significant "build out" of wind power on Northwest forested lands. There is no discussion of how additional wind projects within the range of NSO could impact that ESA-listed species, nor any analysis of how multiple wind power projects could impact the regional electrical transmission system. The FEIS should include a much more robust evaluation of the potential cumulative impacts from the growing wave of wind power projects on forested lands. It should analyze the potential cumulative impacts of a "full build-out" of wind power in the region on avian species, similar to the 2007 National Research Council assessment done for the Mid-Atlantic Highlands or the 2008 West Inc. study done for the Columbia Plateau Eco-region. (DEIS p. 3-274, 3-275) Such an analysis should include an up-to-date projection for potential wind power development in the region as well as incorporate accurate monitoring data on avian mortality and displacement. [LTR 196, CMT 8]*

Response: Please see response to Comment LTR 181, CMT 37, above.

Comment: *I am a resident of Oregon and live in Portland but my wife and I own a second home in Mill A, Washington. It is my feeling that the assessment of direct or indirect and cumulative visual impacts caused by the project are inadequate. The methodology used was to evaluate the potential visual impacts from specific view points and that method does not account for the potential to the most common viewer of the Columbia River Gorge National Scenic Area, those that pass through and view the area as a whole, not the sum of its parts. [LTR 249, CMT 1]*

Response: The lead agencies believe that the EIS provides a reasonably thorough and sufficient analysis of the potential visual effects of the proposed Project, as well as potential cumulative visual impacts. For potential cumulative visual impacts, Section 3.14.3.10 of the EIS assesses these impacts from a variety of viewpoints, and considering a wide variety of past, present and reasonably foreseeable future development that could contribute to cumulative visual impacts. This section has been revised to clarify this assessment.

Comment: *I feel that this cumulative impacts analysis should include the following future projects: Cascade Locks Tribal Casino Broughton Mill Redevelopment. Both of these projects have been evaluated and have had more than enough analysis to include in the cumulative analysis. I feel this is particularly important because SDA Lumber is responsible for both the Broughton Mill development and the Whistling Ridge Energy project. While the CGNSA plan includes the allowances for economic development in addition to the preservation of the unique scenic beauty of the Gorge, it is crucial that such projects as whistling Ridge include a thorough analysis of cumulative affects when such significant development projects threaten the scenic elements of the Gorge that warranted the creation of the NSA. [LTR 249, CMT 1]*

Response: Please see response to Comment LTR 179, CMT 52, above.

Comment: *The DEIS has other flaws. The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 266, CMT 3]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 270, CMT 3]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 274, CMT 3]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 274, CMT 3]*

Response: The lead agencies believe that the visual simulations included in the EIS provide a reasonable accurate representation of potential views of the proposed Project. Methods used to develop these simulations are discussed in Section 3.9.1.3 of the EIS. A total of 13 visual simulations from various representative vantage points throughout the Project vicinity were included in the EIS. More specifically, the EIS includes a visual simulation at a viewpoint along the Columbia River Highway, as suggested by the commenter (see Figure 3.9-14 in the EIS). Even for locations where visual simulations were not prepared, the potential visibility of Project facilities from locations throughout the Project vicinity are shown in Figures 3.9-1 and 3.9-2 of the EIS, and regional visual impacts from the proposed Project are discussed in Section 3.9.3.1 of the EIS.

Comment: *What are the cumulative regional impacts of the existing transmission lines? What would be the future cumulative impacts of new transmission lines? Where would these new transmission lines be located? How big would they be? [LTR 279, CMT 5]*

Response: Consistent with NEPA and SEPA, the cumulative impact analysis in the EIS focuses on the incremental impact of the proposed Project when added to other past, present, and reasonably foreseeable future actions in the vicinity of the proposed Project. Section 3.14 of the EIS also considers existing BPA transmission lines in the Project vicinity, to the extent that they contribute to cumulative impacts for a particular resource. However, BPA does not have a region-wide program or plan concerning improvements or additions to its transmission system. These actions are proposed on a project-specific basis, when needed, to address various transmission reliability and service issues on certain portions of BPA's transmission system. Other BPA transmission infrastructure projects throughout the Pacific Northwest are therefore outside of the scope of this EIS.

Comment: *The proposed location is flawed for reasons of cumulative impact. Existing industrial wind facilities and the rate of development of additional industrial wind facilities in the surrounding areas to the east have created an unacceptable cumulative impact on the wildlife populations of the area, as well as for many of the residents. [LTR 283, CMT 9]*

Response: The lead agencies believe that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with both NEPA and SEPA requirements by cataloguing cumulative projects in the region, considering the aggregate effects of relevant past projects in the region along with potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects.

Comment: *The proposed project location is ill conceived from another cumulative impact circumstance. Recent legal and government decisions related to the Broughton Mill resort and the Cascade Locks Casino make it possible that those facilities could become a reality. If so, the cumulative impact of these establishments, coupled with the construction of an industrial wind facility (and the precedent for other industrial developments) in a relative proximity to each other, could cumulatively negatively impact the Gorge in ways that we cannot now fully conceive. [LTR 283, CMT 11]*

Response: Please see response to Comment LTR 179, CMT 52, above.

Comment: *As I have stated before, cumulative impacts, both direct and indirect, are not done on a project by project basis, but, according to NEPA regulations, must be done on a reference geographical and/or regional basis. This was not done by either SDS or BPA, the two proponents for this wind farm project. [LTR 284, CMT 3]*

Response: To clarify, consistent with SEPA and NEPA, the primary purpose of the EIS is to provide an analysis of the potential environmental impacts, both direct and indirect, associated with the proposed Project itself. Sections 3.1 through 3.13 of the EIS provide this analysis. The cumulative impact analysis provided in Section 3.14 of the EIS has not been prepared on a project-by-project basis, but instead considers the overall cumulative impact from the identified cumulative projects in the region. This analysis discusses the incremental impact of the proposed Project when added to these cumulative projects consistent with NEPA implementing regulations (see 40 CFR 1508.7). However, this analysis should not be confused with a programmatic EIS which would attempt to provide a comprehensive cumulative analysis of all potential wind projects in the region.

Comment: *Briefly, some of my concerns: Cumulative effects and impacts on species viability are not adequately addressed in the DEIS - there is no supporting data to show if avian species birth rates, replacement rates, genetic diversity, etc., would or would not be affected by regional wind farms. This must be addressed. [LTR 284, CMT 4]*

Response: The Wildlife Society, in a landmark publication on wind energy and wildlife, concluded that fatalities of passerines from wind turbine strikes generally are not significant at the population level (Arnett et al. 2007). Also, the National Academy of Sciences (NAS 2008) recently reviewed wind energy impacts on birds, and came to the following conclusion: "At the current level of wind-energy development (approximately 11,600 MW of installed capacity in the United States at the end of 2006, including the older California turbines), the committee sees no evidence that fatalities caused by wind turbines result in measurable demographic changes to bird populations in the United States, with the possible exception of raptor fatalities in the Altamont Pass area." The available information suggests that the Project would be unlikely have to have population impacts on birds. Additionally, the revised report "Analysis of Cumulative Impacts on Avian, Bat and Habitat Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon," (WEST 2010) prepared for Klickitat County, does not suggest the possibility of cumulative population impacts on birds.

Comment: *None of this was addressed in the Whistling Ridge DEIS in terms of cumulative impacts and effects on our region from the proposals to build more and more transmission lines. Why not? This is a real and vital deficiency of information, an information gap, in the DEIS, and these concerns about the effects of wind power on our power grid must be addressed. They have not been adequately addressed in the DEIS. This is a fatal flaw in the DEIS. [LTR 285, CMT 5]*

Response: Please see response to Comment LTR 279, CMT 5 above.

Comment: *[In reference to Section 3.2.2, Impacts; PDF pg. 33], [c]umulative Impact Analyses are NOT done on a project by project basis. They are done on a regional, inclusive*

basis. Therefore, any and all fossil fuel-powered plants and other types of backup energy production that is used to back up BPA's hydro power generation have to be accounted for in the DEIS. They are not. Just because Whistling Ridge doesn't have a gas power plant onsite does not mean that a gas power plant will not be used to balance its wind energy production on the grid. [LTR 286, CMT 18]

Response: Please see response to Comment LTR 36, CMT 10 and LTR 284, CMT 3 above.

Comment: *The statement "Using wind power also likely would have a beneficial effect on visibility" is patently inaccurate. If visibility in the Gorge and along the Columbia River has been deteriorating for 20 or more years when there wasn't any wind power to speak of, then it is pretty specious to make the correlation that using wind power today would have "beneficial" effects on visibility! The two things are not mutually inclusive. [LTR 286, CMT 18]*

Response: The commenter is referencing a discussion of avoided emissions in the Air Quality section of the EIS. This discussion is intended to provide a reasonable assessment of potentially avoided fossil fuel emissions related to the proposed Project, based on the Project's expected annual electricity production as compared to equivalent electricity production and associated emissions from a fossil fuel-based power plant. Based on this assessment, it is reasonable to assume that the proposed Project would not make visibility in the area any worse, and in fact may incrementally help improve visibility. To the extent that the commenter is correct that visibility has deteriorated over the past 20 or more years without wind power development, this actually helps prove the point that a shift to wind power - and away from burning of fossil fuels - may be beneficial to visibility in the area.

Comment: *[In reference to Section 3.4.1.1, Regional Environment; PDF pg. 50], SO, where are the cumulative impact analyses for this apparently industrialized area? If all of this man-made infrastructure exists in this area, surely there are cumulative impacts and they must be considered in the broader context of cumulative regional impacts and effects of further industrialization - and a wind farm is an industry. [LTR 286, CMT 36]*

Response: Cumulative impacts to biological resources are addressed in Section 3.14.3 of the EIS.

Comment: *[In reference to Section 3.5.1, Affected Envrionment; PDF pg. 98], [i]f BPA owns and operates 15,000 miles of power lines, and BPA is concurrently proposing building bigger power lines throughout the NW, where is the cumulative impacts analysis on the environmental effects of 15,000 miles of power lines? Where is the human health cumulative analysis? Where is the cumulative impact analysis on wildlife—habitat fragmentation, habitat destruction, herbicide effects, etc.? From the DEIS we learn that BPA provides energy to a "service area includes Oregon, Washington, Idaho, Western Montana, and small portions of Wyoming,*

Nevada, Utah, California, and Eastern Montana" but this regional area is not included in any cumulative impacts analysis in this DEIS. Why not? BPA's energy production has cumulative effects on the environment, on ecosystems throughout their service area but there is no cumulative impact analysis reporting in this DEIS. This is another fatal flaw in this DEIS. [LTR 286, CMT 45]

Response: Please see response to Comment LTR 279, CMT 5 above.

Comment: *[In reference to Section 3.5.2.1, Proposed Action; PDF pg. 101], [i]f Klickitat County evaluated projected energy demand, then where is their cumulative impacts analysis for environmental impacts? Klickitat is in BPA's service area and any cumulative impacts from their energy production should be part of this DEIS. Cumulative impacts are just not calculated for past and present actions - they must also be calculated for FUTURE actions, such as the "seven 250MW or five 350MW natural gas thermal projects, and the two 50MW biomass projects, and the four wind power projects, and the solar projects" mentioned above. Where are the FUTURE cumulative impacts analyses for these FUTURE actions? [LTR 286, CMT 46]*

Response: The referenced Klickitat County Energy Overlay Zone Final EIS was mentioned in Section 3.5.2.1 to point out that the Whistling Ridge Energy Project was generally consistent with the types of energy technologies expected to be developed in the area over the next 25 years. Because the projects referred to in the comment are speculative at this time, they would not qualify as "reasonably foreseeable future development" for the purposes of the Whistling Ridge cumulative effects analysis.

Comment: *[In reference to Section 3.14, Cumulative Impact Analysis; PDF pg. 268-269], [c]umulative impacts analyses are not done on a project by project basis. They are done on a regional basis, especially when there are regional impacts from these types of proposals! BPA is a regional provider of energy and therefore must do a regional cumulative impacts report detailing the cumulative environmental impacts of all its activities! [LTR 286, CMT 75]*

Response: Please see response to Comment LTR 279, CMT 5 and LTR 284, CMT 3 above.

Comment: *Certainly SDS Lumber is also obliged to do a cumulative impacts and effects analysis of ALL its regional activities, too. SDS has a quarry in White Bingen that recently had some environmental issues. SDS is proposing a huge condo development on the shores of the Columbia River, in the National Scenic Area, that would result, if it comes to pass, in a large increase in population and a commensurate increase in local resources depletion. SDS has stated that it wants to also build a resort in Cascade Locks, OR, in the heart of the NSA. Another impact on local resources such as water and air quality, the Columbia River, quality of life, transportation, etc. [LTR 286, CMT 75]*

Response: The Applicant is a private corporation with no obligation to prepare cumulative effects analysis covering all of its regional activities. See other responses in this section regarding consideration of other Applicant projects or proposals that could result in cumulatively additive effects with its proposed Whistling Ridge Wind Project.

Comment: *SDS and BPA have failed to follow the CEQ's Considering Cumulative Effects: Under the National Environmental Policy Act Handbook in analyzing cumulative regional impacts and this is a very disastrous fatal flaw in this increasingly inadequate DEIS. [LTR 286, CMT 75]*

Response: BPA believes that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with NEPA requirements by cataloguing cumulative projects in the region, considering the aggregate effects of relevant past projects in the region along with the potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects. The CEQ handbook cited by the commenter, while a potentially useful reference document in certain circumstances, is neither formal CEQ guidance nor legally binding on federal agencies preparing EISs under NEPA. Additionally, since the Applicant is not a federal agency, it is not obligated to prepare cumulative effects analysis covering all of its regional activities.

Comment: *[In reference to Section 3.14.3 Cumulative Impacts; PDF pg. 272-273], [t]his is not cumulative impacts analysis, folks. Table 5-3, Primary and special methods for analyzing cumulative impacts, in the CEQ NEPA Considering Cumulative Impacts Handbook (and I have provided EFSEC with a copy of this handbook in my previous testimony), lists these primary methods as follows: Questionnaires, interviews, and panels; checklists; matrices; networks and system diagrams; modeling; trends analysis [my comment: this is a very important part of any cumulative impacts analysis]; overlay mapping and GIS; carrying capacity analysis [my comment: this is a crucial and extremely important analysis and SDS and BPA have failed to do this analysis and it is a FATAL FLAW of the DEIS]; ecosystem analysis [my comment: VERY IMPORTANT and has not been done in this DEIS]; economic impact analysis [my comment: this has not been done. It involves establishing the region of influence, modeling the economic effects, and determining the significance of the effects.]; social impact analysis [my comment: Social impact analysis addresses cumulative effects related to the sustainability of human communities by (1) focusing on key social variables such as population characteristics, community and institutional structures, political and social resources, individual and family changes, and community resources, and (2) projecting future effects using social analysis techniques such as linear trend projections, population multiplier methods, scenarios, expert testimony, and simulation modeling. SDS and BPA have not done these analyses for this proposal and this is yet another instance of a fatal flaw in this DEIS. BPA at least should know better than to try to avoid these types of analyses! [LTR 286, CMT 76]*

Response: BPA believes that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with NEPA requirements by cataloguing cumulative projects in the region,

considering the aggregate effects of relevant past projects in the region along with the potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects. The CEQ handbook cited by the commenter, while a potentially useful reference document in certain circumstances, is neither formal CEQ guidance nor legally binding on federal agencies preparing EISs under NEPA. Additionally, since the Applicant is not a federal agency, it is not obligated to prepare cumulative effects analysis covering all of its regional activities.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 275], [t]he U.S. Forest Service's Pacific NW Experimental Station, located in our own Skamania County, at the old Wind River Nursery site (the oldest nursery in the Pacific NW, dating back to 1909), has put together a CD set on global climate change and its effects on the Pacific NW. One of their conclusions is that we will get more rain and less snow pack, something which will definitely affect BPA's energy production and local quality of life. There will be impacts on fish and other wildlife. One of the things that their research did not address was any changes in wind patterns resulting from global climate change. This is the FUTURE part of cumulative impacts analysis and should be done for this DEIS! [LTR 286, CMT 77]*

Response: Analysis of cumulative effects related to climate change is included on DEIS page 3-270 to 3-271 of the EIS. As discussed in this section, while there generally is scientific consensus about the global environmental impacts of climate change, there is great uncertainty regarding the specific, localized effects of projected global warming. In addition, much of the scientific work done for estimating potential global warming effects has focused on macro-level analyses of likely future temperature and precipitation patterns, with the corresponding potential impact on ocean levels, and very little is known concerning how localized wind patterns might be affected. Finally, as discussed in the EIS, given the high variability of weather conditions in the Pacific Northwest and particularly in the Columbia River Gorge area, it is possible that any changes in wind patterns that may be experienced as part of future global warming would largely fall within historic variations. Accordingly, it is not possible, with any degree of relative certainty, to predict changes in local wind patterns caused by climate change, and regardless, it is expected that these changes would not represent a substantial deviation from historical variations such that the proposed Project would be affected.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 277], I feel like I'm banging my head against a brick wall… One more time: Cumulative impacts are not analyzed on a project by project basis, especially when cumulative impacts are regional. And, just because "threatened or endangered and other special-status species have been cumulatively impacted by past and present development" does not mean that we should continue practices that will impact them in the FUTURE! Cumulative impacts analyses measure past, present, and future direct and indirect impacts and their CUMULATIVE IMPACTS. [LTR 286, CMT 79]*

Response: Please see response to Comment LTR 284, CMT 3 above.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 278], [w]hat does "permanent improvement" mean, exactly?!? What is the factual basis for this statement? [LTR 286, CMT 80]*

Response: "Permanent improvement" means the area that would be occupied permanently (i.e., for the life of the project) by proposed Project facilities, as shown in detail in Table 2-1 of the EIS.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 278], [w]here is the cumulative impact analysis supporting the statement that "The proposed actions thus would contribute INCREMENTALLY, THOUGH IN A RELATIVELY MINOR WAY, to the cumulative impact on terrestrial wildlife species and their habitat"?!? Again, cumulative analysis is NOT done on a project by project basis when there are regional impacts to be considered. It is these types of statements that litter this very inadequate DEIS throughout its many pages. There is no cumulative data or cumulative impacts effects analyses that have been done to support these flagrantly unfounded statements yet they are included in this data-deficient, weak, meager DEIS as if they are factual statements. FATAL FLAW. [LTR 286, CMT 80]*

Response: Please see response to Comment LTR 284, CMT 3 above.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 279], [t]here comes a point when the carrying capacity of a region is met and the cumulative impacts threshold is met. When that time comes, and it should be determined through thorough cumulative impacts and effects analyses, then it is time to say "NO" to further cumulative impacts on the region. When all the cumulative impacts are taken into account there might come a point when no further development can take place because the cumulative impact threshold has been reached and further development would detrimentally and permanently affect the environment. [LTR 286, CMT 1]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 281], Ok. So, cumulatively, all of these activities actually kill how many birds in total? What is the cumulative impact of all this killing on bird populations? Many birds are pollinators. Eighty percent of our agriculture (FOOD!) is dependent on pollinators, birds and bees, etc. What effects do wind farms have on pollinator mortality? How does any killing of pollinators by wind farms affect agriculture and our food supply? The cumulative effects of any pollinator mortalities are not addressed in the DEIS and should be. [LTR 286, CMT 82]*

Response: The lead agencies believe that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with both NEPA and SEPA requirements by cataloguing

cumulative projects in the region, considering the aggregate effects of relevant past projects in the region along with potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 282], [t]his statement "wind energy projects in the region in general, and the proposed project in particular, would not contribute to direct cumulative impacts to fish species" is an unsupported over-generalization with no science or common sense applied. The DEIS has no collective science data to support this assertion. However, there are most probably direct cumulative impacts [BPA's own fish projects show this] to fish species caused by BPA's energy production activities and the wind farm projects along the Columbia River, since they do contribute to BPA's energy production activities, must also contribute to the direct cumulative adverse impacts on fish species. Where is the cumulative impacts analysis on direct and indirect cumulative impacts to fish species in the region? [LTR 286, CMT 83]*

Response: Support for the conclusion that the proposed Project would not directly affect fish species or their habitat is provided in Section 3.4 of the EIS. As discussed in this section, no fish have been documented within the Project Area, no perennial streams are located in areas where the Project would be constructed, and any work in ephemeral drainages would occur when these drainages are dry. Nonetheless, Section 3.14.3.5 of the EIS does acknowledge and discuss the potential for the combined operations of wind projects such as the proposed Project to result in cumulative impacts to fish species in the Columbia River due to the interplay of these operations with hydrosystem operations during certain conditions. This section also discusses steps BPA currently is taking, such as DSO 216 and an interim Environmental Redispatch policy, to avoid these combined effects to help ensure that cumulative wind projects do not adversely affect fish species. Since these steps are designed to avoid wind generation from interfering with BPA's hydrosystem operations for fish, compliance of the proposed Project with these protocols would indeed ensure that there is no contribution from the proposed Project to cumulative impacts to fish species.

Comment: *[In reference to Section 3.14.3, Cumulative Impacts; PDF pg. 283-284], [t]here is no way that the proponent can know that since the proposed wind farm would be subject to DSO 216 and that this authority would "avoid any contribution from the proposed project to indirect cumulative impacts to fish species"!! [LTR 286, CMT 84]*

Response: Please see response to Comment LTR 286, CMT 83 above.

Comment: *In the NEPA booklet, Considering Cumulative Impacts, p. 8, Table 1.2, Principles of cumulative effects analysis, the #2 statement states "Cumulative effects are the total effect, including both direct and indirect effects [my underline emphasis], on a given resource,*

ecosystem, and human community of all actions taken [my underline emphasis], no matter who (federal, nonfederal, or private) has taken the actions. Individual effects from disparate activities [my underline emphasis] may add up or interact to cause additional effects not apparent when looking at the individual effects one at a time [my underline emphasis]. The additional effects contributed by actions unrelated to the proposed action must be included in analysis of cumulative effects." Not only do all the current and future wind farms have to be included in the cumulative impacts analysis, but also to be included are any other development proposals in the affected region. For example, the proposed Cascade Locks, OR off-reservation casino that would contribute cumulative impacts on the Columbia River and the human and wildlife habitats. For example, the proposed SDS Lumber Broughton (WA) condominium development that would potentially introduce 1000-1500 new inhabitants on the shores of the Columbia River, inhabitants who would most certainly impact the Columbia River, for as we all know all treated sewage [this is not drinking water, folks!] goes into the Columbia River, as does everything that comes from our septic fields. For example, SDS has proposed a resort in Cascade Locks, OR, contributing more sewage water and resource depletion into the Columbia River waters, a river that is already considered one of the most toxic and needs to be cleaned up, not dirtied up some more. For example, SDS has a 50 lot subdivision proposal in Carson, WA, a unincorporated area which has no sewage treatment plant, and has approximately 2600 residents who all use septic fields. Everything flows downhill, as we all know, and it all ends up in the poor Columbia River. So, I would say that the wind farm proponent has failed, miserably, to do any cumulative impacts analyses that take into account direct and indirect impacts from a variety of activities that MUST be considered for this DEIS. Certainly, and I consider a fatal flaw of the DEIS, neither BPA or SDS Lumber have defined a BASELINE CONDITION for the resources, ecosystems, and human communities that would be impacted by the proposed project and all other projects that contribute to cumulative impacts. [LTR 286, CMT 84]

Response: Please see response to Comment LTR 179, CMT 52, above.

Comment: *[In reference to Section 3.18, Adverse Impacts; PDF pg. 295], [t]he proponent for this project is being very truthful here. There are "many…potential impacts of the Proposed Action…" that would "not occur" if this wind farm proposal was denied by EFSEC!! This would be a good thing for the environment and for our community. [LTR 286, CMT 86]*

Response: Comment acknowledged.

Comment: *BPA has failed to do a cumulative impact analysis of the existing transmission lines for the DEIS and this is a fatal flaw. BPA has also failed to do a cumulative impact analysis of their FUTURE actions in regard to these existing transmission lines and BPA's proposals to put in NEW, and BIGGER transmission lines. [I will address this in another document.] This is just one very important reason why this Whistling Ridge wind farm proposal should be denied. BPA is a federal agency and is subject to NEPA and its cumulative impacts analyses. BPA has, fatally for the DEIS, not done its job. This DEIS should be sent back to BPA*

and SDS for further analysis and data-gathering. CUMULATIVE IMPACT ANALYSES MATTER! [LTR 286, CMT 86]

Response: Please see response to Comment LTR 279, CMT 5 above.

Comment: *The DEIS has other flaws. The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 287, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 287, CMT 4]*

Response: The lead agencies believe that the visual simulations included in the EIS provide a reasonable accurate representation of potential views of the proposed Project. Methods used to develop these simulations are discussed in Section 3.9.1.3 of the EIS. A total of 13 visual simulations from various representative vantage points throughout the Project vicinity were included in the EIS. More specifically, the EIS includes a visual simulation at a viewpoint along the Columbia River Highway, as suggested by the commenter (see Figure 3.9-14 in the EIS). Even for locations where visual simulations were not prepared, the potential visibility of Project facilities from locations throughout the Project vicinity are shown in Figures 3.9-1 and 3.9-2 of the EIS, and regional visual impacts from the proposed Project are discussed in Section 3.9.3.1 of the EIS.

Comment: *In addition, the DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 288, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 289, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 290, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 291, CMT 5]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 292, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 293, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The photo simulations in the DEIS are inadequate and misleading. Some of them have cloudy backgrounds, thus not adequately representing the full extent of the impacts, and other simulations are out of scale. Additional viewpoints need to be considered, including views from the Historic Columbia River Highway. The DEIS erroneously concludes that the scenic impacts would not be significant, even though most of the turbines would be visible from designated key viewing areas within the National Scenic Area. [LTR 293, CMT 4]*

Response: The lead agencies believe that the visual simulations included in the EIS provide a reasonable accurate representation of potential views of the proposed Project. Methods used to develop these simulations are discussed in Section 3.9.1.3 of the EIS. A total of 13 visual simulations from various representative vantage points throughout the Project vicinity were

included in the EIS. More specifically, the EIS includes a visual simulation at a viewpoint along the Columbia River Highway, as suggested by the commenter (see Figure 3.9-14 in the EIS). Even for locations where visual simulations were not prepared, the potential visibility of Project facilities from locations throughout the Project vicinity are shown in Figures 3.9-1 and 3.9-2 of the EIS, and regional visual impacts from the proposed Project are discussed in Section 3.9.3.1 of the EIS.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy projects and other development projects in the region. [LTR 294, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS proposal fails to present adequate and credible analysis of the impacts of this project over time and fails to consider an overall plan which recognizes other existing and potential future wind energy projects. [LTR 297, CMT 5]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy. projects and other development projects in the region. [LTR 307, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy. projects and other development projects in the region. [LTR 308, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *The DEIS fails to adequately analyze the potential cumulative impacts of this project when considered with other existing and likely future wind energy. projects and other development projects in the region. [LTR 309, CMT 4]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *Whistling Ridge DEIS didn't have any of the information, as far as I was able to (not) find, about the existing transmission lines that would be used by the wind farm project and whether new ones would be proposed at some future date, the substation that is being proposed and what effects it would have on the environment, etc. [LTR 311, CMT 4]*

Response: Please see response to Comment LTR 279, CMT 5 above.

Comment: *Why aren't the BPA transmission lines that Whistling Ridge would use not evaluated in the Whistling Ridge DEIS? [LTR 311, CMT 5]*

Response: Please see response to Comment LTR 279, CMT 5 above.

Comment: *Cumulative impacts have to be done on a regional basis, not on a project basis. Why hasn't BPA done cumulative impacts analyses for their transmission lines and substations? For their towers and conductors? For their access roads? For their staging areas? Gates? Substation facilities? [LTR 311, CMT 8]*

Response: Please see response to Comment LTR 279, CMT 5 above.

Comment: *There are cumulative impacts to wildlife and humans from BPA's energy generation. Where are the cumulative impacts and effects analyses in the DEIS? [LTR 314, CMT 3]*

Response: Cumulative impacts related to the proposed Project are analyzed in Section 3.14 of the EIS. Although BPA does not own any energy generation facilities, Section 3.14 of the EIS does consider the cumulative impacts of hydropower generation in the vicinity on resources such as fish species, as well as the cumulative impact of other wind projects in the vicinity on resources such as avian species and visual quality.

Comment: *The DEIS does not look at cumulative impacts appropriate to the project. There are at least 15 wind projects in Klickitat County and 46 altogether (Oregon and Washington). [LTR 317, CMT 71]*

Response: The lead agencies believe that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with both NEPA and SEPA requirements by cataloguing cumulative projects in the region, considering the aggregate effects of relevant past projects in the region along with potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects. However, in order to address the commenter's concerns related to the

number of projects evaluated and the proximity to the Project Area, the lead agencies have updated the following: Sections 1.8.1.1 and 1.8.1.2 as well as Sections 3.14.1 and 3.14.2. These changes remove the Middle Mountain project from further consideration in this EIS as well as include new wind projects that have come online since the DEIS. Additionally, Figure 3.14-1 has been updated to reflect these changes.

Comment: *There seems to be a lot of talk about cumulative impacts but no analysis. You should include a graphical project of past and future conditions. Also there is no modeling which would address cause and effect relationships. Why are we not seeing the analysis with quantifying data? Where is the baseline data? [LTR 318, CMT 59]*

Response: Please see response to Comment LTR 179, CMT 47 above.

Comment: *Considering Cumulative Effects Under the National Environmental Policy Act [LTR 319, CMT 1]*

Response: BPA believes that the cumulative impact analysis provided in Section 3.14 of the EIS fully complies with NEPA requirements by cataloguing cumulative projects in the region, considering the aggregate effects of relevant past projects in the region along with the potential effects from relevant present and reasonably foreseeable future projects, and identifying the incremental impact of the proposed Project when added to these cumulative projects. The CEQ handbook cited by the commenter, while a potentially useful reference document in certain circumstances, is neither formal CEQ guidance nor legally binding on federal agencies preparing EISs under NEPA.

G.4 ENVIRONMENTAL CONSULTATION, REVIEW, AND PERMITTING REQUIREMENTS

G.4.1 ENDANGERED SPECIES ACT

Comment: *There is no evidence in the DEIS that the proposed project will be in compliance with the federal Endangered Species Act (ESA) of 1973, 16 USC §§ 1531-1544. Under the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Section 9 of the ESA prohibits any actions that would "take" an endangered species, as well as actions that would cause an act constituting a "take." The Ninth Circuit has held that "a habitat modification which significantly impairs the breeding and sheltering of a protected species amounts to 'harm' under the ESA." It seems quite possible that the proposed Whistling Ridge wind project may kill a bald eagle, a migratory*

bird, or an endangered species. The DEIS must evaluate the likelihood of each of these possibilities, and whether Incidental Take Permits are required from the U.S. Fish & Wildlife Service. A recent court ruling in West Virginia has made it clear that such permits are required under federal law when a wind project is likely to kill any individual animals protected by the Endangered Species Act. [LTR 161, CMT 9]

Response: A discussion of the proposed Project's compliance with the federal Endangered Species Act is contained in Section 4.2 of the EIS. This section has been updated to include the US Fish and Wildlife's concurrence related to BPA's Section 7(a) consultation.

G.4.2 MIGRATORY BIRD TREATY ACT

Comment: *The DEIS fails to assess compliance with state and federal laws protecting bald eagles, golden eagles, migratory birds, and endangered species. There are reports of bald eagles and bald eagle nests at the proposed wind site. Yet there is no evidence that the proposed project will be in compliance with the state's Bald Eagle Protection Act, RCW chapter 77.12, and regulations associated with this act. Nor is there any evidence that the proposed project will be in compliance with the federal Bald and Golden Eagle Protection Act, 16 USC § 668-668(d). This act prohibits any person, association, partnership or corporation from taking a bald or golden eagle at any time or by any manner without a permit. A permit may be issued only if the take would be compatible with the preservation of the species. There is no evidence in the DEIS that the proposed project will be in compliance with the federal Migratory Bird Treaty Act (MBTA), 16 USC §§ 703-712. The MBTA requires that the U.S. Fish & Wildlife Service take enforcement against "any person, association, partnership or corporation" that "by any means or in any manner" pursues, hunts, takes, captures, kills, or attempts to take, capture or kill a migratory bird or any part, nest or eggs of any migratory bird. Under the MBTA, a corporation may take or kill a migratory bird only if the U.S. Fish & Wildlife Service determines that the take or kill is compatible with migratory bird treaties. This determination must include an evaluation of the bird's species abundance and distribution, as well as its migratory and breeding habits. The killing of a single migratory bird is sufficient to create criminal liability, and does not need to be intentional. [LTR 161, CMT 9]*

Response: A discussion of the proposed Project's compliance with the federal Migratory Bird Treaty Act is contained in Section 4.5 of the EIS. A discussion of the proposed Project's compliance with the federal Bald and Golden Eagle Protection Act has been added to the EIS under Section 4.7 of the EIS.

G.4.3 STATE, AREA-WIDE, AND LOCAL PLAN AND PROGRAM CONSISTENCY

Comment: *FP. A conversion permits and DNR surface mining reclamation permits (SMRP) are required for timber harvest and rock or gravel mining associated with conversion of forest land and the associated building or construction at the wind tower sites. This was not clear in the DEIS and the SMRP was not listed in Table 4-1. [LTR 172, CMT 3]*

Response: The permanently disturbed, cleared areas would be considered a "forest conversion" under the Washington Forest Practices Act because they would be implemented for the purposes of the Whistling Ridge Energy Project. At the time the FPAs were applied for, the Whistling Ridge Energy Project had not been approved, and therefore the forest conversion has not been approved. If the Governor of the State of Washington approves the Project, new FPA permits will likely be required.

G.4.4 COLUMBIA RIVER GORGE NATIONAL SCENIC AREA ACT

Comment: *We've got to stop building them so close to the Scenic Area until we know more about their long-term effects, and also come to an understanding about how much visual impact we should tolerate. [LTR 12, CMT 6]*

Response: The opinions of the commenter and their preference for other locations for the proposed project are acknowledged.

Comment: *Why is your profit more important than the sacred beauty of the Columbia River Gorge? [LTR 22, CMT 6]*

Response: Comment acknowledged.

Comment: *The Congressional intent of the Gorge Scenic Act was to allow for ongoing economic activity in areas adjacent to the Scenic Area regardless of the affect that these adjacent areas may have on the view from the scenic area. In other words, there was to be no buffer zones to the buffer zone already established by the Gorge Scenic Area boundary. Also I believe that the construction of the Whistling Ridge Wind Farm would not degrade the scenic beauty of the Columbia River Gorge National Scenic Area. As a point of law, EFSEC does not have the authorization to establish new exclusion zones such as buffers to the Gorge Scenic Area without additional authorization from either the legislature or the US Congress. Visual Impact on the Columbia River Gorge National Scenic Area should be an issue of consideration in any*

Environmental Impact Statement review, but the determination of significance of any impact is not capricious or arbitrary, it must be based on the rules that are in place today. Development outside of and adjacent to the Columbia River Gorge National Scenic Area is allowed under the law and as such visual impacts to the National Scenic Area are allowed because the proposed facility is not located within the Scenic Area. I support renewable energy. I also supported and participated in the creation of Columbia River Gorge National Scenic Area which is a national scenic treasure. The creation of the Scenic Area involved a significant public involvement process that carefully considered the location of the boundary of the Scenic Area. The potential for wind energy development in the Columbia River Gorge area was a consideration when those of us who put pen to paper and drew the boundary participated in the creation of the Scenic Area. This boundary was established to buffer the significant resources of the Scenic Area and the legislation that created the Columbia River Gorge National Scenic Area clearly consider potential affects from development outside of the boundary and determined that such development would not be subject to the Scenic Act. It is not EFSEC's role to substitute its judgment for that of the US Congress on this issue. EFSEC must recommend that Governor Gregoire approve this project. [LTR 28, CMT 6]

Response: Comments acknowledged. The fact that the proposed Project is located entirely outside of the Columbia River Gorge National Scenic Area is acknowledged throughout the EIS, including in Sections 2.1, 3.8, 3.9, 3.14, and 4.11 of the EIS. The EIS also addresses the applicability of the provisions of the Act that created the Scenic Area, as well as the Scenic Area Management Plan, to the proposed project.

Comment: *The NIMBYs are concerned with the project being "near" the Columbia Scenic Gorge area. But, it isn't within the Gorge Area. And, thus, isn't subject by attack by the Friends of the Gorge on that account. [LTR 31, CMT 3]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *We oppose the industrialization of rural areas expecially an area that is designated as a national scenic area. [LTR 33, CMT 5]*

Response: The opposition of the commenter to the location of the proposed project is acknowledged. Potential visual impacts of the proposed project, including impacts to views from within the National Scenic Area, are discussed and evaluated in Section 3.9 of the EIS.

Comment: *Whistling Ridge is located outside the National Scenic Area and should not be subject to NSA concerns. Few if any turbines will be visible and this area of the Columbia River Gorge should be available to produce clean renewable energy. [LTR 34, CMT 3]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *I am a native Oregonian and my father was a native Oregonian logger and logging road builder. I now live in Lyle, WA in the Columbia Gorge. Although I am supportive of alternate energy, I am more supportive of keeping the gorge as pristine as possible. When I saw the before and after photos that SDS had in their brochure I couldn't believe they thought these photos would incline people toward their position. It is obvious to me that the wind towers would be eyesores. We recently went to Yellowstone Park. As we drove through I thanked the people of vision who created and preserved the park's naturalness. We must do the same for what's left of the natural beauty of the gorge. My husband is a consultant in the lumber industry and we understand the difficulties the industry is having at this time. But the economic success of the few cannot be the only impetus to allow this project. There is only one Columbia Gorge, we cannot allow its beauty to be compromised. I am unable to attend either of the meetings, but I would like to register my opposition to this project. [LTR 39, CMT 1]*

Response: Please see response to Comment LTR 33, CMT 5 above.

Comment: *Siting Columbia River Gorge would not degrade the scenic value of the Gorge. The turbines and their blinking lights may be slightly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point; however they are not within the scenic area itself. [LTR 40, CMT 5]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *I support renewable energy, adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. The rules governing the scenic area should not creep into managing surrounding areas. [LTR 40, CMT 8]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *In addition, locating 426-foot-tall turbines on the ridge line of the Columbia River Gorge would help power the values of the Gorge. The turbines may even be visible from some viewing areas within the National Scenic Area. The project would introduce industrial development into the natural, forested landscape and ENHANCE views in the National Scenic Area. I support renewable energy and I am in favor of industrial wind energy development within, and adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 44, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing to express opposition to the proposal to site a large-scale wind farm on Saddleback Mountain in a location that is in the heart of the Columbia Gorge, and will be visible from several key viewing areas which are established in the Gorge National Scenic Act. [LTR 46, CMT 1]*

Response: Please see response to Comment LTR 33, CMT 5 above.

Comment: *A giant scar on the Gorge land/river-scape (this includes the National Scenic Area). [LTR 49, CMT 4]*

Response: Please see response to Comment LTR 57, CMT 4 below.

Comment: *Approximately 384 acres would be developed for the wind turbine foundations, connecting roadways and overhead and underground transmission lines. Each turbine would be more than 420 feet tall and equipped with blinking lights. The proposed wind turbines would cover more than 1,000 acres of highly visible ridgelines and would be seen from several designated key viewing areas in the Gorge including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-Underwood Road, and Panorama Point. The project would also be highly visible from communities and cities such as Mill A, Underwood, Hood River, and White Salmon. All wind developments should be sited east of the eastern boundary of the National Scenic Area (Maryhill and the Deschutes River) or in other areas not visible from the NSA. We need alternative energy sources, but here the cost in loss of other assets is too great! [LTR 51, CMT 2]*

Response: Please see response to Comment LTR 12, CMT 6 above.

Comment: *The Columbia River Gorge is the only federally designated scenic area in the U.S. While I'm in total support of renewable energy, placing wind turbines where they are visible within the scenic area is in my mind completely contrary to the purpose of designating this as a scenic area. [LTR 57, CMT 2]*

Response: The opinions of the commenter concerning the intent of the National Scenic Act and congressional and other expectations at the time that Act was passed are acknowledged.

Comment: *In addition, locating 426-foot-tall turbines on the ridge line of the Columbia River Gorge would degrade the scenic value of the Gorge. The turbines and their blinking lights would be highly visible from several designated key viewing areas within the National Scenic Area, including Interstate 84, the Historic Columbia River Highway, Columbia River, Cook-*

Underwood Road, and Panorama Point. The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. [LTR 57, CMT 4]

Response: Comments acknowledged. Potential impacts to views in the Project vicinity, including from within the Columbia River Gorge National Scenic Area, are discussed and evaluated in Section 3.9 of the EIS. In addition, a total of 13 visual simulations from various representative vantage points throughout the Project vicinity were included in the EIS, with 10 of these visual simulations from locations within the Scenic Area. Even for locations where visual simulations were not prepared, the potential visibilities of project facilities from locations throughout the project vicinity are shown in Figures 3.9-1 and 3.9-2 of the EIS, and regional visual impacts from the proposed Project are discussed in Section 3.9.3.1 of the EIS. The EIS also addresses the applicability of the provisions of the Act that created the Scenic Area, as well as the Scenic Area Management Plan, to the proposed project.

Comment: *Regarding land use and the National Scenic Area. We all understand that regulations, boundaries, etc. do not preclude development of this type of project, however can you honestly say that the lawmakers and NSA visionaries understood (many, many years ago) that 400+ tall manmade, noisy, intrusive, structures would be created and erected. Can you honestly and with good conscience, ignore the basic intent of the National Scenic Act: "Preserve our nation's natural scenic resources", by siting loopholes, ordinance weakness, and the limits of our written language. Remember, this is permanent (30+years) and a resource that can never, never be reclaimed to its current grandeur. Please try to justify this project (as a whole or in parts) given this basic concept of natural scenic area preservation. If you knowingly and willingly ignore preservation of a scenic area, you will spoil our treasure just as oil is spoiling Florida beaches now. Please consider a reconfiguration of the project, at a minimum to eliminate the most visible turbines, specifically the "A1-A7" array. [LTR 60, CMT 7]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *I know that you are tired, and a bit numb to the comments so far and yet to come, but I request that you review each as if you lived here. As if you come to the Gorge to enjoy the natural scenery, as if it was in your back yard. Remember, this project is in everyone's back yard, it is a National Scenic Area. [LTR 60, CMT 12]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment *…would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 66, CMT 3]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment *…or a view envisioned by the National Scenic Act Drafters. [LTR 67, CMT 4]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *I object to the contention that proximity to the Columbia Gorge National Scenic Area should prove a barrier to this project. The project is located outside the national scenic area boundary. The intent of Congress in drafting the scenic area legislation in 1986 was to enhance environmental protection and economic development within the Columbia Gorge. While we still face the need to precisely define certain scenic area boundaries and achieve a necessary mechanism for modifying those boundaries over time, it is very clear that the intent of Congress was not to restrict developments proposed outside the current scenic area boundary. This principle has already been demonstrated in Klickitat and Sherman counties, where wind farms are already visible from within the national scenic area, and the precedent so established should also apply elsewhere in regions adjoining but not included within the national scenic area proper. Yes, there will be some visual impact. But in keeping with my first point, as a society we cannot have our cake and eat it, too. Wind turbines or Gulf Coast oil spills? Not to over-simplify our options, but as a society we will be asked to make precisely this same choice many times, in many places, in the long decades ahead as we confront the global climate change crisis. We might as well face reality now. I vote for wind turbines. [LTR 68, CMT 3]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *Opposition to this project from various groups on the grounds of impact to the scenic area is ridiculous. It is located outside COL. G.SA Boundary Lines and they have no right to dictate land use on private property. [LTR 71, CMT 3]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *This project is outside the boundary of the National Scenic Area. [LTR 72, CMT 3]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *The impact to the Scenic Area is too great. We may need more energy from sources other than oil. We may need to do more research on conservation. However THIS windfarm is not crucial to solving the energy crises. The harm to the scenic area and local residents is too great. [LTR 73, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *The Scenic Area impacts have been discussed by many already. It would be more than unfortunate to allow all of the effort that has so far been expended to maintain the un-occluded foothill views within the designated area to be despoiled by a project of this magnitude, even though it may be located just outside of the Scenic Area. To many, especially in these times, aesthetic values are worth advocating for. [LTR 76, CMT 7]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *The Condit Dam on the White Salmon River is going to be removed. Day-after-day, Condit churns out 8-10 megawatts of power, almost half of the firm power Whistling Ridge would produce. Should we rethink the facility's removal? No! Because it's been determined that salmon recovery is a higher priority than renewable energy from the White Salmon River. So it is with the Columbia Gorge. The Gorge was set aside by Congress as a special place to be preserved and protected for all future generations. No one anticipated the abomination of 500', gleaming white towers with rotating blades being located on ridges just outside the National Scenic Area boundaries, otherwise the lines would have been drawn differently. If this proposal is permitted along with other proposals in the east Gorge, the iconic landscapes that the Scenic Act purports to protect will become subordinate by day to giant towers with whirling blades and by night to flashing red lights. If the Whistling Ridge project is permitted, then it will be time to ask Congress to redraw the boundaries. The incongruity of industrial wind energy projects up-and-down the Gorge on ridge-tops just beyond the Scenic Area boundary flies in the face of the very intent of Scenic Act itself. [LTR 77, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *At an initial hearing before EFSEC on Whistling Ridge, Wallace Stevenson, owner of SDS, said that his company has always tried to do the "right thing". CGAS assumes that this was said to help persuade EFSEC to render a decision favorable to Whistling Ridge. We would like to balance the record with this: Concurrent with establishing the National Scenic Area, Congress designated the lower White Salmon River under the National Wild and Scenic Rivers Act. The management area boundary included some SDS property, including lands along Spring Creek, a critical area for salmon spawning once they are reintroduced. The Forest Service offered SDS a land exchange so these lands would not be logged and the values for which the river was designated could be preserved. Apparently SDS was unable to get above appraised values for their lands, so the company cut the forest down to include Spring Creek and other areas where hiking trails and picnic areas were planned. Now we ask you, was this the right thing to do? [LTR 77, CMT 7]*

Response: Comment acknowledged.

Comment: *The EIS should clearly state that, should this proposal be approved, it would set a precedent by allowing the first wind farm visible from within the Columbia Gorge Scenic Area. [LTR 79, CMT 5]*

Response: It is unclear at this time whether approval of the proposed Project would set a precedent for siting other wind projects in the area. Since all projects are evaluated on a case-by-case basis, approval of this Project does not dictate that any other Project that may be proposed in the future would also be approved. In addition, most developers are aware of the challenges of attempting to site wind projects in this general area. For the Applicant, proposing a wind project in this area may make sense, but other wind project developers may have differing opinions. Nonetheless, because there are no current proposals for other wind projects in the area; such future development is considered too speculative at this time.

Comment: *Thank you for the opportunity to comment on this draft. Please respond to our comments and concerns in the next version of the EIS. The SDS proposed wind turbine field you are now studying is unique in several respects: It would be the first such project located directly adjacent to the Columbia River Gorge Scenic Area and would introduce turbine towers visible from various locations within the Scenic Area. [LTR 79, CMT 14]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *The Gorge Act, though it did not visualize tall towers that would impact views from the gorge, is very specific about aesthetics. Since the Act's implementation, even single nonconforming houses have generated extensive debate. [LTR 79, CMT 14]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *Jim Luce called last week and left the following question "How does EFSC work with critical viewing areas in the Columbia Gorge Scenic Area?" Historically, protected areas are listed as part of our rules (OAR 34.5~22~0040) and the Columbia River Scenic Area is one those listed, see paragraph (g). By virtue of being listed an energy facility is not allowed. The big however is that we do not assume that an energy facility outside the scenic is automatically precluded. For example; when FirstWind proposed the Seven Mile Hill project, just east of the Dalles and bordering the scenic area, the issue of the CGSA came up amid the applicant was told that they could not place their facility in the that protected area. Multiple discussion were had that being able to see the facility from the CGSA was not the issue as you can stand within the CGSA and see a myriad of industrial views. However, as FirstWind withdrew the application that regulatory finding was not challenged. Thus, it remains our hypothesis that, for Oregon only a facility within the CGSA would be prohibited. [LTR 85, CMT 1]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *Although the site is outside the Scenic Area, it will be visible from the Scenic Area. [LTR 92, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *We also offer the following observation with respect to the Columbia River Gorge Scenic Area. Whistling Ridge is proposed for location outside the National Scenic Area boundaries. It is outside the purview of the Columbia River Gorge Commission, the Scenic Area Management Plan, and all National Scenic Area Act Provisions affecting land use. Similar to Skamania County, Klickitat could not realize its community and economic development objectives or address its historically high unemployment levels, if Scenic Area proximity were to restrain wind or other types of development in the thirteen exempted urban areas (eg the cities of Hood River, Bingen, White Salmon, and the Dalles) or external to the National Scenic Area boundaries. Such an outcome would be inconsistent with the letter and intent of the National Scenic Area Act. [LTR 93, CMT 4]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *Since all wind turbines will be located outside of the Columbia Gorge National Scenic area, this should not even be an issue. I hope the lazy turning turbine blades will soon be a sign of progress, and a promise of better things to come. [LTR 96, CMT 5]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *The project area is outside the Scenic Area thus concerns that relate to it should/do not apply. [LTR 97, CMT 2]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *I am a strong supporter of alternative energy sources, as long as they are properly sited and designed to minimally impact significant natural resources. Unfortunately, in the case of Whistling Ridge, I cannot support this particular development due to its potential negative impact on the Columbia River Gorge. [LTR 101, CMT 1]*

Response: The views of the commenter that the proposed location of this wind project is less suitable than other locations are acknowledged. The potential impact of the proposed Project on views in the project vicinity, including from within the Columbia River Gorge National Scenic Area, are discussed and evaluated in Section 3.9 of the EIS.

Comment: *The Columbia River Gorge was designated as a National Scenic Area in order to protect and manage its scenic beauty and abundant recreation opportunities. Unfortunately, at the time of the original designation, the legislation did not address "view impacts" of adjoining buffer areas as seen from within the National Scenic Area. I would think that, if industrial wind farms would have been prevalent in the Northwest at the time, the legislation would have addressed siting restrictions for this type of use in those areas where it would negatively impact the National Scenic Area. The Pacific Northwest does not have a shortage of available sites for wind energy developments. [LTR 101, CMT 1]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *Views. Our Members have mixed opinions as to whether they would necessarily object to views of the wind turbines, however, most believe that structures of this nature are not in keeping with the spirit or beauty of a National Scenic Area even though such structures are built on land that is just outside of the boundary. [LTR 119, CMT 9]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *Eliminating the A1-A7 turbines keeps the Whistling Ridge project in compliance with the basic intent of the National Scenic Act: to "Preserve our nation's natural scenic resources". This allows EFSEC to support the preservation of a scenic area while also supporting wind energy. [LTR 124, CMT 6]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *Would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. [LTR 127, CMT 3]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. The plan is in direct opposition to the Scenic Area, as it would impose unalterable impacts on major viewpoints, and any proposal or alternative that does not ban it outright is missing the main point. [LTR 131, CMT 1]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *Is there perhaps a site better suited for this development than in the heart of the Columbia River Gorge National Scenic Area? I think it's vital that we protect the scenic beauty of this particular place. I already wince at every clear cut visible in the NSA. The last thing we need is to add industrial development to an area that has already been compromised by commercial interests. [LTR 134, CMT 1]*

Response: The views of the commenter that the proposed location of this wind project is less suitable than other locations are acknowledged. The potential impact of the proposed Project on views in the project vicinity, including from within the Columbia River Gorge National Scenic Area, are discussed and evaluated in Section 3.9 of the EIS.

Comment: *The City of Bingen notes that the Whistling Ridge project is located outside of the Columbia River Gorge National Scenic Area and is therefore not subject to the National Scenic Area Act. The City of Bingen is also in an area that is not subject to the National Scenic Area Act. We would not be able to realize our community and economic development objectives if proximity to the Scenic Area begins to restrain that development. The city believes that restrictions on propel1ies located outside of the Scenic Area or that are exempt from the Scenic Area Act are inconsistent with the letter and intent of the National Scenic Area Act. Thank you for considering our comments. [LTR 137, CMT 2]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *It has come to my attention that there may be some opposition to the project because several of the turbines may be visible from within the National Scenic Area. I find the argument disingenuous and political in nature. I don't consider a few turbines to be an eyesore, rather they are a powerful symbol of our changing economy in the gorge and our national commitment to renewable energy. I find the complaints hollow because those who complain of having to see a few turbines from inside the NSA have not complained of similar visual impairments from nearby communities. Stand inside the NSA and you can see signs of commerce, industry and development from nearby communities that are outside the boundaries of the NSA. It is as Congress intended: a balance of environmental protection and economic vitality. As a member of Congress, I have been a strong supporter of the NSA. The legislation specifically states in the Saving Clause of the Act, that no protective measures or buffer zones should be established around the NSA. This project is outside the NSA. It is not subject to the rules of the NSA. It is an environmentally sound project that should be embraced and encouraged. I support it. It is the right project at the right time in the right place. [LTR 138, CMT 5]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *Our second area of concern relates to protecting the incredible scenic beauty of the Columbia River Gorge. This area is a local, national and even global treasure, recently rated in National Geographic as tied for number 6 in the world for its natural and sustainable beauty. [LTR 139, CMT 22]*

Response: Comment acknowledged. The extraordinary nature of the Scenic Area is acknowledged. As discussed in the EIS, no part of the proposed Project would be located within the Scenic Area. Furthermore, the use of various roads to access the Project Area and the potential effect of the proposed Project on views from within the Scenic Area are discussed in the appropriate sections of the EIS.

Comment: *Regulatory restrictions: Whistling Ridge Energy Project is located entirely Outside the Columbia River Gorge National Scenic Area. While close, the fact that the project is outside the boundary is significant. [LTR 155, CMT 3]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *SPECIFIC COMMENTS. Visual resources AWB strongly supports the Paragraph 4.11 (pg. 4-9) DEIS interpretation of the Columbia River Gorge National Scenic Area Act (CRGNSA) and the corresponding "savings clause" found at 16 USC § 5440(a)(10). This project application is not, and should not be subject to the requirements of the CRGNSA. The DEIS appropriately acknowledges the proposed site is located outside of, but immediately adjacent to, the northern boundary of the CRGNSA. The DEIS continues that "although the proposed project thus is in close proximity to the CRGNSA, the CRGNSA Act expressly states that: Nothing in [this Act] shall . .. establish protective perimeters or buffer zones around the scenic area or each specia/management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas." The DEIS concludes: "[a]ccordingly because the proposed project is located outside of the CRGNSA, the provisions of the CRGNSA Act do not apply to the proposed project." (Emphasis added) We could not more strongly agree. This accurate interpretation of the CRGNSA "savings clause" is also found in Paragraph 3.9.2.1 (Regional Landscape Setting) which concludes "[t]he project area is completely outside the Scenic Area and therefore is not subject to the Columbia River Gorge Scenic Area Management Plan or related regulatory requirements." (Emphasis added) This reasoning is continued at page 3-194 of the DEIS which concludes "... [t]his federal policy and Congressional mandate discourage projecting National Scenic Act policies, regulations and directives beyond the boundary of the Scenic Area." Federal regulation and zoning of development in an area that is largely private land, and the economic survival of existing counties and communities, were major concerns when the CRGNSA Act was debated in Congress. Several major compromises to the Act were adopted by amendment to address these issues before passage in its final form. These compromises included the purchase or trade of private lands that were highly scenic and would be heavily restricted in the SMA zone; less restriction on private lands in the GMA zone;*

and urban areas that were completely exempt from restriction and a boundary that was to be the absolute boundary with no buffer or setback outside of the CRGNSA. This was the reasoning and intent behind the "savings clause" and the proposed project is exactly what was contemplated when it was adopted. The "savings clause" established a boundary - a boundary in every sense of the word - a place where regulation exists, and a line drawn where it ends. Beyond this boundary, it was intended that private landowners and counties would be allowed to have economic development activity without scenic restriction. Without the "savings clause", Congress would not have enacted the CRGNSA and President Reagan would not have signed the bill in to law. [LTR 162, CMT 6]

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *RESOLUTION 2010-51 (A Resolution Demanding Retraction of the Department of Interior Comments on the Draft Environmental Impact Statement for the Whistling Ridge Wind Energy Project and explanation of its Actions in Commenting without Authority or Jurisdiction against the Secretary's and Administration Policy) WHEREAS, Whistling Ridge Energy Project filed an Application for Site Certification to the Washington Energy Facility Site Evaluation Council ("EFSEC") on March 10,2009 for the Whistling Ridge Energy Project; and WHEREAS, EFSEC is lead agency pursuant to the State Environmental Policy Act, and Bonneville Power Administration ("BPA") is federal lead agency pursuant to the National Environmental Policy Act; and WHEREAS, EFSEC and BPA have independently issued a joint Draft Environmental Impact Statement for this Project and arc seeking public comment on the DEIS; and WHEREAS, the entire .project is located outside of the Columbia River Gorge National Scenic Area ("Scenic Area") on privately owned lands in Skamania County; and WHEREAS, Federal Government regulation of private lands as well as the economic survival of Skamania, other local counties and communities were major concerns when the Columbia River Gorge National Scenic Area ("Scenic Area Act") was debated in Congress; which resulted in several major compromises to address these concerns before passage of the Scenic Area Act in its final form, without which, Congress would not have enacted the Scenic Area Act and President Reagan would not have signed it into law. These compromises included the purchase or trade of private lands that were regulated for the protection of scenery in the Special Management Areas, the designation of Urban Areas that are completely exempt from restrictions and the designation of an external boundary that by Congressional direction is the absolute boundary with no buffers or setbacks outside of the Scenic Area. Congressional intent is found in the "Savings Provision" at 16 USC § 5440(a)(IO) which states: Nothing in [this Act] shall . .. establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas."; and WHEREAS, The National Trail System Act, 16 USC §§ 1241-1251 authorizes Congress to designate National Scenic and Historic Trails but does not, by mandate or implication, authorize Interior to regulate or restrict private lands or to even negatively comment on or oppose private . projects proposed on private lands nearby, or visible from, designated trail sections; and WHEREAS, Skamania County recently received a copy of the U.S. Department of the Interior ("Interior") DEIS comment letter dated July 19, 2010, wherein*

Interior raises concerns about visibility of the proposed project from the Scenic Area and the nationally designated Lewis and Clark National Historic Trail and suggests elimination of Whistling Ridge wind turbines that are visible from both the Scenic Area and the Lewis and Clark National Historic Trail; and WHEREAS, many thousands of miles of trails are designated throughout the Western United States under the National Trail System Act. With the exception of federal lands, and lands acquired by the Federal Government for preservation of trails, the Federal Government has no authority to regulate or restrict the use of private lands near trails designated under the National Trail System Act, for any reason, especially for purported visual effects on trail segments. Moreover, as described in the Interior letter, the "trail" at issue here is coextensive with US Interstate 84 and Washington State Highway 14 which are not pristine "trail" segments-they are major, busy multi-modal transportation corridors, including the only sea level train route (on both sides of the Columbia River) through the Cascades, with over 80 commercial trains -transiting per day. NOW, THEREFORE,BE IT RESOLVED THAT THE Board of Commissioners being concerned and alarmed with Interior's comments and apparent attempt at inappropriate Federal intervention on the consideration of the Whistling Ridge application, find as follows: The Board finds: Interior's reference to the National Trail Systems Act and the Scenic Area as authority for the comment letter is an abuse of federal authority that exceeds the legal and policy directives and Congressional intent of both the National Trail Systems Act and the Scenic Area Act. Interior's comments are particularly egregious where they recommend that renewable wind energy construction (proposed on private lands outside of the Scenic Area and miles away from any trail segments in Skamania County) that are visible from the National Trail Systems Act and the Scenic Area should be eliminated from the Project, or that the proponent must justify "feasibility" for the locations visible from 1-84. The Board finds: Many man-made structures and activities are-visible and will be visible along these "trails" that follow Interstate highways, where the most visible of "impacts" on travelers are the many semi trucks, trains, transmission lines, dams, industrial facilities, mines, and coal, gas and nuclear power generating facilities, as well as many cities, homes, commercial buildings, advertising signs and billboards, that they pass by. It is a gross abuse of federal authority to negatively comment on, and seek to obstruct a renewable energy project on private lands merely because a small portion is remotely visible from an Interstate highway. The Board finds: Consistent with our concerns raised above regarding National Trail Systems Act authority, that Interior's recommendation of restricting private land development in view of the Scenic Area is in direct violation of the critically important Scenic Area Act compromises and Savings Provisions the intent of which was to allow local counties economic development opportunity for their continued survival. 2 The Board finds: Interior's comments and recommendations have serious policy implications not only for renewable energy development but also for other non-wind energy related projects that are visible from the Scenic Area and National Historic Trails, such as electrical transmissions systems, dams, rail transportation, interstate commerce and traffic, as well as residential, commercial and industrial development in Skamania and other Counties near the Scenic Area and/or Counties 10cated near similarly designated trails under the National Trails System Act. The Board finds: Interiors comments contradict both the Secretary's publicly stated policy as it pertains to renewable energy as well as contradicting the clear energy policy direction of the current Administration. The Board finds: Finally, in addition to the comment concerning the Scenic Area and the Interstate Highway corridor, Interior provided specific comments related to purported groundwater issues-issues raised by local citizen neighbor opponents at the NEP NSEP A comment hearing. Skamania County has regulatory responsibility for groundwater issues, and will work with EFSEC to address the citizen comment.

This is not a federal issue. Interior has no authority to insert itself into this uniquely local issue, and its decision to do so demonstrates its lack of regard for Skamania County's authority: strongly suggesting inappropriate collaboration with Whistling Ridge project opponents. Now, therefore, be it finally resolved that the Board of Commissioners reacting to this clear abuse of authority without jurisdiction, hereby demand, in the strongest possible terms, that Interior's comments be immediately retracted and removed from the public record on this matter, and further respectfully request that the Secretary and the Administration clarify how Interior has acted within its authority, consistent with the stated policy direction of the Secretary and the Administration, and what this letter means for the implementation of the Administration's declared land management and energy policies. [LTR 164, CMT 5]

Response: Comment acknowledged.

Comment: *As a citizenry here in the US we try to preserve a small number of exceptional areas. The Gorge (and the US citizens) deserve as gorgeous a Gorge as possible. There is lots of windy land in these United States that is not protected as a national treasure. Seeing windmills from anywhere in the Gorge Scenic Area would be a further loss. I am still adjusting to the changed landscape around Maryhill with the addition of windmills there in the last couple of years. They are interesting to see, but they detract from the formerly simply grand landscape. Please don't bring tall, moving, unnatural structures into view in Skamania County! Any additional mechanical objects on the horizon WILL detract from the wonderful and unique Columbia Gorge experience. [LTR 166, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *[In reference to DEIS Section] 3.9.2.3, Viewpoints, See comments under sections 3.91 and 3.9.1.3. Columbia River Gorge National Scenic Area - p.3-194. Visual impacts are among the issues to be addressed in NEPA and SEPA analysis. Although Congress has expressed reluctance to apply Scenic Area restrictions to lands lying outside the scenic area boundary, land uses outside the scenic area will impact the visual quality within the scenic area and should be subject to visual analysis consistent with the values encompassed by the CRGNSA. [LTR 177, CMT 61]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *The Columbia River Gorge and the Affected Communities The Whistling Ridge project would be sited in the heart of the Columbia River Gorge. Many of the proposed turbines would be sited immediately adjacent to and/or highly visible from the Columbia River Gorge National Scenic Area. In addition, portions of the proposed "haul route," along which construction materials and turbine components would be transported, are located within the National Scenic Area. Established by Congress in 1986, the National Scenic Area is an*

extraordinary national treasure, an area protected under federal law for its aesthetic, biological, ecological, historic, and recreational values. See Columbia River Gorge National Scenic Area Act ("Scenic Area Act"), 16 U.S.C. §§ 544–544p. The Gorge, under the protection of the Scenic Area Act, offers unfettered scenic and historic views along the Columbia River, site of the final portion of Lewis and Clark's journey across the West. [LTR 179, CMT 6]

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *The DEIS Misquotes and Misrepresents the Language and Meaning of the Columbia River Gorge National Scenic Area Act. The DEIS attempts to rewrite the Columbia River Gorge National Scenic Area Act to effect a dramatically different purpose than intended by Congress. This misrepresentation, if it goes uncorrected, would dramatically hinder EFSEC's and the BPA's ability to protect the public from adverse impacts to important local, state, and national resources. The DEIS includes the following passage that purports to quote the Columbia River Gorge National Scenic Area Act: The Act states that "no protective perimeters or buffer zones shall be established around the scenic area or each special management area. Activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas" (16 U.S.C. § 544O(a)(10)). DEIS at 3-194 (emphasis in original). The above language, reprinted verbatim from the DEIS, seriously misquotes and misrepresents the Act. The actual language in the Act is as follows: (a) Nothing in this Act shall ... (10) Establish protective perimeters or buffer zones around the scenic area or each special management area. The fact that activities or uses inconsistent with the management directives for the scenic area or special management areas can be seen or heard from these areas shall not, of itself, preclude such activities or uses up to the boundaries of the scenic area or special management areas. 16 U.S.C. § 544o(a)(10) (emphasis added). The first sentence of the misquoted Act in the DEIS completely changes the meaning of the statute. The intent to misrepresent is clear. The difference in the meaning of the true wording versus the quoted wording is significant. The language in 16 U.S.C. § 544o(a)(10) provides that nothing in the Scenic Area Act shall establish protective perimeters or buffer zones. It does not, as the DEIS language states, outright prohibit protective buffers, for example under operation of some other local, state, or federal law. [LTR 179, CMT 37]*

Response: Comment acknowledged. The exact, verbatim language of Section 544O(a)(10) of the National Scenic Act was provided on page 3-141 and 4-9 of the Draft EIS. The portion of the Draft EIS cited by the commenter was meant to reasonably paraphrase Section 544O(a)(10) and was not intended to mislead. The discussion of Section 544O(a)(10) (on page 3-194 of the DEIS) has been revised to include the verbatim language of the statute.

Comment: *EFSEC and the BPA must apply numerous other laws in their decision-making, and must protect affected resources and communities. The misquoted language in the DEIS implies that Congress mandated that some other law or factor, independent of the Scenic Area Act, could not result in the protection of lands adjacent to the Scenic Area. This is absolutely*

incorrect. While the Scenic Area Act does not in and of itself impose buffers, neither does it prevent them under operation of other laws. [LTR 179, CMT 38]

Response: Please see response to Comment LTR 179, CMT 37 above.

Comment: *The western intersection of Cook-Underwood Road and State Route 14 is also important. The Applicant has proposed to use this intersection as part of the haul route, but has also not shown that road improvements at this intersection would not be necessary. These distinctions are important, because if this project does in fact involve road construction or ground-disturbing activities within the GMA, such activities must be reviewed by Skamania County under the Scenic Area laws and rules for whether they are allowed and for the protection of resources. SCC § 22.06.010. The agencies need to require better information about the proposed haul route, and resolve whether any road work would in fact be necessary. If so, Scenic Area review and a decision by Skamania County will be required. [LTR 179, CMT 46]*

Response: As stated in Section 3.11.2.1 (page 3-226 of the DEIS), "Improvements to County roads and private roads between SR 14 and the Project Area would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components." However, according to the County Engineer for Skamania County (Timothy Homann) the dimensions and alignments of the existing roadway cross-sections of County Roads in the Scenic Area are adequate to accommodate the large specialized trucks that would haul turbine components to the Project Area, provided oversize and overweight vehicles use the east intersection of SR 14 and Cook-Underwood Road and the east intersection of Cook-Underwood Road and Willard Road (Prefiled Testimony, Exhibit No. 12.00). Therefore, no improvements to County roads within the Scenic Area are anticipated.

Comment: *Moreover, visual quality objectives for viewpoints within the Scenic Area exist. Although the Scenic Area Act does not apply these VQOs outside the Scenic Area, they are a useful way of measuring the scenic impacts of the project on the affected landscape pursuant to NEPA and SEPA. Both the Forest Service and BLM visual assessment methods were designed and have been gradually adapted and refined to address numerous impact types. Though neither method anticipated giant commercial wind turbines, both have been used to review utilities, dams, mining and other energy related infrastructure. The BLM visual contrast method in particular has proven to be very useful and adaptable to assessing wind turbine development. Yet on page 3-156 of the DEIS the project proponents dismiss the BLM visual contrast method due to the absence of pre-existing "visual resource objectives" (even though as stated earlier, these exist for the affected key viewing areas). The assumption appears to be that visual contrast cannot be determined unless one first establishes resource objectives. But visual contrast is a useful way of measuring impacts regardless of whether a resource management objective has been established, because it relies on simple and time tested analytical standards, summarized below from BLM Manual 8431. [LTR 180, CMT 7]*

Response: Please see comment responses under the Visual Resources section of this volume. As stated within that section, the use of the BLM methodology, particularly the application of the contrast rating, hinges upon the comparison with established visual classifications. As noted on page 3-156 of the DEIS, in order to use the BLM process for projects on private lands where no visual resource objectives have been established, it would be necessary to complete a full visual management inventory to delineate all lands in question and then classify each delineated area using the BLM classifications. The EIS does describe the visual setting on pages 3-161 to 3-164. The EIS also provides measures for Landscape Scenic Quality in Table 3.9-1 and applies these measures to each viewpoint. The application of USFS landscape management objectives to private lands would not be appropriate for this Project.

Comment: *Scenic Quality Ratings and Viewer Sensitivity, [on] Page 3-157 of the DEIS states that "Scenic quality ratings were based on observations in the field, photographs of the affected area, methods for assessing visual quality, and research on public perceptions of the environment…" (emphasis added). It needs to be noted that wind project proposals in scenic landscapes tend to generate a lot of public concern and opposition, while proposals in less scenic areas (i.e. the prairie and plains states) generate very little opposition. For example, Cape Wind (off Cape Cod) several wind projects in New England and upstate New York, previous projects along the Columbia River Gorge National Scenic Area, including the abandoned Cascade Wind proposal not far from this site in Wasco County, projects proposed near the Wallowa and Steens Mountains in Oregon, and those in coastal areas have raised significant public opposition. In contrast, multiple projects proposed and built in the open range and farm land of the Columbia Basin have generated very little opposition based on aesthetic impact. This experience suggests that much if not most of the public is uncomfortable with the scenic impacts of commercial-scale wind energy projects in landscapes valued for their scenic qualities. [LTR 180, CMT 10]*

Response: Comment acknowledged.

Comment: *The Columbia River Gorge is clearly valued for its scenic qualities, both natural and cultural. It is a federally protected national scenic area. It has a unique bi-state commission that plans, regulates, and monitors to protect scenic quality. The American Society of Landscape Architects included the Columbia River Gorge as one of the 100 most outstanding landscapes in the United States, ranking it along with Yosemite, Yellowstone and other national icons. Clearly, the public has already weighed in on the issue of whether the Gorge is scenic and merits conservation, and the answer is "yes." [LTR 180, CMT 10]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *S.D.S. Co., LLC must modify its application to better address the applicable review criteria, to remove all portions of the project from the National Scenic Area, and to*

substantially reduce the impacts of the project on scenic, natural, and recreational resources. As for consistency with land use laws, the application contains a fatal flaw: part of the project would be located within the National Scenic Area. The entire project is classified as an industrial use under the Scenic Area rules because it would be primarily involved in the production of electric power for commercial purposes. [LTR 182, CMT 2]

Response: The proposed Project would be located entirely outside of the Columbia River Gorge National Scenic Area, as acknowledged throughout the EIS, including in Sections 2.1, 3.8, 3.9, 3.14, and 4.11 of the EIS.

Comment: *Industrial uses are prohibited within the General Management Area of the Scenic Area. [LTR 182, CMT 3]*

Response: Comment acknowledged. The lead agencies understand Management Plan policies concerning industrial development in the Scenic Area and believe that the proposed Project does not involve aspects that run contrary to these policies.

Comment: *I sincerely hope that the Council appreciates the unique challenges that the private sector confronts in operating within the Columbia River Gorge National Scenic Area. [LTR 185, CMT 2]*

Response: The comments concerning the additional requirements faced by proposed activities and development in the National Scenic Area are noted.

Comment: *Those of us in Clark County are aware of the onerous requirements imposed by the Act. While much of Clark and Multnomah counties only have a peripheral stake in the Gorge, 6% of Skamania's land mass is privately held, and much of that falls within the Scenic Area. [LTR 185, CMT 6]*

Response: Please see response to Comment LTR 185, CMT 2 above.

Comment: *Council members should, if they are not already, be aware of the history behind the Act and what is becoming a remarkable and implicit disregard for the takings of property rights that the Act seems to have spawned. The bitterness which has developed since passage of the Act is troubling especially for the communities in the Scenic Area. That bitterness is regrettable and is growing. It remains because advocacy groups campaign constantly for expansion of restrictions within and extensions beyond the defined CRGNSA boundary. The Energy Facility Site Evaluation Council has already heard considerable testimony along these lines; testimony that bears no repeating here. My point is simply that none of what has been*

entered into the record is supported by the legislative intent of the Act's authors, or in the language of the Act as written. The proposition that whatever can be seen from within the Scenic Area should be treated as if it were within its boundary is ludicrous. It is also outrageous. I can tell you personally that when the law was written that was never the intent. This is outrageous because a reduction in the capacity of SDS' wind farm will render the entire project untenable. Outrageous because prohibiting SDS from pursuing the highest and best use of its lands in ways fully compatible with timber production, is a blatant property rights taking. Outrageous because Whistling Ridge, with the jobs and tax revenue and local purchases it will engender, is a private economic stimulus for a community that urgently needs one. And finally, asserting a de facto expansion of the Scenic Area boundary is outrageous because it pours salt on the wound of decades of local residents' bitterness toward the original Act despite its clearly limited mandate; there never was, nor should be, a buffer around or extension of the CRGNSA boundary. [LTR 185, CMT 8]

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *The Whistling Ridge Wind Farm is also outside of the Columbia River Gorge Natural Scenic Area. The Congressional intent of the Gorge Scenic Act was to allow for ongoing economic activity in areas adjacent to the Scenic Area regardless of the affect that these adjacent areas may have on the view from the scenic area. In other words, there was to be no buffer zones to the buffer zone already established by the Gorge Scenic Area boundary. Also I believe that the construction of the Whistling Ridge Wind Farm would not degrade the scenic beauty of the Columbia River Gorge National Scenic Area. As a point of law, EFSEC does not have the authorization to establish new exclusion zones such as buffers to the Gorge Scenic Area without additional authorization from either the legislature or the US Congress. Visual Impact on the Columbia River Gorge National Scenic Area should be an issue of consideration in any Environmental Impact Statement review, but the determination of significance of any impact is not capricious or arbitrary, it must be based on the rules that are in place today. Development outside of and adjacent to the Columbia River Gorge National Scenic Area is allowed under the law and as such visual impacts to the National Scenic Area are allowed because the proposed facility is not located within the Scenic Area. [LTR 191, CMT 4]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *I also supported and participated in the creation of Columbia River Gorge National Scenic Area which is national scenic treasure. The creation of the Scenic Area involved a significant public involvement process that carefully consider the location of the boundary of the Scenic Area. The potential for wind energy development in the Columbia River Gorge area was a consideration when those of us who put pen to paper and drew the boundary participated in the creation of the Scenic Area. This boundary was established to buffer the significant resources of the Scenic Area and the legislation that created the Columbia River Gorge National Scenic Area clearly consider potential affects from development outside of the boundary and determined that such development would not be subject to the Scenic Act. It is not*

EFSEC's role to substitute its judgment for that of the US Congress on this issue. [LTR 191, CMT 7]

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *The Board finds: Consistent with our concerns raised above regarding National Trail Systems Act authority, that Interior's recommendation of restricting private land development in view of the Scenic Area is in direct violation of the critically important Scenic Area Act compromises and Savings Provisions the intent of which was to allow local counties economic development opportunity for their continued survival. [LTR 197, CMT 5]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *The Board finds: Interior's comments and recommendations have serious policy implications not only for renewable energy development but also for other non-wind energy related projects that are visible from the Scenic Area and National Historic Trails, such as electrical transmissions systems, dams, rail transportation, interstate commerce and traffic, as well as residential, commercial and industrial development in Skamania and other Counties near the Scenic Area and/or Counties located near similarly designated trails under the National Trails System Act. [LTR 197, CMT 6]*

Response: Please see response to Comment LTR 83, CMT 3 above.

Comment: *In addition, the onslaught of wind turbines will continue to encircle the Columbia Gorge and destroy once-pristine views of the ridges and horizon that were one of the primary reasons the National Scenic Area was created. [LTR 201, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *I am all for Alternative Energy Projects, but, not at the expense of despoiling one of our National Treasures. We live in the area and have many visitors, all those visitors comment on the pristine beauty of the area. We need to retain the vista, not only of the area covered by the Scenic act, but also of the area bordering this stunning scenery for future generations. These vistas would be adversely impacted by the proposed project and directly effect the enjoyment of visitors and locals alike. Please don't allow the project to go ahead. [LTR 202, CMT 1]*

Response: Please see response to Comment LTR 33, CMT 5 above.

Comment: *I'm opposed to the project because this contradicts the spirit of the Columbia Gorge Scenic Area. Even though the project is outside the area, it was never envisioned that there would be this type of project that could be seen from within the scenic area. [LTR 205, CMT 1]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *While not technically within the boundaries of the Columbia Gorge Scenic Area, the Whistling Ridge Energy Project contradicts the spirit of the Scenic Area. Had anyone imagined the building of skyscraper-height structures just outside the scenic area, I'm confident that they would have designated a bigger area. We live in Hood River, Oregon, and the ridges upon which they are proposing the turbines are visible from all over the beautiful Hood River valley. [LTR 206, CMT 1]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *While supportive of clean energy, we are certainly concerned with the visual impact in the HEART of the scenic area. We are pleased with the development of the wind power further east in the Gorge and throughout various areas in the northwest. [LTR 210, CMT 1]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *I am against siting any wind turbines in any key viewing area of the Columbia River Gorge NSA. This wind farm will be visible from many points in the CRG NSA. [LTR 220, CMT 1]*

Response: Please see response to Comment LTR 33, CMT 5 above.

Comment: *Please do not approve Whistling Ridge in any form. Please be part of maintaining the intent of the CRG NSA. Do not sell out this area for respite from the metropolis to the money-making interests of those wishing to benefit from wind-generated electricity. This, and any wind farm in view spaces of the CRG NSA should not be approved. I would be looking right at Whistling Ridge turbines every time I left my house to drive down the hill into Mosier. Thank you for taking my comment. [LTR 220, CMT 4]*

Response: Please see response to Comment LTR 134, CMT 1 above.

Comment: *In regards to the whistling ridge wind farm proposal, I have to say that it is a poor location choice for a turbine farm for these reasons. 1. With-in the view corridor of a sensitive NATIONAL SCENIC AREA!!! ...Bad choice for people, national pride and the wind turbine industry. [LTR 226, CMT 1]*

Response: Please see response to Comment LTR 134, CMT 1 above.

Comment: *While the Whistling Ridge Wind Project proponents deserve credit for responding thoughtfully to some of the previous objections to their earlier proposals, the revised proposal remains of great concern. If allowed the proposed wind mills will still seriously impact the beauty of the Gorge Scenic Area. As presently proposed viewers from numerous locations including parts of the cities of White Salmon, Underwood, and Hood River, as well as the Columbia River itself will have their views of the Gorge defaced by 425 foot towers of steel, rotating blades and flashing strobe lights. There are few areas in the world with as much natural beauty as we now have in this part of the Gorge. We should not sell it away. Granted our Nation needs alternative sources of energy and Skamania County needs new sources of revenue. But there are many less scenic areas of Washington, Oregon and the entire country which could also contain our windmills. Some things should not be traded for money. [LTR 230, CMT 1]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *I am an environmental planner by training and profession with over twenty years of experience writing, managing and reviewing environmental impact statements prepared in compliance with the State and National Environmental Policy Act. For nearly as long, I have worked and played in an around the Columbia River Gorge and am protective of its unique and spectacular scenic, natural, cultural and recreational resources. The Columbia River Gorge is a unique and irreplaceable treasure that includes federal and privately owned land and provides important regional economic development opportunities. The National Scenic Area designation was a compromise that offers a high level of protection against the threats posed by incompatible development in Special Management Areas, less protection and greater recognition of economic needs in General Management Areas and no regulation of activities in Urban Exempt Areas or lands outside of the Scenic Area boundaries. Interestingly, the Act provides these restrictions on land use but not against air pollution generated upwind that dims the Gorge's spectacular views on smoggy and hazy days. Our planet Earth is likewise a unique and irreplaceable treasure, just on a larger scale. It goes without saying that the scale of the numerous threats to our global environment is proportionately larger and more significant than those facing the Gorge. Of the many threats facing our planet, none are as grave or as irreversible as climate change. [LTR 231, CMT 1]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *The Whistling Ridge Energy Project does not breech the boundaries of the Columbia River National Scenic Area as the so called Friends of the Gorge would seem to want you to believe. They also were involved when the boundaries of the NSA were set but that was apparently a stepping stone for further advances against the survival of our local government. [LTR 235, CMT 2]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *After a good deal of thought about trade-offs between impact to local residents, the need for renewable energy, and the availability of sites in relatively unpopulated areas, I have concluded that the project is incompatible with the proposed site. It will affect many residents in the Gorge, which is a national scenic area. Other sites to the east exist. [LTR 237, CMT 4]*

Response: Please see response to Comment LTR 12, CMT 6 above.

Comment: *If allowed the proposed wind mills will still seriously impact the beauty of the Gorge Scenic Area. As presently proposed viewers from numerous locations including parts of the cities of White Salmon, Underwood, and Hood River, as well as the Columbia River itself will have their views of the Gorge defaced by 425 foot towers of steel, rotating blades and flashing strobe lights. There are few areas in the world with as much natural beauty as we now have in this part of the Gorge. We should not sell it away. [LTR 241, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *The Friends of the Historic Columbia River Highway has sincere and strong concerns about the proposed Whistling Ridge Energy Project's potential impacts on the Historic Columbia River Highway, a district listed in the National Register of Historic Places. The Historic Columbia River Highway (HCRH) is a linear scenic and historic resource in Oregon extending from Troutdale to The Dalles. All of the HCRH is a Key Viewing Area within the Columbia River Gorge National Scenic Area (CRGNSA). Portions of the HCRH that are a trail are designated as a National Recreational Trail. Portions of the HCRH are closer to the proposed project than the sites chosen for visual resource analysis. In particular, Mitchell Point is due south of the proposed project and within the Special Management Area of the CRGNSA. There is an existing viewpoint/overlook within the Oregon Parks and Recreation Department (OPRD) property at Mitchell Point, including an interpretive sign at the edge of the cliff overlooking the Columbia River. See photo. Mitchell Point was the site of the famous Mitchell Point Tunnel (also known as the Tunnel of Many Vistas because of its five "windows" overlooking the Columbia River) on the Columbia River Highway (see photos). While the original tunnel is gone, planning efforts since 1987 have looked at ways to reconnect the HCRH in this area. In 2008 the Friends of the Historic Columbia River Highway financed an*

engineering feasibility study that concluded that it is feasible to construct a new tunnel at this site, which could have "windows" at the former location of the viaduct. This proposal is included in the Mile Post 2016 Reconnection Projects, the most recent planning document published (see attachments). In addition, OPRD is currently developing a project to enhance the existing viewpoint. [LTR 242, CMT 1]

Response: Please see response to Comment LTR 141, CMT 2 above.

Comment: *The significance of this view was further confirmed when the Management Plan for the CRGNSA was adopted in 1991. The Underwood Bluff was given an Open Space zoning designation and a Gorge Walls, Canyonlands, and Wildlands landscape setting designation. Both designations were adopted in part in response to scenic resource inventories that established visually quality objectives. [LTR 242, CMT 4]*

Response: Comment acknowledged.

Comment: *I can support wind energy projects but not with a location on the border of the National Scenic Area. The views from this protected region need to be protected also -- 400+ foot high turbines destroy part of what the Scenic Act stands to protect. These are not the views from a few local homes or a couple of small towns - these are the views of an entire region -- a protected region. Please do not degrade the Columbia River Gorge. [LTR 250, CMT 2]*

Response: Please see response to Comment LTR 134, CMT 1 above.

Comment: *I drive through the gorge quite often. I think wind power is a good thing, but not in the gorge because of the scenic area and could have impacts on wildlife and plants. That would degrade the scenic area. For this reason this project should be denied. [LTR 253, CMT 1]*

Response: Please see response to Comment LTR 134, CMT 1 above.

Comment: *Not where they are visible to the National Scenic area. [LTR 255, CMT 2]*

Response: Please see response to Comment LTR 134, CMT 1 above.

Comment: *It becomes difficult to see the natural environment when those big towers move and blink at you, and the natural environment is what most people living in the county are there*

to enjoy. It should be no surprise that rural people do not appreciate their county views turned into industrial zones, neither should it surprise us that proponent studies will seek to diminish the significance of this fact. [LTR 256, CMT 17]

Response: Comment acknowledged.

Comment: *The National Scenic Area supports renewable energy development and believes that the Whistling Ridge Energy Project will be enhanced with consideration given to the scenic values associated with the Columbia River Gorge National Scenic Area (CRGNSA). [LTR 257, CMT 2]*

Response: Comment acknowledged.

Comment: *Approving this siting will set a precedent for decisions in the rest of WA when a wind farm is near a National Park or other scenically beloved area. The towers are not in the CGNSA, but are set very close (I have heard 20 feet from the boundary, but in any case a look at the enclosed map shows that they are very close) to the boundary. Because they are not in the boundary, the CGNSA has no legal authority over the wind farm placement. In OR, however, the Dept. of Energy Facilities Siting Council has written standards (enclosed) for siting. Two of them are that new energy facilities shall not have adverse effects on certain places, the Columbia Gorge being one, and second that new facilities shall not adversely affect scenic values recognized in federal or local land use plans, and the CGNSA Key Viewing Areas would be a perfect example. If the WA EFSEC fails in this case to consider well defined adverse impacts on a federal National Scenic Area, you are setting a precedent. I realize it is easy for WA government to sacrifice the Columbia Gorge because it is not near Seattle, but if you site towers here, what grounds will you use to deny siting near scenic areas like Mt Rainier, Puget Sound, and the Olympics? [LTR 262, CMT 1]*

Response: The guidelines of the Oregon EFSC are noted. These guidelines are not applicable to the proposed Project, which is proposed to be located in Washington State. Washington EFSEC does not have analogous guidelines or standards. Nonetheless, potential impacts of the proposed Project from views within the National Scenic Area have been evaluated and are discussed in Section 3.9, Visual Resources of the EIS. It is unclear at this time whether approval of the proposed Project would set a precedent for siting other wind projects in the area. Since all projects are evaluated on a case-by-case basis, approval of this Project does not dictate that any other Project that may be proposed in the future would also be approved. In addition, most developers are aware of the challenges of attempting to site wind projects in this general area. Nonetheless, because there are no current proposals for other wind projects in the area; such future development is considered too speculative at this time.

Comment: *The Management plan set the afore-mentioned standards to protect the natural beauty of the Gorge from being overwhelmed by human construction. If you allow wind towers on the rim of the Gorge where they will be very visible, that makes a mockery of all these standards that private landowners have to abide by in building their houses in the CGNSA. Why should someone have to paint their house an inconspicuous dark brown if above him can be seen white spinning towers with red lights at night? [LTR 262, CMT 1]*

Response: The Columbia River Gorge National Scenic Area Act, the National Scenic Area it created, and the Management Plan for this Area are discussed in Section 4.11 of the EIS. As discussed in Section 4.11 and acknowledged by the commenter, the National Scenic Area Act expressly does not establish protective perimeters or buffer zones around the National Scenic Area. The Management Plan for the National Scenic Area reflects this limitation. Potential visual impacts of the proposed Project from various vantage points, including from within the National Scenic Area, are discussed in Section 3.9 of the EIS.

Comment: *The Columbia Gorge National Scenic Area was created 25 years ago to protect the beauty of the Gorge. No buffer zone was created for its boundaries, but at the time no one envisioned the possibility of huge (greater than 400 ft. tall) wind towers on the tops of all its ridges. Recently wind towers went in just east of the Gorge Scenic Area boundary along Hwy. 97 as it winds up out of the Gorge going to Goldendale. If you doubt that wind towers impact the landscape, drive that road. You may like them or not, but they are now the first thing you notice, not the land. In fact, their movement is so hypnotic that I have trouble watching the road. The Gorge Management Plan that was created to carry out the National Scenic Area Act lists "key viewing areas" in the Gorge that deserve special protection, and the Management Plan gives clear standards for anything built that can be seen from the key viewing areas. The proposed wind towers will be just outside the boundary of "General Management Area (GMA)" coniferous forest land. I enclose the relevant Management Plan pages (2007 revision) that govern building on that category of land if it is visible from a "key viewing area." Some of these are: "Each development shall be visually subordinate to its setting as seen from key viewing areas." (p.I-I-7) "The silhouette of new buildings shall remain below the skyline of a bluff, cliff, or ridge as seen from key viewing areas." (p.I-I-S) "Colors of structures on sites visible from key viewing areas shall be dark earth-tones found at the specific site or in the surrounding landscape." (1-1-9) "The exterior of buildings on lands seen from key viewing areas shall be composed of non-reflective materials or materials with low reflectivity…" (1-1-9) "Exterior lighting shall be directed downward and sited, hooded, and shielded such that it is not highly visible from key viewing areas." (1-1-10) "Structure height small remain below the forest canopy level." (1-1-17) These towers will be visible from several "key viewing areas." Two of these key viewing areas are I-84, the freeway on the OR side, and the Cook-Underwood Rd. in WA. I have put those on the enclosed map as dots. Again, the towers will not be within the Scenic Area boundary, so the Scenic Area rules do not apply directly. On the other hand, the Scenic Area guidelines for building (see above) give clear standards for what "adversely affects" the Columbia Gorge. I have heard that the towers closest to the Scenic Area boundary will be only 20 ft. away from it, but let us say it is 200 ft. I have also heard that the towers area taller than 400 ft, but let us say they are 400 ft, including the blade. By the map enclosed, I find that the Cook-Underwood Rd. simulation viewpoint in the URS is about 1 3/8 miles from the*

closest tower. Let us say that tower is 200 ft out of the Scenic Area, and 400 ft. tall. A little math (enclosed) shows that this tower is the visual equivalent of a 389 foot tower built just on the boundary, as seen from the Cook Underwood Rd. Looking at the standards for building within the Scenic Area, it is clear that a 389 ft tower built just inside the boundary would violate every building guideline listed - it would be on the ridge against the sky, far above the trees, shiny white, with a red flashing light at night. In addition, it would be moving, and the human eye and brain instinctively focus on movement. (I taught perception in college, and that was one of the principles.) This tower would be about the furthest thing from "visually subordinate" that could be imagined. It would dominate the landscape. These building guidelines are in the Management Plan to prevent structures from having an adverse impact on the Gorge, and can therefore be taken as criterion for when something would have an adverse impact. [LTR 262, CMT 1]

Response: The Columbia River Gorge National Scenic Area Act, the National Scenic Area it created, and the Management Plan for this Area are discussed in Section 4.11 of the EIS. As discussed in Section 4.11 and acknowledged by the commenter, the National Scenic Area Act expressly does not establish protective perimeters or buffer zones around the National Scenic Area. The Management Plan for the National Scenic Area reflects this limitation. Potential visual impacts of the proposed Project from various vantage points, including from within the National Scenic Area, are discussed in Section 3.9 of the EIS.

Comment: *In Oregon the Facilities Siting Council has written guidelines for siting energy facilities. (Division 22: General Standards for siting Non-Nuclear Energy Facilities) Two of these are: (345-022-0040) Protected Areas I) …the Council shall not issue a site certificate for a proposed facility located in the areas listed below. To issue a site certificate for a proposed facility located outside the areas listed below, the Council must find that, taking into account mitigation, the design, construction and operation of the facility are not likely to result in significant adverse impact to the areas listed below. (The Columbia Gorge National Scenic Area is a listed area.) (345-022-0080) Scenic and Aesthetic Values 1) The Council must find that the design, construction, operation and retirement of the facility, taking into account mitigation, are not likely to result in significant adverse impact to scenic and aesthetic values identified as significant or important in applicable federal land management plans or in local land use plans in the analysis area described in the project order. A proposed wind farm on the OR side of the Gorge on Sevenmile Hill also would have had towers next to the Scenic Area boundary and visible from many key viewing areas. The question was, is seeing wind towers an "adverse impact?" Given the standards for building structures visible from key viewing areas within the Scenic Area, and the fact that wind towers violate all those standards, there is an objective way of saying that seeing towers would be an adverse impact. I do not know if the WA facilities siting authority has standards, but it should. Personally, I think that in certain cases it might be OK to see wind towers, and the standard could be quantified. I remember that in a previous version of the management plan, or in Wasco County's ordinances, no house visible from Key Viewing Areas could be built more than 35 ft. high. On my calculations sheet I have figured how far a 400 ft tower would have to be from the Cook-Underwood Rd. to be the visual equivalent of a structure 35 ft. tall at the Scenic Area boundary, 1 3/8 miles from Cook-Underwood. It would have to be 15.7 miles from the Cook-Underwood Rd. Maybe a standard could be make whereby*

any wind towers, rather than being totally invisible, would have to be equivalent to allowable heights of structures within the Scenic Area. This would mean nothing could be built really close to the boundary. I hope that the WA council, like OR, will take into account large scenic values, especially when siting facilities near federally or state recognized preserved areas. I hope also that siting facilities of huge towers right on the boundary and very visible from a National Scenic Area will be rejected. I am for wind power, and find most of the wheat field siting satisfactory. But we do not need to put wind towers everywhere, just as we did not need to dam every river. Let us not make the same mistake again. [see PDF page 5 - 20 for aforementioned calculations and attached references] [LTR 262, CMT 1]

Response: The guidelines of the Oregon EFSC are noted. These guidelines are not applicable to the proposed Project, which is proposed to be located in Washington State. Related Washington EFSEC guidelines, however, can be found in WAC 463-60-362. Nonetheless, potential impacts of the proposed Project from views within the National Scenic Area have been evaluated and are discussed in Section 3.9, Visual Resources of the EIS.

Comment: *I am writing about the DEIS for the Whistling Ridge Energy Project, proposed in Washington state, along the Skamania and Klickitat county lines. Please help us protect the Gorge for future generations. It is a national treasure. [LTR 265, CMT 1]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *As a resident of Clark County and as one who has been involved in the decisions regarding the Columbia River Gorge since before and after the Columbia River Gorge National Scenic Areas was established, I have a deep appreciation for the Gorge and a deep awareness of what it takes to operate a successful business in the Scenic Area and in the Pacific Northwest. My family and I enjoy visiting the Gorge frequently from our Vancouver home, and we are not interested in seeing the character of the Gorge destroyed or significantly altered. [LTR 269, CMT 1]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *The proposition that whatever can be seen from within the Scenic Area should be treated as if it were within its boundary is ludicrous. It is also outrageous. I can tell you personally that when the law was written that was never the intent. This is outrageous because a reduction in the capacity of SDS' wind farm will render the entire project untenable. Outrageous because prohibiting SDS from pursuing the highest and best use of its lands in ways fully compatible with timber production, is a blatant property rights taking. Outrageous because Whistling Ridge, with the jobs and tax revenue and local purchases it will engender, is a private economic stimulus for a community that urgently needs one. And finally, asserting a de facto expansion of the Scenic Area boundary is outrageous because it pours salt on the wound of*

decades of local residents' bitterness toward the original Act despite its dearly limited mandate; there never was, nor should be, a buffer around or extension of the CRGNSA boundary. [LTR 269, CMT 1]

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *My husband and I live in White Salmon, W A. We, like thousands of other families, have purchased homes in this area because of the "protected" beauty of the National Scenic Area (NSA). It should continue to be protected as a priceless asset to the NW and our country. It is time for our government to stop supporting any project that is politically expedient at the expense of the citizens. We are hopeful that reason will prevail and that the powers that be perform a careful and thorough analysis of every single possible negative impact to our local communities and environment by this project. [LTR 273, CMT 1]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *How could anyone have ever anticipated that when the NSA act was created by Congress that the most politically powerful family in the Gorge would many years later propose siting a huge industrial wind farm over 400 feet above a ridge immediately outside the boundary lines of the NSA and in plain view of their own White Salmon, Hood River, and Skamania County neighbors? [LTR 273, CMT 1]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *Also, a significant and large area of the Columbia Gorge National Scenic Area will have sightlines negatively affected if the project goes ahead. Therefore, I ask that the State of Washington deny the proposal. [LTR 280, CMT 3]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *Your approval of an industrial facility impacting, but not technically in the boundary of The Columbia Gorge National Scenic Area (NSA) would set a precedent that could open the flood gates for any development visible from the NSA but not technically within its boundaries, including, but not limited to Las Vegas style casino signs, Space Needle type establishments, and high rise developments on formerly forested ridges. You have the power and authority to prevent setting the precedent that the Columbia River Gorge is open to a gold rush of industrial development. [LTR 283, CMT 3]*

Response: It is unclear at this time whether approval of the proposed Project would set a precedent for siting other wind projects in the area. Since all projects are evaluated on a case-by-case basis, approval of this Project does not dictate that any other Project that may be proposed in the future would also be approved. In addition, most developers are aware of the challenges of attempting to site wind projects in this general area. For the Applicant, proposing a wind project in this area may make sense, but other wind project developers may have differing opinions. Nonetheless, because there are no current proposals for other wind projects in the area; such future development is considered too speculative at this time.

Comment: *We must be good stewards of this national scenic area, not its destroyers. [LTR 283, CMT 12]*

Response: Comment acknowledged.

Comment: *The construction of the proposed facility would entail unacceptable traffic and emergency response impacts for residents and visitors to the NSA, particularly to key viewing points in the Underwood area. [LTR 283, CMT 14]*

Response: Please see response to Comments LTR 64, CMT 1, and LTR 170, CMT 3 above, and LTR 318, CMT 12 below.

Comment: *Should the residents and visitors to the Columbia River Gorge National Scenic Area be subjected to the intrusion of the construction and presence of an industrial wind energy facility that statistically is likely to become owned by an out of state entity that sells its power out of state? [LTR 283, CMT 19]*

Response: Comment acknowledged.

Comment: *[In reference to Section 3.6.2.1, Impacts, Proposed Action; PDF pg. 192], "[d]iscourages" does not mean that people and agencies can't speak up when they don't want turbines littering the rural landscape. The NSA is a national treasure. It is also an economic boon to this area. Tourism contributes millions of dollars to the coffers of the counties located in the NSA. [LTR 286, CMT 62]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *The visual scenery that thousands of people come to enjoy, and those of us who live here enjoy it all the time, would be destroyed by horizon-topping wind turbines. This is too high a price to pay. Wind farms don't belong in forests and they don't belong on the boundaries of the NSA. [LTR 286, CMT 62]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *This project is proposed to sit on the boundary of the Columbia River Gorge National Scenic Area, and it is not clear why that location has been selected. The project would directly impact the beauty and appeal of the Lewis and Clark National Trail and the Columbia River Gorge Scenic Area - one of the treasures of Washington and Oregon heritage. [LTR 297, CMT 2]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. Surely there are plenty of places to site wind turbines so that they don't besmirch the wonderful vistas to/in/from the Columbia Gorge National Scenic Area. It's a scenic area; wind turbines are anything but scenic! [LTR 298, CMT 1]*

Response: Please see response to Comment LTR 134, CMT 1 above.

Comment: *Many, if not all, of the proposed turbines and the strobe lights thereon will be highly visible from the Cook Underwood Road Key Viewing Area, as well as from numerous points throughout the NSA. Issue: Is the proposed project legal under Title 22 of the Skamania County Code (Title 22)? [LTR 301, CMT 3]*

Response: As noted by the commenter, Title 22 of Skamania County Code (SCC) is discussed in Section 3.8.2 of the EIS. Title 22 specifies that its purpose is to carry out the provisions of the Scenic Area Management Plan, which (pursuant to the statute creating the Scenic Area) only applies to development within the Scenic Area. *See SCC 22.02.030*. Furthermore, when reading Title 22 of the SCC in combination with Title 21 of the SCC, it is very clear that only Title 21 is intended to apply to development outside of the Scenic Area, and that Title 22 is limited in its application to only development within the Scenic Area. *Compare SCC 21.16.010 with SCC 22.02.050*. In determining which title of the SCC to apply, the key factor thus is the location of the proposed development, not the location from which that development can be viewed. This distinction is reinforced by the review and approval provision of Title 22, which states "No building, structure or parcel of land shall be used, and no building or structure shall be hereafter erected, altered or enlarged, including those proposed by local, state or federal agencies, in that portion of the County lying within the Columbia River Gorge

National Scenic Area in any manner that is inconsistent with the provisions of this Title." *SCC 22.06.010*. Therefore, the fact that development outside of the Scenic Area may be seen from within the Scenic Area, even from locations defined as key viewing areas by Title 22, does not trigger the requirements of Title 22.

Comment: *The Oregon EFSEC provides that before issuing a site certificate the Council must determine by a preponderance of evidence that there will be no significant adverse impacts to the scenic, aesthetic, recreational, and wildlife resources of the Columbia River Gorge. OAR 345-022-0000(1)(a). Title 22 includes numerous provisions demonstrating that Skamania County, like Oregon, has protected the NSA Key Viewing Areas within Skamania County from scenic intrusions originating from both inside and outside the Scenic Area. Conclusion: Title 22 protects the "Viewshed" of Cook Underwood Road, and requires that any development which can be seen from Cook Underwood Road be "Visually Subordinate" to its setting as seen from Cook Underwood Road. [LTR 301, CMT 4]*

Response: Please see response to Comments LTR 262, CMT 1 and LTR 301, CMT 3 above.

Comment: *Section 3.8.2 of the DEIS briefly mentions Title 22 and incorrectly assumes that, because the Whistling Ridge project is located outside the NSA boundaries, Title 22 is not applicable. Section 22.02.050 of Title 22 provides, in pertinent part, that "This title applies to all lands in that portion of Skamania County lying within the Columbia River Gorge National Scenic Area ... and to no other lands within the county ..." The Cook Underwood Road Key Viewing Area lies within the National Scenic Area. Thus, Title 22 applies to the Cook Underwood Road Key Viewing Area. [LTR 301, CMT 6]*

Response: Please see response to Comment LTR 301, CMT 3 above.

Comment: *Section O provides that "The silhouette of new buildings shall remain below the skyline of a bluff, cliff or ridge as seen from key viewing areas." Clearly, the proposed Whistling Ridge project cannot pass these tests. The project's proponents are likely to point to the language in Section 22.02.050 of Title 22 stating that "This title applies to all lands in that portion of Skamania County lying within the Columbia River Gorge National Scenic Area ... and to no other lands within the county ..." and argue that, based on the italicized language, Title 22 is not applicable to the proposed project because it lies (in some cases approximately just 60+/- feet) outside the NSA. While it may be true that the project lies outside the NSA, it is undeniable that Cook Underwood Road does lie within of the NSA. It is also undeniable that some or all of the turbines and their strobe lights will be highly visible from Cook Underwood Road and therefore lie within the view shed of Cook Underwood Road. [LTR 301, CMT 9]*

Response: Please see response to Comment LTR 301, CMT 3 above.

Comment: *Title 22 includes numerous provisions demonstrating that Skamania County, like Oregon, has protected the NSA Key Viewing Areas within Skamania County from scenic intrusions originating from both inside and outside the Scenic Area. The proposed whistling ridge energy project is illegal under title 22, because it cannot pass the test of visual subordination. [LTR 301, CMT 13]*

Response: Please see response to Comments LTR 262, CMT 1 and LTR 301, CMT 3 above.

Comment: *Lastly, the Columbia Gorge Scenic area includes the skyline, at least the quality of the scenic area does. This project will have a horrible impact on the scenic beauty of this area. There is no place like it in our country. [LTR 305, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *To those charged with making a decision on the proposed Wind turbine project on Whistling Ridge: We support wind energy projects, however: Not near houses; Not where they are visible to the National Scenic area. Not in the middle of a forest where animals become endangered. Perhaps the Broughton Lumber Company would be able to trade the proposed site for one further removed from houses and the Gorge. [LTR 310, CMT 1]*

Response: Please see response to Comment LTR 12, CMT 6 above.

Comment: *Whistling Ridge Energy Project would create an essentially permanent, potentially radical, change in the scenic features which motivated the establishment of the Columbia River Gorge National Scenic Area (CRGNSA), recognized nationally and internationally to contain one of the great landscapes of the world. [LTR 315, CMT 2]*

Response: Please see response to Comment LTR 57, CMT 4 above.

Comment: *Regulations and boundaries do not preclude development of this type of project, however, is the vision of the National Scenic Area 400ft tall structures? [LTR 317, CMT 28]*

Response: Please see response to Comment LTR 57, CMT 2 above.

Comment: *Oregon pulled a project on 7 mile hill due to infringing on the National Scenic Area (even though it was outside boundaries). I hope that Washington will reciprocate the effort to protect the integrity of our national treasure. [LTR 317, CMT 45]*

Response: Comment acknowledged.

Comment: *This project is situated on top of the Columbia River Gorge National Scenic Area so our decision will have nation and international ramifications. [LTR 317, CMT 62]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *I do not agree that homeowners in the NSA have been asked to camouflage their houses and now you want to string turbines and red lights out. Not fair. [LTR 317, CMT 88]*

Response: Comment acknowledged.

Comment: *Activities/uses inconsistent with management directives for NSA should not preclude uses up to the boundaries of the Gorge. The intent of Congress is clear on this. [LTR 318, CMT 1]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *I object to the contention that proximity to the National Scenic Area should prove a barrier to this project. The project is located outside of the scenic area boundaries. The intent of congress was to enhance economic development and project the environment within the Columbia Gorge...The intent of congress was not to restrict development within the current boundary. [LTR 318, CMT 26]*

Response: Please see response to Comment LTR 28, CMT 6 above.

Comment: *The Gorge was set aside by Congress as a special place to preserve. If this proposal is permitted the iconic landscapes the Scenic Act protects will be lost. [LTR 318, CMT 52]*

Response: Please see response to Comment LTR 139, CMT 22 above.

Comment: *I share the same concerns as other regarding the impact to National Scenic Area. [LTR 318, CMT 56]*

Response: Please see response to Comment LTR 57, CMT 4 above.

G.5 DISTRIBUTION LIST

Comment: *I am writing to comment on the Whistling Ridge Energy Project Draft Environmental Impact Statement (DEIS). Please include my comments in the public record, and include my name on the mailing list for all future notices and decisions. [LTR 36, CMT 1]*

Response: All comments submitted to the lead agencies for this Project have been included in the Project's administrative record. The Project mailing and distribution list also has been updated to include the requested individuals.

Comment: *I am writing to comment on the Whistling Ridge Energy Project Draft Environmental Impact Statement (DEIS). Please include my comments in the public record, and include my name on the mailing list for all future notices and decisions. [LTR 161, CMT 1]*

Response: Please see response to Comment LTR 36, CMT 1 above.

Comment: *Please add the following people to the federal agency distribution list for this project: Dan Wiley, Chief of Resources Stewardship, Lewis and Clark National Historic Trail, 601 Riverfront Drive Omaha, NE, 68102, (402) 661-1830, Dan_Wiley@nps.gov; Lee Kreutzer, National Trails System, National Park Service, 324 S. State, Suite 200, Salt Lake City, UT, 84111, (801) 741-1012, ext. 118, Lee_Kreutzer@nps.gov. [LTR 164, CMT 3]*

Response: Please see response to Comment LTR 36, CMT 1 above.

G.6 LIST OF PREPARERS

Comment: *The Applicant and its Consultants Appear to Have Played an Improper Role in the Drafting of the DEIS, Leading to a Biased and Result-Oriented Document. The agencies' ability to prepare an EIS that would provide a balanced and objective analysis, leading to a decision that addresses the interests of the general community and not just the Applicant, have become further compromised by an apparent decision to allow the same consultants who*

prepared the application on behalf of the Applicant to also prepare analytical content in the DEIS. [Footnote: These consultants include employees of URS Corporation, West Inc., and others. Although several consultants who prepared the application also are listed in section 6 of the DEIS as "preparers" of the DEIS, none of them noted their role in preparing the application on their disclosure statements in Appendix F.] [LTR 179, CMT 29]

Response: Neither SEPA nor NEPA require that an EIS disclose a consultant's past work in preparing a permit or other application for a proposed Project. Nonetheless, for each consultant who worked on the site certificate application and also contributed to preparation of the EIS, a notation has been made in Section 6 of the EIS.

G.7 GENERAL COMMENTS

Comment: *Why the big push on no wind mills in Underwood? Diversity can be defined in many different ways. Diversity is a commitment to recognizing and appreciating the variety of characteristics that make individuals unique in an atmosphere that promotes and celebrates individual and collective achievement! Examples of these characteristics are: age; cognitive style; culture; disability (mental, learning, physical); economic background; education; ethnicity; gender identity; geographic background; language(s) spoken; marital/partnered status; physical appearance; political affiliation; race; religious beliefs; sexual orientation. There is another diversity just as powerful and that is the natural diversity of Mother Nature in the form of Wind power, or wind energy, it is a renewable resource; it is from the sun. The intensity of solar radiation is diverse across the globe. Some areas receive intense amounts of sunlight, while others receive much less. The result is a temperature gradient; a gradient which is mediated by the flow of air to and from areas of dissimilar temperatures and pressure systems in our atmosphere. Uneven heating of the earth's atmosphere, in addition to irregularities on the earth's surface and the rotation of the earth create wind. Terrain, water bodies, and vegetation then shape flow patterns.... in other words Diversity!!! Although, the wind is not constant, and may blow at a variable pace, it can become difficult to rely upon this source of power on the quieter days, when there's no breeze. Not much different than we human beings, we are not constant, we may blow at anytime, we can be difficult to be relied upon, and we do have quieter days. [LTR 1, CMT 1]*

Response: Comment acknowledged.

Comment: *The wind is free and with modern technology it can be captured efficiently. [LTR 1, CMT 3]*

Response: Comment acknowledged.

Comment: *Wind turbines have a role to play in both the developed and third world. [LTR 1, CMT 8]*

Response: Comment acknowledged.

Comment: *So what does all this mean? Here is what I have gotten from all the rhetoric. We as humans are as diverse and fickle in our opinions as mother nature is in hers. On the one hand you have a Company who has agriculture and forestry down to a science. On the other hand you have special interest groups arriving in the area concerned about environment; Mother Nature, rivers, and views and they too have agriculture and the fruits of their labors down to a science. So with these two groups who both profess to be "Green" and stand for all things "Green" why are they bickering? ~ Money? The one group thinks the windmills will detract from the value of their propet1y, destroy the view, ruin business, and will apparently stop at nothing to convince you of their opinion, while the other group thinks wind power is an alternative to energy besides fossil fuels (I believe in this). They have done their convincing with truth, facts, and openness to convince you of their opinion. A quote from J. Ollie Edmunds: "This country was not built by men who relied on somebody else to take care of them. It was built by men who relied on themselves, who dared to shape their own lives, who had enough courage to blaze new trails with enough confidence in themselves to take the necessary risks. This self-reliance is our American legacy. It is the secret of that something which stamped Americans as Americans." In conclusion I believe that company's like SDS are made up of men and women who shape their own lives, have good moral character, rely on themselves, and blaze new trails toward making our community and our environment a better place to live. They have proved themselves as good stewards of our land for the last 60 years. More so than any special interest group to date!!! So, please let us move forward and get on with building the windmills at whistling ridge. [LTR 1, CMT 11]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 2, CMT 1]*

Response: Comment acknowledged.

Comment: *I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 2, CMT 4]*

Response: Comment acknowledged.

Comment: *EFSEC should recommend that Governor Gregoire accept this project. I support renewable energy, anything to replace the coal exhaust blowing down the gorge! We know we can't have it all! [LTR 3, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing as a resident of the Columbia River Gorge and as a small business owner. Many fellow business owners depend on the natural beauty of the Columbia River Gorge for their livelihoods. It is also the reason many of us choose to live here. I am also writing as a strong supporter of green energy and having a PhD in environmental engineering, I understand the importance of eliminating carbon based energy. I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. [LTR 4, CMT 1]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 4, CMT 2]*

Response: Comment acknowledged.

Comment: *I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. There are plenty of areas outside the Columbia River Gorge National Scenic Area that are far more suitable for such a development. [LTR 4, CMT 5]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 5, CMT 1]*

Response: Comment acknowledged.

Comment: *I highly support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. There are plenty of areas outside the Columbia River Gorge National Scenic Area. There are other locations available. [LTR 5, CMT 4]*

Response: Comment acknowledged.

Comment: *The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 6, CMT 2]*

Response: Comment acknowledged.

Comment: *I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. There are plenty of areas outside the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 6, CMT 5]*

Response: Comment acknowledged.

Comment: *I join with Friends of the Columbia Gorge and its many supporters to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 9, CMT 1]*

Response: Comment acknowledged.

Comment: *I strongly support renewable energy, but I am opposed to wind energy development that would cause such significant negative impacts to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 9, CMT 4]*

Response: Comment acknowledged.

Comment: *Just to let you know that I am a resident of rural Klickitat County (just out of White Salmon) and support this project. [LTR 10, CMT 1]*

Response: Comment acknowledged.

Comment: *Now I'm a big fan of renewable energy, but something about this march of the turbines reminds me of what happened when The Dalles Dam was built and drowned Celilo Falls. We didn't appreciate what we lost at the time, and now it's unlikely we'll ever get the falls or the salmon back for decades to come, maybe never. [LTR 12, CMT 2]*

Response: Comment acknowledged.

Comment: *I strongly support renewable energy, but I am opposed to wind energy development that would cause such significant negative impacts to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 13, CMT 4]*

Response: Comment acknowledged.

Comment: *As resident of White Salmon for 60 years I can se no harm of any kind from this project. I have been all over this area many times and it is a perfect location for a wind farm. BPA main line runs through this property so no additional big lines needed. I fully support this project. SDS always goes a good job on all their projects. Please give them a big go ahead. [LTR 14, CMT 1]*

Response: Comment acknowledged.

Comment: *As residents of the area that will be able to see some of the turbines of this proposed project, we are in favor of it. We can't continue the practice of saying "Yes, we need it but not here". This will not get us where we need to be down the road. SDS is a good and responsible Company that cares. It is their land, they have the right to this project and will do it in an responsible manner. It is funny that some of the people who are against this project were the same ones that were cutting hiking trails on SDS property in this same general area-having no real respect for someone else's land. [LTR 15, CMT 1]*

Response: Comment acknowledged.

Comment: *As a small local business located in Bingen, WA - not far from the proposed location - we would like to offer our support for the approval of this project. The turbines are located outside the gorge scenic area, are environmentally acceptable and will provide needed energy for the region. SDS should be complemented for its concern to safeguard the local economy and the environment I believe people who are taking the 'not in my backyard' position are both selfish and short-sighted. [LTR 16, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 19, CMT 1]*

Response: Comment acknowledged.

Comment: *I was born and raised in Skamania County, Washington and my husband and I have lived in the Columbia River Gorge most of our adult lives. We love this area and can think of no place that we would rather live. We are not always thrilled with the constant winds we receive at our house but cannot change the fact that we live in a very windy location. It seems foolish not to harness this abundant energy and use it to our advantage. We ABSOLUTELY SUPPORT the Whistling Ridge Energy Project and applaud SDS Lumber for trying to bring clean energy to Skamania County. [LTR 20, CMT 1]*

Response: Comment acknowledged.

Comment: *To those conducting public hearings on The Whistling Ridge Energy Project: We are part of that silent majority who do not like to attend meetings where people argue and make us feel intimidated. We feel that our voice does need to be heard on this matter, it is very important to us. We support the Whistling Ridge Energy Project. [LTR 21, CMT 1]*

Response: Comment acknowledged.

Comment: *In our opinion, the people who are causing the obstacles in implementing this natural resource are the same people who have opposed most everything else that is proposed in the Gorge. They have personal agendas which are not for the good of the community but for their selfish interests. Wind Energy is a Good thing for the Gorge, a Good thing for the economy*

of the Gorge and a good, clean alternative that all the environmentalists have been insisting on. Let's move forward and let a Good thing happen. [LTR 21, CMT 4]

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 23, CMT 2]*

Response: Comment acknowledged.

Comment: *I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 23, CMT 5]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would be just what the environment needs. Wind energy is totally supported by me! EFSEC should recommend that Governor Gregoire support this project. I support renewable energy, wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 24, CMT 1]*

Response: Comment acknowledged.

Comment: *I strongly endorse the Whistling Ridge Wind Energy Project. The Project has gone through the EIS process and found no significant impacts to wildlife, the scenic value of the Columbia Gorge Corridor or to other resources. The Northwest is in desperate need of other power sources and we can't be reliant on hydro-power in the decades to come. I am appalled that many of the groups who are opposed to this project are the same people calling for removal of dams on the Snake River. Where will we get our power in the future. Many of our AFRC members have located cogeneration power plants on their sites as efforts to supplement needed clean power here in the Northwest and we strongly support this effort by SDS Lumber to provide more green energy. Please help bring some common sense to the process and support the Whistling Ridge Wind Energy Project. [LTR 25, CMT 1]*

Response: Comment acknowledged.

Comment: *We are writing because we will be out of area for the meetings in Underwood and Stevenson. We are against the proposed Whistling Ridge Project for these following reasons… [LTR 26, CMT 1]*

Response: Comment acknowledged.

Comment: *We demand that a hard, long look be given the decision to sanction this project. SAY NO!!! [LTR 26, CMT 7]*

Response: Comment acknowledged.

Comment: *I disagree with the slanted view of the Friends of the Gorge regarding the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. This project has been studied for seven years and found to pose no wildlife impact and it is located entirely OUTSIDE the Gorge Scenic Area. I respectfully disagree with Friends of the Gorge's position and ask that you approve Whistling Ridge. [LTR 27, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would not have negative impacts to the environment. The project is located on commercial timberland that have been subject to decades of intensive harvesting operations under a sustain yield forestry program regulated by the Washington Department of Natural Resources. [LTR 28, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. EFSEC should recommend that Governor Gregoire allow this project. This proposal is on a ridgeline because that is where it is WINDY. The project would disturb a small area of SOMEONE'S PRIVATE PROPERTY. I support renewable energy. [LTR 29, CMT 1]*

Response: Comment acknowledged.

Comment: *With the mess in the Gulf and President Obama's speech last night, we have to support non-fossil clean renewable sustainable energy like the Whistling Ridge wind project. [LTR 31, CMT 4]*

Response: Comment acknowledged.

Comment: *I am completely opposed to any wind turbines that can be seen from the scenic gorge area. I am specifically opposed to the sds wind farms proposed. [LTR 32, CMT 1]*

Response: Comment acknowledged.

Comment: *We are writing in opposition to the Whistling Ridge Wind Energy Project. We live in Husum, WA which is in the impact area of the project. We oppose the project for a number of reasons… [LTR 33, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause NO significant negative impacts to sensitive wildlife and plant habitat and would not degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire support this project. [LTR 34, CMT 1]*

Response: Comment acknowledged.

Comment: *I support renewable energy and I support the Whistling Ridge development adjacent to the Columbia River Gorge National Scenic Area. I support Whistling Ridge and wind energy in the gorge. [LTR 34, CMT 4]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. I support the proposed project because it will provide alternative energy so necessary should we hope to one day not have to rely on fossil fuels for our power. The EFSEC should recommend that Governor Gregoire approve this project. [LTR 35, CMT 1]*

Response: Comment acknowledged.

Comment: *In other words OKIMBY OK in my backyard I support renewable energy and I support this wind energy development. [LTR 35, CMT 5]*

Response: Comment acknowledged.

Comment: *I have lived in the area of this proposed project for 18 years and have followed wind energy developments closely for most of that time, both here in the Columbia Gorge and nationally. I serve as an environmental representative on the technical advisory committees of three wind power projects in the area. I have participated in field visits to wind projects all over the West. I have a degree in biology and have read a great deal of the scientific literature pertaining to wildlife-turbine interactions. As someone who is well informed about both wind power and ecology, I have a number of concerns regarding the DEIS prepared for the Whistling Ridge Energy Project. [LTR 36, CMT 2]*

Response: Comment acknowledged.

Comment: *I, Robert P. Duncan and my wife Jacqueline B. Duncan are in favor of the wind farm in Skamania county. [LTR 37, CMT 1]*

Response: Comment acknowledged.

Comment: *I am a resident of the community of Mill A in Skamania County, Washington - having moved to this community in 1976 and lived here since then (except for 5 years while teaching at Pepperdine University in California -- now retired from teaching). My home is located just west of the proposed Whistling Ridge Energy Project. [LTR 38, CMT 1]*

Response: Comment acknowledged.

Comment: *Wind-generators are an excellent method of energy production and will do much to help our country decrease our dependence on foreign oil. They are clean, efficient, and are even better than "renewable" since they do not consume anything (no wood, coal, etc.) I strongly support the Whistling Ridge Energy Project, and I encourage EFSEC and BPA to approve it. [LTR 38, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause NO significant negative impacts to sensitive wildlife and plant habitat and would not degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire ACCEPT this project. [LTR 40, CMT 1]*

Response: Comment acknowledged.

Comment: *I want to take a few minutes to register my support for the subject project as proposed by SDS Lumber Company. Although I occasionally drive-by SDS mill in Bingen, I am not and have never been connected with SDS in any way whatsoever: not as an employee, contractor, supplier, by marriage, friendship or in any other fashion. Neither do I stand to gain or profit in any way by SDS's development of the proposed wind energy project. There can be no conceivable, legitimate reason for this project not to be given your support and authorization to move forward as soon as possible. I very much hope that final approval will be forthcoming. [LTR 41, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to express my support of the Whistling Ridge Energy Project plans. I am a long-time resident of Skamania County and have watched as residents struggled through economic hard times for many, many years, whether related to timber owls, or tourism. Other Gorge counties are benefiting from the Gorge's abundant wind supply and, as an opponent of nuclear power and also a salmon recovery advocate, I very much favor the clean energy wind farms provide. [LTR 43, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing in support of the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project WILL NOT cause negative impacts to sensitive wildlife. As proposed, this project will not degrade the scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire APPROVE this project. [LTR 44, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The DEIS is*

complete, comprehensive and no further analysis is required. I support the Whistling Ridge Energy project. [LTR 45, CMT 1]

Response: Comment acknowledged.

Comment: *I have not had an opportunity to carefully review this proposal, but due to the short public comment period, I want to go on record and express that my wife Jodi and I oppose this project and urge you to recommend denial to Governor Gregoire because Whistling Ridge is environmentally irresponsible and would harm the Columbia River Gorge. Thank you for taking our input into consideration. [LTR 46, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. Studies have shown that the proposed project would have no negative impact on wildlife and plant habitat and would not affect the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire approve this project. I support renewable energy, and reducing our reliance on foreign oil, particularly given the current situation in the Gulf of Mexico. This project is an important step in the right direction for the state of Washington and for the Gorge's energy independence. [LTR 47, CMT 1]*

Response: Comment acknowledged.

Comment: *I support the Whistling Ridge Energy Project. I believe America needs to move ahead with clean energy solutions which don't depend on oil. I hope you will also support this project. [LTR 48, CMT 1]*

Response: Comment acknowledged.

Comment: *Huge profits (surplus electricity sold back to the electricity brokers for resale to CALIFORNIA/Seattle) for the Stevenson Empire. The only long-term benefit here is decades of easy money for one entity: Stevenson Empire. Oops, almost forgot the other beneficiaries: electricity brokers who sell to California and Washington's big municipal users. I am tired of 800# gorillas, such as the Stevensons, throwing their weight around so indiscriminately around here to the detriment of average and below-average locals. Don't the Stevensons have enough wealth already? How much is enough for them? Somebody please make them stop! Talk is cheap. If the Stevensons truly cared about the local community, decades ago they would have spent serious money on a construction solution (such as an overpass for the Bingen lumber mill)*

to the audibly and psychologically disturbing train horn and noise which plagues Bingen and Hood River residents several times per day and night! [LTR 49, CMT 5]

Response: Comment acknowledged.

Comment: *The choices are limited: Proceed with the project and other similar wind farms. Increase the energy production from oil, gas, nuclear, and coal and accept the ensuing environmental devastation. Do without the energy. One wonders how many of the NIMBY opponents are willing to forego cooling and heating their homes to avoid seeing the windmills in their distant view! It seems that a mild aesthetic impact (although I personally find windmills aesthetically pleasing) and the loss of some bird population is a far lesser evil than pollution of air and water. The loss of life and treasure associated with the various wars we engage in to protect the supplies of fossil fuels is an additional matter of concern. [LTR 50, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing in opposition to the proposal by Whistling Ridge Energy LLC to construct up to 50 turbines along 2,000 foot-tall ridgeline on the boundary of the Columbia River Gorge National Scenic Area near White Salmon Washington. [LTR 51, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project will not cause significant negative impacts to sensitive wildlife and plant habitat and will not degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire approve this project. [LTR 52, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would substantially improve the economic conditions in these two counties without causing negative impacts to sensitive wildlife and plant habitat or impacting the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire approve this project. [LTR 53, CMT 1]*

Response: Comment acknowledged.

Comment: *I support renewable energy, and encourage EFSEC to recommend that Governor Gregoire approve this project. [LTR 53, CMT 4]*

Response: Comment acknowledged.

Comment: *I would like to express my support for the Whistling Ridge Energy Project. Solar, wind, and bio-fuels are our energy future. We NEED to start thinking clean renewable energy instead of the old model of "polluting", "limited resource", "harmful to the environment" types of energy. I know the Gorge is a special place and needs to be preserved but I see wind energy doing just that. Windmills are far less harmful than the polluting coalfired Boardman plant that spews "dangerous pollutants" into our air and water that ultimately affects the quality of life here in the Gorge. [LTR 54, CMT 1]*

Response: Comment acknowledged.

Comment: *For these reasons we hope you do not allow, the Whistling Ridge Project as there are plenty of other locations suitable for winds farms in eastern Washington and Oregon. [LTR 55, CMT 3]*

Response: Comment acknowledged.

Comment: *Let me be known that I am strongly opposed to the wind farm being proposed for the Underwood Bluff in Washington. [LTR 56, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 57, CMT 1]*

Response: Comment acknowledged.

Comment: *I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 57, CMT 5]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. EFSEC should recommend that Governor Gregoire approve this project. [LTR 58, CMT 1]*

Response: Comment acknowledged.

Comment: *Mr. Chairman and Members of the Council, I commend you and BPA for commissioning an excellent environmental document, which provides a rock solid foundation on which to inform your ultimate action on the Whistling Ridge Wind Energy Project. [LTR 61, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing this letter to you to tell you of my support of the proposed Whistling Ridge Energy project. I have no business or personal connections to anyone connected to this project. I have no financial loss or gain from this project. But I do use electricity and I support any alternative energy production. Even our President last night said we must become less dependent on current technology. I believe this project is a benefit to the county. Incidentally I live 15 miles distant from the proposed project. [LTR 65, CMT 1]*

Response: Comment acknowledged.

Comment: *I support the Whistling Ridge wind project. [LTR 71, CMT 1]*

Response: Comment acknowledged.

Comment: *I am in favor of this wind project. Environmental Impact Statement found no significant negative Impacts that would preclude the development of this wind project. [LTR 72, CMT 1]*

Response: Comment acknowledged.

Comment: *Not fauna, flora nor scenic impacts. [LTR 72, CMT 2]*

Response: Comment acknowledged.

Comment: *I am opposed to this project as it is written. It is hard for me to believe that the parties responsible for drafting this DEIS can be objective and impartial for this proposal. EFSEC is an agency known for siting energy facilities and the BPA is an agency which deals with power generation and distribution of that power. Nothing personal, it is your duty to be objective. [LTR 74, CMT 1]*

Response: Comment acknowledged.

Comment: *Why does Portland get to decide what goes in the gorge because it ruins their view, when we see only lights across the river? And why should windows in a tunnel come before much needed jobs? This was a plan up the river. If there is another meeting it should be people of Skamania County people only as they are the ones impacted. [LTR 75, CMT 5]*

Response: Comment acknowledged.

Comment: *The horrifying, large-scale oil contamination event in the Gulf has increased the pressure to develop viable, alternative sources of energy. Wind-generated power, popularly advertised as being "clean" or "green," is, however, not without drawbacks. The in-toto, as well as individual problems associated with wind turbines and large turbine arrays may, under certain circumstances and at particular locations, outweigh their benefits. Regardless of opinion regarding this proposed project, there must be unbiased, objective documents that permit the public access to information and to guide decision-makers to their tasks as well. The inattention to detail, lack of thoroughness, and to the appearance of fairness is very discouraging to see, especially in print. This EIS was created, with time to spare, compared to the time we have been allotted to review it and to prepare comment. [LTR 76, CMT 1]*

Response: Comment acknowledged.

Comment: *Skamania County needs the Whistling Ridge Energy Project to be a success - and SDS can make it happen. Projects such as this, which are environmentally friendly, economically friendly and community friendly spur similar ideas. They almost force existing and new companies to reconsider how they plan to operate in communities that need growth – but hope to maintain the hometown, rural area environment. As the council continues with the hearing tonight - I would ask that you consider who is sharing their comments for and against this project. Those for the project - I suspect they live here, and have for a long time. I suspect*

that they have seen what Skamania County once was, what it could be - and how this project will be of great value to our home. [LTR 78, CMT 5]

Response: Comment acknowledged.

Comment: *We are residents of Skamania County, Washington and would like to provide our support for the proposed Whistling Ridge wind power site. Alternative sources of energy are a vital part of our future, and fit with National goals of implementing programs to achieve energy sources. We commend SDS for taking the initiative to research and implement this energy source west of the Cascades. The analysis of mitigation methods to achieve a safe and effective energy source such as wind power have already been implemented in other areas of Washington State, as well as throughout the world. We are hoping to see more of these projects implemented in the future. [LTR 80, CMT 1]*

Response: Comment acknowledged.

Comment: *First and foremost, I wanted to be brief and not waste your time. I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would have significant positive economic impacts without effecting wildlife and plant habitat. In my opinion, this project would NOT affect any scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire approve this project. [LTR 81, CMT 1]*

Response: Comment acknowledged.

Comment: *I was born, raised and currently live next to this proposed project site. I have found that many people form an opinion based on untrue facts. I have read and reviewed the draft environmental impact statement, and in doing so have evaluated all the pros and cons of this project like any project you have people on both sides and sometimes in the middle. I feel that it is obvious that the pros way outweigh the cons. This project is a must; and quite frankly a need here in our community! [LTR 81, CMT 2]*

Response: Comment acknowledged.

Comment: *I am in full support for renewable energy. We need to understand for our future to be successful, this project must go through. SDS Lumber Company has worked hard and has given so much to this community. Most of the people that are opposing this do not live in this area and do not really understand what our needs are right now and what they will be in the future. Thank you for your time. [LTR 81, CMT 4]*

Response: Comment acknowledged.

Comment: *We believe the Whistling Ridge Energy Project will do nothing more than improve this beautiful county we call home. Thank you in advance for taking the time to read this email and consider our opinion for this project. [LTR 86, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 87, CMT 1]*

Response: Comment acknowledged.

Comment: *I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 87, CMT 4]*

Response: Comment acknowledged.

Comment: *I cannot believe in this age of BP that we are questioning any environmentally friendly wind project. This, just like all such projects, should be expedited as fast as possible. [LTR 88, CMT 1]*

Response: Comment acknowledged.

Comment: *It would be in every ones best interest to be in FAVOR of the excellent energy creation project proposed for Skamania County. Whistling Ridge will benefit the entire region with clean affordable electric power for generations. This is exactly what we need here. I live in district 3 in Skamania County where this project is proposed and support it wholeheartedly. I would encourage both of your fine organizations to approve Whistling Ridge as soon as is reasonably possible. [LTR 89, CMT 1]*

Response: Comment acknowledged.

Comment: *I am all for the Whistling Ridge energy project. I think it's a good idea to put this wind that we have in good use. The gorge and where I live in Murdock, we get a lot of wind so why not make good use of it and benefit people by supplying jobs and energy. I like the name Whistling Ridge because the wind does whistle here at times. [LTR 90, CMT 1]*

Response: Comment acknowledged.

Comment: *This is the Columbia River Gorge Natural Scenic Area, you don't put wind turbines in the Grand Canyon, and you don't put them here. I say why don't you put these turbines on your SDS mill site right on the Columbia River in Binger there is plenty of wind there. These wind turbines belong nowhere near the Columbia River Gorge National Scenic Area, this is not the right place. [LTR 91, CMT 2]*

Response: Comment acknowledged.

Comment: *As for the right project, it really saddens me that the SDS Lumber Co. can stroll in and clear cut the entire side of Underwood Mountain or spend thousands of dollars mailing everyone a slick brochure on how much this area needs this project. We don't need it, you need it. Myself as a landowner in Underwood can't cut a tree down or paint my house a different color without jumping through the gorge Commission hoops. [LTR 91, CMT 3]*

Response: Comment acknowledged.

Comment: *I live in the Gorge. I am opposed to the proposed site of Whistling Ridge Energy Project. [LTR 92, CMT 1]*

Response: Comment acknowledged.

Comment: *The brochure photo from Hwy 84 is misleading. What it does not show is Mt. Adams, East of the site. [LTR 92, CMT 4]*

Response: Comment acknowledged.

Comment: *Klickitat County appreciates the opportunity to provide this comment on the joint Draft EIS for the Whistling Ridge Energy Project. Whistling Ridge is proposed for location in Skamania County, adjacent to Klickitat County. Klickitat has permitted several wind projects over the past decade, so has acquired experience with evaluating and mitigating project impacts,*

as well as an appreciation for the socio-economic benefits wind development can bring to a rural community. It is within this context that the County offers these comments and support for Whistling Ridge. [LTR 93, CMT 1]

Response: Comment acknowledged.

Comment: *Environmental Review for Whistling Ridge. This is EFSEC's fourth wind development project, and the state has been addressing wind project siting now for a decade. BPA has been addressing wind project siting for nearly two decades, if not longer. EFSEC's and BPA's environmental review processes are comprehensive. Skamania County has reviewed Whistling Ridge for consistency with its land use plans and zoning requirements, as documented through Resolution 2009-54. Klickitat County respects this determination. [LTR 93, CMT 3]*

Response: Comment acknowledged.

Comment: *Conclusion Klickitat County appreciates your consideration of these comments. EFSEC and BPA are thoroughly reviewing the Project, which, if constructed, will be an economic and environmental asset to the region and state. [LTR 93, CMT 5]*

Response: Comment acknowledged.

Comment: *Renewable Northwest Project (RNP) provides the following comments with respect to the environmental review conducted for the Whistling Ridge Energy Project pending before the Energy Facility Site Evaluation Council (EFSEC) and currently undergoing a comment process for the joint BPA and EFSEC Draft Environmental Impact Statement (DEIS). [LTR 95, CMT 1]*

Response: Comment acknowledged.

Comment: *We are writing to express our support for acceptance of environmental information contained in the DEIS, and to commend EFSEC, BPA and Whistling Ridge Energy for their compliance with both the spirit and the letter of applicable siting standards and process, including Washington's Wind Power Guidelines. RNP was actively involved in the negotiation and development of the 2003 Washington Wind Power Guidelines, as well as the revised 2009 Washington Wind Power Guidelines. We were also active participants in the 2008 Oregon-Columbia Plateau Ecoregion Wind Energy Siting and Permitting Guidelines. [LTR 95, CMT 6]*

Response: Comment acknowledged.

Comment: *This survey work is beyond what has typically been done in other Northwest wind power projects, and is consistent with the guideline's theme of siting the project in a manner that will avoid, minimize and mitigate impacts. We applaud the Project sponsors for the open and transparent manner in which they conducted their research, shared their findings, and engaged the interested public in a series of discussions, field trips, and constructive dialogue. We appreciate the sensitivities associated with a project proposed for location between DNR land historically associated with Northern Spotted Owls and the Columbia Gorge National Scenic Area. [LTR 95, CMT 8]*

Response: Comment acknowledged.

Comment: *In sum, RNP believes that the Whistling Ridge Energy Project has demonstrated the commitment to meaningful engagement with wildlife agencies, to rigorous environmental review, and to constructive community dialogue that we believe is consistent with the Washington Wind Power Guidelines, and that characterizes responsible wind energy development in the Northwest's commercial forestlands. We appreciate the opportunity to provide this comment. [LTR 95, CMT 10]*

Response: Comment acknowledged.

Comment: *Like many people giving open testimony, I am all FOR the project. [LTR 96, CMT 1]*

Response: Comment acknowledged.

Comment: *There are those who want to stop all progress, just for the sake of having no change. Then there are the Not In My Back Yard people. And, from the worldwide environmental perspective, wind power is much friendlier than transporting oil halfway around the world in ships. The location of this turbine project seems to be the primary question. Whistling Ridge is where the wind is abundantly available, locally. The ridge's name is derived from the fact that the wind literally whistles through the trees when it blows. Trading the whistling noise for the soft slap of turbine blades, and then only when the wind blows, may be better than the whistle. The power connecting substation can be located optimally close to the project sight and right next to a main Bonneville distribution line. This very rural area will limit impact on a very few humans. [LTR 96, CMT 3]*

Response: Comment acknowledged.

Comment: *For the reasons stated above, I endorse and SUPPORT this project. [LTR 96, CMT 8]*

Response: Comment acknowledged.

Comment: *As a five year resident of Klickitat County and a near lifelong Gorge area resident I support the Whistling Ridge Energy Project & urge your support of this project. [LTR 97, CMT 1]*

Response: Comment acknowledged.

Comment: *Also & more importantly I urge the Council to disregard the Portland Oregon downtown based Friends of the Gorge's (FOG) thoughts/efforts to miss lead the EFSE Council. Otherwise any large corporation or private organization like FOG worth 7.5 million can offer/promote a lot of directed comments & miss represent the true opinions of the area citizens who reside in the nearby communities & live here within the Gorge. [LTR 97, CMT 3]*

Response: Comment acknowledged.

Comment: *There are many other reasons that I am against the Turbine project. I am opposed to the destruction of the landscape and the wildlife that will be affected. The migratory birds are at risk, golden eagles, bats etc. In other installations it has been noted that with wildlife nearby disappears or is killed. The Fish and Wildlife Service recommends not to place these turbines on ridges. [LTR 98, CMT 5]*

Response: Comment acknowledged.

Comment: *I am not opposed to wind turbines, but these ridges so close to the scenic area and long established communities are not a good fit. I told Jason Spadero almost 3 years ago, just because you have this land here and you want to be in the energy industry doesn't mean that it is a good fit. [LTR 98, CMT 7]*

Response: Comment acknowledged.

Comment: *I was unable to attend the recent public hearings regarding the Whistling Ridge Energy Project proposed by SDS Lumber Company. I am in full support of this project and strongly favor its implementation. [LTR 99, CMT 1]*

Response: Comment acknowledged.

Comment: *Sustainable wind energy is an obvious course to pursue in this area of sustainable and abundant energy source. [LTR 99, CMT 2]*

Response: Comment acknowledged.

Comment: *I understand, now the Oregon coal fired plant is about to become history! What is wrong with these people? They say it creates acid rain in the gorge. BS I say! The only air quality problem we have is when the west winds blow, bringing all the airshed problems of Portland and Vancouver with it. Global warming. Al Gore and all of his fellow believers need to go somewhere and start their own country someplace else! Our weather and climate are changed forever, each time, a volcano erupts somewhere in our world, but then in their environmental movement, never talk of this! I have no issues over taking care of our environment. We should, it's our duty to do so as stewards of our world we live in. The problem is extremism! In anything is counterproductive and really destructive to our way of life and our country's economy. [LTR 100, CMT 2]*

Response: Comment acknowledged.

Comment: *So my feeling on wind farms, let's get it done! Time is wasting. Let's take advantage of this great resource, the wind! [LTR 100, CMT 3]*

Response: Comment acknowledged.

Comment: *I am 70 years old, disabled and retired. I live a lot in these 70 years. I've seen a lot and done a lot and learned a lot! All this green madness that's going on now is going to destroy us in the end. You've got my vote for the Whistling Ridge project! [LTR 100, CMT 5]*

Response: Comment acknowledged.

Comment: *Please deny the application for the Whistling Ridge development, and help preserve the soul of our Columbia River Gorge. [LTR 101, CMT 2]*

Response: Comment acknowledged.

Comment: *Please do not put the wind turbines on Whistling Ridge. [LTR 102, CMT 1]*

Response: Comment acknowledged.

Comment: *The project west of the Dalles has been canceled and the middle mt. project south of Hood River has been stopped. If we would have known that Whistling Ridge was to become an industrial wind factory we never would have bought property in Mill A. Common sense tells us this is a bad idea and should never be put in. [LTR 102, CMT 4]*

Response: Comment acknowledged.

Comment: *I steadfastly oppose the Whistling Ridge Project for a number of reasons. Primarily, it is a terrible site as it impacts the Columbia Gorge National Scenic Area in a very big way. Industrial Wind Farms destroy all natural character of the places they are sited. I know. I drive through the eastern Gorge quiet frequently and healthy, wide open feel and wildness of the area is gone now dominated by twirling blades, roads, power lines and thousands of red lights at night. To some this may be an acceptable sacrifice way out in flat farm country, it is completely the opposite, however here on the edge of the Columbia Gorge!!!! We do need to address increasing energy demands but NOT on the edge of a nationally recognized treasure like the Columbia Gorge. [LTR 103, CMT 1]*

Response: Comment acknowledged.

Comment: *What is wrong with the project? Everything! 50 wind turbines 426 feet tall on the very edge of a National Scenic Area is insane. They are too high, too many and in the wrong place!! If California, or Canada, need this power, they can build their own turbines on their land and ruin their scenery, etc. Let's not be their FOOLS! [LTR 104, CMT 1]*

Response: Comment acknowledged.

Comment: *A wind farm is an affront to the land and to living things! For all of the above reasons please deny this application. The environmental impact is too great. Please demonstrate wisdom for all living things. [LTR 104, CMT 5]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. Washington State utilities must reach the goals set by Initiative 937. [LTR 105, CMT 1]*

Response: Comment acknowledged.

Comment: *Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. [LTR 105, CMT 3]*

Response: Comment acknowledged.

Comment: *The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. The choice is clear support Whistling Ridge and Skamania County by approving this project. [LTR 105, CMT 4]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 106, CMT 1]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 107, CMT 1]*

Response: Comment acknowledged.

Comment: *Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. [LTR 107, CMT 3]*

Response: Comment acknowledged.

Comment: *The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. The choice is clear: support Whistling Ridge and Skamania County by approving this project. [LTR 107, CMT 4]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 108, CMT 1]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 109, CMT 1]*

Response: Comment acknowledged.

Comment: *Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. [LTR 109, CMT 2]*

Response: Comment acknowledged.

Comment: *Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. [LTR 109, CMT 3]*

Response: Comment acknowledged.

Comment: *The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. [LTR 109, CMT 4]*

Response: Comment acknowledged.

Comment: *As a Washington resident who often enjoys the recreational activities available in Skamania County and the Columbia River Gorge (and hence contributes to the local economy), I feel that windmills would enhance rather than detract from the natural beauty of the area. Those who oppose the responsible construction of windfarms are selfish and short-sighted. The choice is clear: support Whistling Ridge .and Skamania County by approving this project. [LTR 109, CMT 5]*

Response: Comment acknowledged.

Comment: *I'm tired of our country being held hostage to Big Oil with its many foreign sources. I am tired of the ecological disasters that accompany the exploration, refining and consumption of oil. It is imperative that safe, non-polluting forms of energy are encouraged. Wind River is such an alternative. Not to approve this wind farm would be both irresponsible and unAmerican! [LTR 110, CMT 1]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 111, CMT 1]*

Response: Comment acknowledged.

Comment: *Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. [LTR 111, CMT 2]*

Response: Comment acknowledged.

Comment: *Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. [LTR 111, CMT 3]*

Response: Comment acknowledged.

Comment: *The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. [LTR 111, CMT 4]*

Response: Comment acknowledged.

Comment: *As a Washington resident who often enjoys the recreational activities available in Skamania County and the Columbia River Gorge (and hence contributes to the local economy), I feel that windmills would enhance rather than detract from the natural beauty of the area. Those who oppose the responsible construction of windfarms are selfish and short-sighted. The choice is clear: support Whistling Ridge .and Skamania County by approving this project. [LTR 111, CMT 5]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. I am a medical student at the University of Washington, School of Medicine, and while my professional focus is not on the environment, I am well aware of the human impacts that environmental damage can cause. [LTR 112, CMT 1]*

Response: Comment acknowledged.

Comment: *The recent tragedy in the Gulf Coast highlights the previously existing need for alternative energy, and opponents to its development are contributing to environmental damage while claiming to be fighting against it. Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. [LTR 112, CMT 2]*

Response: Comment acknowledged.

Comment: *Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. [LTR 112, CMT 3]*

Response: Comment acknowledged.

Comment: *The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. The choice is clear: support Whistling Ridge and Skamania County by approving this project. [LTR 112, CMT 4]*

Response: Comment acknowledged.

Comment: *I strongly support the Whistling Ridge Energy Project. [LTR 113, CMT 1]*

Response: Comment acknowledged.

Comment: *We need renewable clean energy now! This project has it all. Great wind and low impact. It is time to move for energy independence now. [LTR 113, CMT 2]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 114, CMT 1]*

Response: Comment acknowledged.

Comment: *Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. [LTR 114, CMT 2]*

Response: Comment acknowledged.

Comment: *Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. [LTR 114, CMT 3]*

Response: Comment acknowledged.

Comment: *As a Washington resident who often enjoys the recreational activities available in Skamania County and the Columbia River Gorge (and hence contributes to the local economy), I feel that windmills would enhance rather than detract from the natural beauty of the area. Those who oppose the responsible construction of windfarms are selfish and short-sighted. The choice is clear: support Whistling Ridge and Skamania County by approving this project. [LTR 114, CMT 5]*

Response: Comment acknowledged.

Comment: *Sorry I could not make it to the meeting 6-17. I was not feeling well. I am all for the Whistling Ridge Energy project. [LTR 115, CMT 1]*

Response: Comment acknowledged.

Comment: *We really need the project to help with energy costs. As many seniors are low income and have a hard time affording utilities this would be a big help. [LTR 115, CMT 2]*

Response: Comment acknowledged.

Comment: *I want to leave my children with clean, reliable, inexpensive electricity to power their future. That means developing alternative sources of energy and having a whole mix of power options to serve our growing population. [LTR 116, CMT 1]*

Response: Comment acknowledged.

Comment: *Wind energy is one of those choices and it makes sense to develop it at Whistling Ridge. Few places exist with the strong winds and transmission lines for such a project. [LTR 116, CMT 2]*

Response: Comment acknowledged.

Comment: *Wind energy is clean, renewable, cost competitive, and is a product we can make right here and use or export to the rest of the country, just like timber. It creates no pollution and can coexist peacefully with the wonderful variety of wildlife we enjoy. Please allow this project to go ahead so that we can leave our children with alternatives for their energy future. [LTR 116, CMT 3]*

Response: Comment acknowledged.

Comment: *The Whistling Ridge project would technically not be within the scenic area, but it would bring an unnatural and terribly imposing negative visual impact to the scenic area. It sets a horrible precedent for industrial-scale and visually imposing and discordant development that will be quite visible from an area prized for its wild areas and scenic beauty: [LTR 117, CMT 1]*

Response: Comment acknowledged.

Comment: *Since this project, like all other windmill projects, is subsidized, shouldn't the tax payer dollars benefit the most people, not just the investors? Please reconsider this project for the issues above. The country needs alternative energy sources, but we need to be smart about it as well. Once the visual impact is altered by a project like this, it is altered for all decades. [LTR 117, CMT 3]*

Response: Comment acknowledged.

Comment: *Since I could not attend the hearing on the wind farm proposal, I want to now voice my opposition to this project. [LTR 118, CMT 1]*

Response: Comment acknowledged.

Comment *…and invasion of our beloved quiet and privacy we have enjoyed for over 20 years. We understand the value of "harnessing the wind" but, please, not SO close to an established community! Thank you for your consideration. [LTR 118, CMT 5]*

Response: Comment acknowledged.

Comment: *The Board of Directors of Northwestern Lake Development Homeowners' Association submits the following comments regarding the Draft Environmental Impact Study (DEIS) conducted by EFSEC and BPA with respect to the Whistling Ridge Energy Project (the Project). I. Introduction. We represent the owners of 30 residential properties located near the mouth of Little Buck Creek where it empties into Northwestern Lake. There are currently 23 residences built, most of which are full-time residences (as distinct from most recreational cabins located along Northwestern Lake). Our community is approximately two miles east of the Project, and is near the bottom of the Little Buck Creek watershed. The Project would sit at the head of this watershed. Because of our proximity to the Project, we have major concerns about the possible adverse effects it might have on us and our environment. [LTR 119, CMT 1]*

Response: Comment acknowledged.

Comment: *Given that there are abundant optional locations for this type of project, we cannot support this Project until there is conclusive documentation that it will not have "adverse effects" on our lives and our environment. We respectfully request that EFSEC and BPA rigorously investigate, document, and evaluate our concerns. Thank you. [LTR 119, CMT 13]*

Response: Comment acknowledged.

Comment: *Wow! It could happen here. Our little community can be a part of a new clean energy economy. I salute Whistling Ridge Energy/SDS efforts to really make this happen. Power has to come from somewhere and what a better place than a locally produced renewable source right in our backyard. We have the wind resource, the transmission lines, and a local company and willing workforce that can make this happen. Let's do this one right. [LTR 120, CMT 1]*

Response: Comment acknowledged.

Comment: *Ultimately, the arguments against wind turbines boil down to detractors "don't like the way they look." They are entitled to this opinion. If educated about the dirty alternatives or presented with the very real possibility of their sons and daughters being involved in future conflicts to secure our nation's energy security I'm certain their opinions would change. [LTR 120, CMT 2]*

Response: Comment acknowledged.

Comment: *The new energy economy is not about a silver bullet that renders everything else obsolete. Wind energy is going to be just one part of an increasingly interlinked and interdependent network of distributed renewable energy generation facilities. Solar, hydro,*

biomass, waves, geothermal, and wind are the silver buckshot that will move our country towards energy independence. I would be proud to say that I'm from a forward community that is contributing towards this effort. Oh, and, for the record… I think wind turbines look amazingly cool. [LTR 120, CMT 3]

Response: Comment acknowledged.

Comment: *I would like to urge you to deny permission for the wind energy project proposed by Whistling Ridge. Although wind energy may be appropriate in some areas, it is simply short-sighted and destructive to allow for-profit corporations to plant wind farms in sensitive areas, with major financial incentives, without the state and country first making a careful study of what locations are appropriate. [LTR 121, CMT 1]*

Response: Comment acknowledged.

Comment: *This kind of marring of the landscape is virtually impossible to undo, and the benefits of the excess energy production are far-off and limited. The project could easily end up being a complete boondoggle, with citizens and the environment paying the price, not just financially, but in loss of our beloved natural areas. So much more energy could be saved by some modest efforts at energy conservation, and the environment of our region would benefit too. I urge you to take on the vested interests and push for real conservation measures, calling on the people of Washington to each do their part, instead of opting for the easy political gains of hyping alternate energy while selling out the state to self-interested corporations. [LTR 121, CMT 2]*

Response: Comment acknowledged.

Comment: *Beyond all this, I fully support the following message from Friends of the Columbia Gorge: I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. The proposed project would cause significant negative impacts to sensitive wildlife and plant habitat and would degrade the outstanding scenic beauty of the Columbia River Gorge National Scenic Area. EFSEC should recommend that Governor Gregoire deny this project. [LTR 121, CMT 3]*

Response: Comment acknowledged.

Comment: *The project would introduce industrial development into the natural, forested landscape and indefinitely alter views in the National Scenic Area. I support renewable energy, but I am opposed to industrial-scale wind energy development within or adjacent to the*

Columbia River Gorge National Scenic Area, a designated national scenic treasure. [LTR 121, CMT 6]

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 122, CMT 1]*

Response: Comment acknowledged.

Comment: *This wind farm will give the Skamania County economy a necessary boost. Our county has struggled for too many years with high unemployment, which is far above the state average. Now Skamania County has an opportunity to take advantage of a natural resource, which is clean and economically viable. This industry is exactly what our county needs. It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing? Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I urge the Council to approve the SDS application and advance this important project quickly. [LTR 122, CMT 2]*

Response: Comment acknowledged.

Comment: *I'm writing to express my opposition to the Whistling Ridge Energy Project. [LTR 123, CMT 1]*

Response: Comment acknowledged.

Comment: *What's more, while the proposed site is just outside the Columbia River Gorge National Scenic Area, it is highly visible from many locations within the scenic area. The original legislation for the NSA called for extremely limited development within view from Interstate 84 and Highway 14. This project will be extremely visible from those locations. SDS has been running ads in the local paper showing how visible these towers will be from within the NSA. At some point we need to look to the congressional intent to protect the views of this area. I highly doubt the framers of the scenic area act ever envisioned allowing 400 foot towers (with bright red lights on each of them at night) where they are so visible. The Columbia River Gorge is an area I consider to be sacred to me and my family. This is the wrong project for the wrong area. Please say no to the Whistling Ridge Energy Project. [LTR 123, CMT 3]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 125, CMT 1]*

Response: Comment acknowledged.

Comment: *This wind farm will give the Skamania County economy the boost it needs. We are too dependent on timber harvests and federal timber payments. Too many residents are stuck in low-income brackets while unemployment ranks far above the state average. Fortunately, Skamania has another natural resource to develop: wind. Bringing another industry here is exactly what our county needs. It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing? Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I hope the Council approves the SDS application and that the project advances quickly. [LTR 125, CMT 2]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 126, CMT 1]*

Response: Comment acknowledged.

Comment: *This wind farm will give the Skamania County economy the boost it needs. We are too dependent on timber harvests and federal timber payments. Too many residents are stuck in low-income brackets while unemployment ranks far above the state average. Fortunately, Skamania has another natural resource to develop: wind. Bringing another industry here is exactly what our county needs. It will stimulate local spending, create jobs, and provide new tax revenues. How can that be a bad thing? Skamania County needs to diversify its resources and revenue, and Whistling Ridge can make that happen. I hope the Council approves the SDS application and that the project advances quickly. [LTR 126, CMT 2]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. I am all in favor of wind projects such as this. [LTR 128, CMT 1]*

Response: Comment acknowledged.

Comment: *I am concerned about the impacts of major industrial construction on the ridgeline boundary of the Columbia River Gorge National Scenic Area near White Salmon. I live in the City of Mosier, where our businesses depend on the tourism created by the natural scenic beauty of the Columbia Gorge. In a recent survey (Mosier Community Survey, 213138) 99% of the Mosier Valley residents who responded rated "scenery and natural beauty" as Very Important to them. For a wider view, read the final report of the Columbia Gorge Future Forum, in which many Gorge residents responded negatively to the industrialization of the Gorge by the wind turbine industry and in which one of the most commonly shared Gorge values was our scenic beauty. And who hasn't read the National Geographic review of the Gorge as the 6th most highly rated destination in the world because of the "…incredible job of protecting the views…" It greatly concerns me that we can so easily despoil forever what is so rare and so highly valued by the rest of the world. And for what? The sacrifice of long term vision for immediate profit? Profit for a very few at the expense of the other Gorge communities and counties whose economic development depends on the protection of the scenic Columbia Gorge? I hope that greed does not lead us into making decisions that will negatively impact most of our current population and that our future generations will forever regret. [LTR 129, CMT 1]*

Response: Comment acknowledged.

Comment: *I, as ought to be anyone with sense, am opposed to the project and to any attempt to analyze it into creation, including the current DEIS. [LTR 131, CMT 2]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 132, CMT 1]*

Response: Comment acknowledged.

Comment: *Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. [LTR 132, CMT 2]*

Response: Comment acknowledged.

Comment: *For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. [LTR 132, CMT 3]*

Response: Comment acknowledged.

Comment: *I support the project as a whole. [LTR 133, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. Please keep the Gorge looking as it did in the days of Lewis & Clark. We have so few areas in the U.S. where a historical landscape is unmarred. [LTR 136, CMT 1]*

Response: Comment acknowledged.

Comment: *The City of Bingen, located in Klickitat County adjacent to the proposed Whistling Ridge Energy Project, is supportive of alternative renewable energy including wind energy facilities. Wind energy projects are one way the State of Washington and the United States can help reduce the reliance on traditional, nonrenewable energy sources. [LTR 137, CMT 1]*

Response: Comment acknowledged.

Comment: *I write to offer my strong support to the proposed Whistling Ridge Energy Project in Skamania County. [LTR 138, CMT 1]*

Response: Comment acknowledged.

Comment: *This is a viable project on privately held commercial timberland outside of the National Scenic Area. [LTR 138, CMT 2]*

Response: Comment acknowledged.

Comment: *EFSEC... the very name indicates that you must evaluate appropriate siting for proposed energy facilities, but does it demand that you must site? Have you ever recommended against siting a wind energy facility? This siting, if it occurs, will set a precedent with troubling and long-standing consequences for not only forested lands in Washington, but will also put at risk all other national and state treasures, parks, and scenic areas. History is replete with disastrous consequences from forging ahead to achieve short-term financial windfalls without adequate regulatory oversight and caution. Big money interests and unfortunately, sometimes government, suppresses and ignores mounting scientific evidence that is contrary to its financial and political goals (as in the effects of tobacco, deforestation and most recently, deep-water drilling). Must we blindly go forward and ruin all that has been set aside? Once it is gone, it is gone. Employing wisdom and forethought, if there is ever a time for EFSEC and BPA to determine "NO, the cost is too great!" this is it. [For attachments: The "How To" Guide to Siting Wind Turbines to Prevent Health Risks from Sound, see PDF starting at page 179, Simple guidelines for siting wind turbines to prevent health risks, see PDF starting at page 62, Environmental Noise Guidelines: Wind Farms, see PDF starting at page 73, Public Health Impacts of Wind Turbines, see PDF starting at page 93, Noise Control Regulations for Industry and Commerce, see PDF starting at page 123, Wind Turbines, Health, Ridgelines, and Valleys, see PDF starting at page 128, Deputation to the Standing Committee on General Government Regarding Bill C-150 April 22 2009, see PDF starting at page 134, Mars Hill Wind Turbine Project Heath Effects – Preliminary Findings, see PDF starting at page 141, Health Concerns and the Need for Careful Siting of Wind Turbines, see PDF starting at page 178] [LTR 139, CMT 29]*

Response: Comment acknowledged.

Comment: *The thirteen members of the Board of Directors of the Skamania County Economic Development Council unanimously support approval of the Whistling Ridge Energy Project. We have reviewed the Draft EIS and believe that it is objective, comprehensive, accurate and authoritative. [LTR 140, CMT 1]*

Response: Comment acknowledged.

Comment: *I have lived in the Columbia Gorge (White Salmon, WA) since 1950 and just recently moved to The Dalles, OR. The Whistling Ridge Energy Project is ideally located, out of the Gorge Scenic area and would disturb very few people – if any. I am 100% in favor of this project and hope you can see your way clear to approve this very worthy project without any further delay. [LTR 149, CMT 1]*

Response: Comment acknowledged.

Comment: *We live in Underwood, and fully support the Whistling Ridge Energy Project. We have heard no reasonable or convincing reasons why the project should not proceed to completion. [LTR 150, CMT 1]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 152, CMT 1]*

Response: Comment acknowledged.

Comment: *I appreciate the opportunity to comment on the Whistling Ridge Project. Normally I would just say: yes, do it, it's a renewable. But the Columbia Gorge is a one of-a-kind place. I grew up in the gorge; I spent a lot of my youth exploring it, including the forest lands in Skamania County. I observed up close the movement to establish the National Scenic Area. A primary reason the NSA was established was the poor stewardship of some of the Gorge's extraction industries such as SDS Lumber. The prevailing approach of SDS and their cohorts was and is to cut/quarry as fast as possible. In the past years, SDS cut to within an inch of the NSA and in full view of its core scenic assets (clear cuts across from Viento Park and nearby areas). SDS would argue they were/are playing by the rules. Perhaps they were, but I suspect they found some sort of barely legal ways to bend the rules. The death of the viewsheds in the NSA is death by a thousand cuts. Some would argue there are already an interstate freeway and a railroad and a whole dam but that is exactly WHY the preservation of what remains of the viewshed is so important to the value of the NSA. Much of the Columbia Gorge is now a National SCENIC area. We need to preserve the scenic quality whenever possible; the rules of the NSA are clear on that point. SDS has always viewed the NSA and the NPS with disdain and has done their darndest to stick their finger in the eye of those who love the Scenic Area. I don't think they should be allowed to do it again. [LTR 153, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am adamantly opposed to this project as it would violate the spirit of the law of the Columbia Gorge Scenic Area Act and destroy the intended viewshed of the area. I am a supporter of alternative energy in general. But, I firmly believe that industrial wind turbine development should be installed in areas that are very remote from people and vital natural resources. [LTR 154, CMT 1]*

Response: Comment acknowledged.

Comment: *I strongly urge the Council to see the value of this project for the short and long term local, regional, and national benefits to society and our goal toward a clean energy future. Thank you for taking the time to review my comments. [LTR 155, CMT 9]*

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. [LTR 156, CMT 1]*

Response: Comment acknowledged.

Comment: *Skamania County has the wind, SDS Lumber has the land: it is a match made in heaven. Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. [LTR 156, CMT 5]*

Response: Comment acknowledged.

Comment: *The choice is clear: support Whistling Ridge and Skamania County by approving this project. [LTR 156, CMT 6]*

Response: Comment acknowledged.

Comment: *As a Skamania County resident who would be located near the area where the SDS' 75 megawatt wind farm would be sited, I am in full support of this project. [LTR 157, CMT 1]*

Response: Comment acknowledged.

Comment: *I have lived near forest lands owned by SDS since 1983 and know that SDS has always been a responsible and considerate neighbor to us at the Northwestern Lake area. I give them my full endorsement without any reservations. [LTR 157, CMT 3]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county lines. I am pleased that the best available area for renewable energy is being utilized. The ridgelines allow the greatest amount of wind energy to be captured. [LTR 158, CMT 1]*

Response: Comment acknowledged.

Comment: *I am 100% in favor of the Whistling Ridge Project. I have lived in Skamania County 84 years, except 3 years U.S. Navy Service in W.W.2. [LTR 159, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing in support of the Whistling Ridge Energy Project. [LTR 160, CMT 1]*

Response: Comment acknowledged.

Comment: *I have lived in the area of this proposed project for 18 years and have followed wind energy developments closely for most of that time, both here in the Columbia Gorge and nationally. I serve as an environmental representative on the technical advisory committees of three wind power projects in the area. I have participated in field visits to wind projects all over the West. I have a degree in biology and have read a great deal of the scientific literature pertaining to wildlife-turbine interactions. As someone who is well informed about both wind power and ecology, I have a number of concerns regarding the DEIS prepared for the Whistling Ridge Energy Project. [LTR 161, CMT 2]*

Response: Comment acknowledged.

Comment: *On behalf of the Association of Washington Business (AWB), thank you for the opportunity to provide comments on the Whistling Ridge Draft Environmental Impact Statement (DEIS). Formed in 1904, AWB is Washington's oldest and largest statewide business association, and includes more than 7,000 members representing over 650,000 employees. AWB serves as both the state's chamber of commerce and manufacturing and technology association. 90 percent of AWB members employ fewer than 100 people and more than half of AWB's members employ fewer than 10. We write today in support of the May, 2010 DEIS and offer the following general and specific comments in support thereof. [LTR 162, CMT 1]*

Response: Comment acknowledged.

Comment: *The U.S. Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement (DEIS) for the Bonneville Power Administration's Whistling Ridge Energy Project, Skamania County, Washington. The Department offers the following comments for use in developing the Final Environmental Impact Statement for the project. [LTR 164, CMT 1]*

Response: Comment acknowledged.

Comment: *I am a Portland resident with a second home in White Salmon, Wa. I have a view of Mt Hood and Underwood Mountain (among other things). I am opposed to adding windmills to the views in the Gorge, as long as that is possible. [LTR 166, CMT 1]*

Response: Comment acknowledged.

Comment: *In response to the Draft EIS, this letter is submitted to you to document our continued support for the Whistling Ridge Energy Project. As Chiefs of the Klickitat and Cascades Tribes of the Yakama Nation, we have worked closely with Jason Spadaro, President of SDS Lumber Company, on the Whistling Ridge Energy Project for several years. SDS Lumber Company approached us cooperatively and very early in their process, asking us to review their property and identify any concerns we may have with a wind energy project in the area. [LTR 168, CMT 1]*

Response: Comment acknowledged.

Comment: *We strongly believe wind energy development should be encouraged in appropriate areas because it is clean energy. We believe the SDS land being proposed is a very appropriate area because the SDS wildlife surveys have shown no threatened or endangered plants or animals exist in the area and we do not find any cultural resource concerns to our Tribes. [LTR 168, CMT 3]*

Response: Comment acknowledged.

Comment: *We believe everyone should be supportive of wind energy in places such as this because it is clean energy and should be encouraged over traditional energy resources like natural gas and coal fired plants that consume large amounts of water and pollute our air,*

hydroelectric dams that destroy our fish and nuclear power plants that poison our people. [LTR 168, CMT 4]

Response: Comment acknowledged.

Comment: *On April 14-16, 2008, the 76th Western Snow Conference was held at the Best Western Hood River Inn, Hood river, Oregon. Climatologists, hydrologists, meteorologists, and geoscientists attended. They were from the universities of California, Washington, Oregon State, Portland State, Idaho, Idaho State, Boise State, Wyoming, Utah, Colorado State, and Nevada. Others attending were from the U. S. Army Corp of Engineers, U. S. Dept of Agriculture, U. S. Bureau of Reclamation, National Weather Service, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, U. S. Geological Survey, NASA Ames Research Center, Natural Resources Conservation Service, California Dept of Water Resources, San Francisco Hetch-Hetchy Water System, Bonneville Power Administration (BPA), British Columbia Hydro, and Portland General Electric. The theme of the conference was the impact of global warming and climate change on the following: 1.water storage and early melting of the snow packs In the Washington and Oregon cascade mountains, Colorado and Canadian Rocky mountains, and the California Sierra Nevada mountains; 2. melting and receding glaciers in the western U. S. and Canada; 3. changing hydrology of western rivers; 4. drastic reductions of the water levels of Lake Powell and Lake Mead, which are only one-half full; 5. Water deliveries to the lower Colorado River Compact states; 6.increaslng extreme drought conditions in the Southwest; and 7. Increasing severe Wildfires in the West. It was all about water, energy, and people. .The impact of global warming in the western U. S. may be worse than the assessments of the Intergovernmental Panel on Climate Change. During the conference the subject of water for the Increasing populations of the western U. S. was introduced. The compound Increase in the U. S. population could easily cancel out a 20% increase in water and energy conservation. The· Population Division of the U. S. Census Bureau has published a report, GCTTI- P Data Set-2007, which states that the U.S. is the third most populous country in the world, with about 304 million as of July, 2008. The U.S. population is increasing at a rate of 0.95% per year (1.8 million per year), which is the highest of any Industrialized nation and which is expected to reach 418 million just 34 years from now. The U. S. Census Bureau states that California had a population of 36,553,000 on July 1, 2007, which is now increasing by one-half million per year. California has more people than the combined population of the states of Washington, Oregon, Idaho, Nevada, Arizona, Montana, Wyoming, North and South Dakota, Colorado, Utah, New Mexico, and Nebraska. California has as many representatives in Congress as all of the above-mentioned states. California has 3.5 times more representatives in Congress than the Columbia River Basin states of Oregon, Washington, and Idaho. This power bloc in Congress could be detrimental to· these states. The U. S. Dept of Energy states that the U. S. consumes nearly 100 Quads of energy per year, which is just over one-fourth of the world's consumption. A Quad of energy is nearly 1 exa joules (1 billion billion joules), or 1 peta BTUs (1 million billion BTUs), The U.S. energy consumption is projected to increase by 1.5% in the same 34-year time period. It is only a matter of time before the expanding populations of the Southwest will require more electric power and water above and beyond that saved byco!1servation. Who will supply the power? There is a high probability that no more power generating dams and nuclear fission power plants will be built in the near future*

in the Northwest. The additional power will probably come from the development of more wind farms. Some of the wind-powered generated electricity from the Northwest is already going to California. Eastern Washington and part of eastern Oregon is the home of six wind farms, with 924 wind turbines generating about 1.1 billion watts peak power when the wind is blowing. With an efficacy of about 0.33, the average power is about 356 million watts, which is enough electricity for 226,000 homes. The Biglow Canyon Wind Farm in Sherman County, Oregon, plus two other proposed wind farms in eastern Oregon, when completed will add another 800-950 megawatt peak power to the BPA grid. The yearly energy output of the Washington wind farms is about 3127 gigawatt hours, which is slightly more than the 2892 gigawatt hours of the Rock Island Dam on the Columbia River and about 60% of the energy output of the little Goose Dam on the Lower Snake River. The yearly electrical energy output of 91,928 gigawatt hours from the 11 dams on the U.S. portion of the Columbia River is 29 times greater than the output of the six Washington wind farms. These seem like very large numbers; however, the potential for more wind power in eastern Washington and Oregon is encouraging since only about one 1% of the leased or owned land around the wind farm is now utilized. Who will supply the water? The Colorado River is presently the source of much of the water for Las Vegas, Nevada and Phoenix, Arizona. The allocation of Colorado River Basin water to Colorado, Wyoming, New Mexico, Utah, Arizona, Nevada, and California is governed by the 1922 Colorado River Compact which promised 7.5 million acre feet of water to California, Arizona, and Nevada. An acre foot is the amount of water covering an acre of ground to a depth of one foot or the amount of water used by a typical U.S. family in one year. The 7.5 million acre feet (maf) was one-half of the annual flow of the Colorado River and was not depriving the up-stream states of water. However, the growing populations of these upper stream states now need more of the flow, and the Compact Is now under more political stress. The scheduled depletions for this year total 11.8 maf, which will be unsustainable in the future. Global climate models don't always agree with each other in the predictions of rain and snow fall, but they universally agree the U. S. Southwest is drying up. There is a 50% chance that lakes Mead, Powell, and Mojave will dry up by 2021. Besides Las Vegas, Nevada, and Phoenix, Arizona, other cities that will be drastically affected will be Los Angeles and its surrounding area, and San Diego, California. 3 Developers have expanded the environs of these cities without much thought regarding the future water supply. So where will the water come from? Rash distillation of 10 maf of Pacific Ocean water would be extremely energy intensive and would require the construction of many huge solar or nuclear power plants, which would raise the cry "not in my back yard." The population of California is predicted to increase by 10 million by 2028, while the Colorado River flow will be drastically reduced. It was remarked at the conference that obtaining water for the increasing population is already a problem and is rapidly getting worse. It was also brought up that the Columbia River could supply 10 maf to California without stressing the Columbia River Basin since the average yearly water outflow at Bonneville Dam is 137.5 maf. Nothing was discussed regarding the environment of the Columbia River Gorge or the salmon. The Southwest states are aware that the diversion of 10 maf through an aqueduct over the plateau of eastern Oregon to the California border would be much easier and less expensive than the 1000~mile-long Trans Alaska Pipeline, which crosses three mountain ranges, 800 or more rivers and streams, and costs nine billion dollars. This aqueduct would parallel the existing high-voltage electrical transmission lines starting near The Dalles, Oregon, and extending 255 miles to the California border south of Klamath Falls, Oregon (elevation 4105 feet). The extension from the California border to Shasta Lake is about 75 miles downhill. Some of the energy lost In pumping Columbia River water up onto and along the eastern Oregon plateau would be recovered by in-line hydroelectric

generating systems utilizing the water falling down from higher elevations to Shasta lake. Engineers have much experience in designing and building large pumping systems and pipelines. There are no show stoppers, with the electrical energy coming from the expanded eastern Oregon arid Washington wind farms. The states of Arizona and Nevada know that an aqueduct skirting east of the cascade and Sierra Nevada mountains extending to the Colorado River near Las Vegas is also quite feasible. We only need to remember a plan to divert Columbia River water to California (in the 1950s), which was blocked by Washington senators Henry Jackson and Warren Magnuson, who were chairmen Of Important senate committees. It is now clear that the Issue is not dead and will be revived. People in the Southwest are now talking about water for their children and also for the next generation. [LTR 170, CMT 1]

Response: Comment acknowledged.

Comment: *Thank you for the opportunity to comment on the draft environmental impact statement for the Whistling Ridge Energy project located about seven miles north of the City of White Salmon in Skamania County. The Department of Ecology (Ecology) reviewed the information provided and has the following comment(s): TOXICS CLEANUP: Connie Groven (360) 407-6254 Toxics Cleanup program comments submitted May 12, 2009, still apply to the project described (see enclosure). There are no new comments submitted at this time. Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action. If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above. Thank you for the opportunity to comment on the determination of significance scoping notice for the Whistling Ridge Energy project (Application No. 2009-01) located in Skamania County as proposed by Whistling Ridge Energy LLC. [LTR 171, CMT 1]*

Response: Comment acknowledged.

Comment: *Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action. If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above. [LTR 171, CMT 6]*

Response: Comment acknowledged.

Comment: *Project Location. The proposed Project is located on private land, approximately 7 miles northwest of the city of White Salmon in Skamania County, Washington. The Project encompasses approximately 1,152 acres of land in sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in section 13 of Township 3 North, Range 9 East, Willamette*

Meridian. Summary of the Proposed Action The Bonneville Power Administration (BPA) is proposing to interconnect up to 70 megawatts (MW) of new wind energy from the proposed Project to the North Bonneville-Midway 230- kilovolt transmission line. The interconnect would occur at a new sub-station to be built about 5 miles west of BPA's Underwood Substation in Skamania County. The interconnect was requested by the Project proponent, SDS Lumber Company, in Bingen, Washington. The SDS Lumber Company has created a new limited liability company called Whistling Ridge Energy LLC (WRE) that would finance, develop, and operate the Project. The Project is expected to operate for at least 30 years. The proposed Project would consist of no more than 50, 1.2 MW to 2.5-MW wind turbines up to 426 feet tall, as well as infrastructure such as newly constructed and improved roads, transformers, underground energy-collector lines, a substation, and an operations and maintenance facility. The Project area consists of 1,152 acres of mostly commercial forests in various age categories, of which 384 acres would be disturbed by the Project, and all but 61 acres would remain in commercial forest. Most of the property where the turbine strings are planned has been recently clear-cut harvested and will be further disturbed with the development of the turbine pads. [LTR 173, CMT 2]

Response: Comment acknowledged.

Comment: *This office represents Save Our Scenic Area (SOSA), a Washington corporation representing persons interested in the scenic, recreational and natural values of the Columbia Gorge. SOSA's primary mission is to preserve the Columbia River Gorge National Scenic Area view-shed; to further maintain the existing rural and scenic character of Underwood, Washington, and surrounding communities in Washington and Oregon; and work to preserve the intent of the Columbia River Gorge National Scenic Area Act. WRE proposes to construct as many as 50 wind turbines on ridge lines on their property in Skamania County to produce a minimum of 70 MW. I write today to provide comments on the recently issued draft environmental impact statement (DEIS) for the WRE proposal. [LTR 175, CMT 1]*

Response: Comment acknowledged.

Comment: *This office represents Save Our Scenic Area (SOSA), a Washington corporation representing persons interested in the Whistling Ridge Energy Project (WRE). SOSA's primary mission is to preserve the Columbia River Gorge National Scenic Area view-shed; to further maintain the existing rural and scenic character of Underwood, Washington, and surrounding communities in Washington and Oregon; and work to preserve the intent of the Columbia River Gorge National Scenic Area Act. I write today to provide comments on the recently issued draft environmental impact statement (DEIS) for the WRE proposal. WRE proposes to construct as many as 50 wind turbines on ridge lines on its property in Skamania County to produce a minimum of 70 MW. The project includes the construction and operation of a substation to be owned and operated by BPA that will connect the project to the Federal Columbia River Transmission System (FCRTS or the Grid). As discussed herein the project includes the*

turbines, the electrical connection system, the necessary infrastructure and the BPA substation. [LTR 176, CMT 1]

Response: Comment acknowledged.

Comment: *Counsel for the Environment (CFE) appreciates this opportunity to comment on the Whistling Ridge Energy Project (Whistling Ridge) Draft Environmental Impact Statement (DEIS). The following comments seek to ensure that the Final Environmental Impact Statement (FEIS) fully captures and analyzes the proposed project's environmental impacts, potential mitigation measures, and reasonable off-site and on-site alternatives so that permitting authorities can make a fully informed decision. CFE takes no position regarding the merits of the project at this time. [LTR 177, CMT 1]*

Response: Comment acknowledged.

Comment: *Save Our Scenic Area (SOSA) is involved with the Whistling Ridge Energy (WRE) project application as an Intervener. SOSA is a non profit corporation formed by concerned local Gorge citizens. Its primary mission is to help preserve the Columbia River Gorge National Scenic Area view shed; to further maintain the existing rural and scenic character of Underwood, Washington, and surrounding communities in Washington and Oregon; and work to preserve the intent of the Columbia River Gorge National Scenic Area Act. I am writing today to provide comments on the recently issued draft environmental impact statement (DEIS) for the WRE proposal. SOSA is submitting several different comment letters, covering a variety of subject matter within the DEIS. We have also reviewed the comments submitted by the Friends of Columbia Gorge, agree with them and incorporate them by reference. There are multiple environmental issues involved in the consideration of this project and it is important that each be given through consideration in the EIS process. We find that, in many areas, the present DEIS is completely insufficient and we urge that the NEPA/SEPA responsible officials prepare a supplemental DEIS. The following 24 pages of charted comments, plus Exhibits, are intended to address some, but not all, of the deficiencies noted in the WRE DEIS. In all cases, the deficiencies are explained. In most cases, particular remedies are suggested. Because no remedy is proposed by SOSA does not mean there should not be one implemented by the NEPA/SEPA responsible officials. Two of the larger sized Exhibits will be included as separate PDF files: exhibit 2E and exhibit 2F. All other exhibits appear at the end of this charted comment letter/file. Thank you for this opportunity to comment on the DEIS. SOSA trusts that the DFEIS and FEIS will provide facts and analysis on the issues raised herein. [LTR 178, CMT 31]*

Response: Comment acknowledged.

Comment: *This DEIS divides and splits information in a way that makes it difficult for the reviewers to assess any aspect of concern without reading the entire document word for word and placing wording into a spreadsheet for organization as is done here. Remedy - Redo the entire DEIS and organize into a coherent and comprehensible document. [LTR 178, CMT 77]*

Response: Comment acknowledged.

Comment: *General Comment on DEIS - The layout of information within the DEIS makes it difficult to understand and assess the true nature of the Project. Remedy - No obvious remedy to suggest. [LTR 178, CMT 137]*

Response: Comment acknowledged.

Comment: *General Comment on DEIS - Incorporate others' testimony by reference. Remedy - SOSA hereby incorporates by reference, the comments of: Keith Brown and Teresa Robbins, Skamania County Residents (SCR) Mike and Joyce Eastwick, SCR Mary Repar, SCR Friends of the Columbia Gorge Dawn Stover, Klickitat County Resident Sally Newell, SCR Paul Smith, SCR [LTR 178, CMT 138]*

Response: Comment acknowledged.

Comment: *Save Our Scenic Area (SOSA) is involved with the Whistling Ridge Energy (WRE) project application as an Intervener. SOSA is a non-profit corporation formed by concerned local Gorge citizens. Its primary mission is to help preserve the Columbia River Gorge National Scenic Area view-shed; to further maintain the existing rural and scenic character of Underwood, Washington, and surrounding communities in Washington and Oregon; and work to preserve the intent of the Columbia River Gorge National Scenic Area Act. I am writing today to provide comments on the recently issued draft environmental impact statement (DEIS) for the WRE proposal. SOSA is submitting several different comment letters, covering a variety of subject matter within the DEIS. We have also reviewed the comments submitted by the Friends of Columbia Gorge, agree with them and incorporate them by reference. There are multiple environmental issues involved in the consideration of this project and it is important that each be given through consideration in the EIS process. [LTR 178, CMT 145]*

Response: Comment acknowledged.

Comment: *Of all the wind energy projects that EFSEC and BPA have reviewed to date, the Whistling Ridge Energy Project is easily the most controversial and problematic, as well as the*

project most likely to cause significant environmental impacts. This is the only project proposed to be located within forested habitat. [LTR 179, CMT 1]

Response: Comment acknowledged.

Comment: *Rather than restate Friends' arguments at length in the instant comments, Friends relies on its previous submissions to EFSEC, as well as its briefing to the Skamania County Hearing Examiner in the prior administrative appeal involving Skamania County's proposed (now abandoned) energy zoning amendments (County File No. SEP-08-35), [Footnote: Copies of all the relevant documents from both proceedings are attached hereto as exhibits] except as modified or supplemented below. Friends also adopts and reiterates all arguments of Save Our Scenic Area regarding land use consistency. [LTR 179, CMT 41]*

Response: Comment acknowledged.

Comment: *This memo is intended to provide an independent professional evaluation of the Draft Environmental Impact Statement for the Whistling Ridge Energy Project, proposed to be located in the central part of the Columbia River Gorge near White Salmon, Washington. The memo is provided at the request of Friends of the Columbia Gorge. Background. I am a professional landscape architect with over 31 years experience. I am currently employed as a Senior Landscape Architect by MIG Inc., a multi-disciplinary planning and design firm with over 100 staff in California and Oregon. My areas of professional emphasis include scenic resource assessment, natural resource planning, landscape ecology and ecological restoration. My clients have included the Oregon Department of Transportation, the U.S. Forest Service, the National Park Service, the Washington Forest Law Center, the Forest Stewardship Council, Metro, Friends of the Columbia Gorge, Western Resource Advocates and several private landowners located within the Columbia River Gorge National Scenic Area. Prior to entering private practice, I was chief landscape architect at the Mt. Hood National Forest. My work included having the lead role for management of scenic resources, and design of several projects within the Columbia River Gorge. I have included a more complete resume as an attachment. I have reviewed the sections of the Draft Environmental Impact Statement (DEIS) that address scenic impacts, including maps, drawings, photos and simulations, and will focus my comments on scenic impacts. I am familiar with the general area from previous work in the Gorge. Project Description. The proposal is to construct a wind energy project in the southeast portion of Skamania County, Washington, north and west of Underwood Mountain. Up to 50 commercial-scales wind turbines are proposed on forested land owned by SDS and Broughton Lumber Companies. According to the DEIS, the total land area involved is 1,152 acres, of which about 384 acres would be developed with turbines and associated facilities and roads. The proposed towers would each be over 400 feet tall, including three blades each up to 150 feet long. Analysis by the proponent demonstrates that most of the proposed turbines would be visible from multiple key viewing areas (KVAs) within the Columbia River Gorge National Scenic Area, as well as from other public and private viewpoints. The project site lies within the Cascade Range, and is at the western edge of the Columbia Plateau. The landscape topography includes a series*

of ridges west of White Salmon that orient generally northwest to southeast and overlook the Columbia River and Hood River, Oregon. Current land use is commercial timber. The surrounding landscape is a patchwork of forest, brushfields, and meadows in varying stages of regeneration from timber harvest, as well as dramatic mountain vistas, steep rocky cliffs, pastoral lands, and the Columbia River. Landforms in the vicinity are steep, complex and dissected by deep ravines. Wind Facilities and Aesthetic Impacts. Wind energy is still a relatively new type of land development, both in the Pacific Northwest and nationally. The first large-scale commercial wind energy project in the United States appeared at San Gorgonio Pass near Palm Springs, California in the early 1980s. This project and others in California (Altamont and Tehachapi passes) were and still are controversial, with aesthetic impacts often noted as a serious issue. The past few years have seen a significant number of proposals for wind energy development. Parts of the region, most notably the Columbia Basin, have already been visually transformed by the sheer number of turbines installed. Wind energy projects are land extensive, with single turbines needing 50 or more acres of free space around them. If present trends continue, hundreds of thousands of acres in Oregon and Washington will be developed with wind turbines within the next decade. [LTR 180, CMT 1]

Response: Comment acknowledged.

Comment: *Friends of the Columbia Gorge asked me to prepare an expert comment letter on the Whistling Ridge Wind Energy Project DEIS. I reviewed this document and its appendices. My comments will mostly address the baseline data used to assess impacts and proposed mitigation measures. A summary of my comments appears on page 24. I am an ecologist with 25 years of research and consulting experience on issues related to wildlife management and conservation problems. My qualifications for preparing this declaration are summarized in my curriculum vitae, which is attached. I received a Ph.D. degree in ecology from the University of California at Davis in 1990. Following four years of postgraduate research in the Agronomy and Range Science Department at UCD, I have worked for citizen groups, businesses, attorneys, and government agencies, largely on solving problems affecting wildlife, especially on special-status species. I have eleven years of experience with the biological impacts caused by wind turbines. I performed multiple monitoring and research programs in the Altamont Pass Wind Resources Area (APWRA), and I senior authored many reports that followed, most of which were peer-reviewed. I consulted for the California Energy Commission on matters related to wind farm development. I also consulted to wind power companies, and helped project applicants obtain permits to repower a portion of the APWRA. My contribution to wind energy development has been to produce research-based solutions to avoiding, minimizing, and reducing bird collisions with wind turbines. [LTR 181, CMT 1]*

Response: Comment acknowledged.

Comment: *My name is Gary Kahn and I am an attorney representing Friends of the Columbia Gorge. Friends is a non-profit organization with approximately 5,000 members dedicated to protecting and enhancing the resources of the Columbia River Gorge.*

Friends'membership includes hundreds of citizens who reside within the Columbia River Gorge National Scenic Area. Friends supports renewable energy development, so long as projects are responsibly sited and comply with all applicable laws. Friends of the Columbia Gorge opposes the Whistling Ridge Energy project as it is currently proposed. [LTR 182, CMT 1]

Response: Comment acknowledged.

Comment: *The Washington Department of Fish and Wildlife (WDFW) has reviewed the above-referenced documents and offers the following comments at this time. Other comments may be offered as the project progresses. WDFW is continuing to carefully considered the potential impacts to natural resources on the site. [LTR 183, CMT 1]*

Response: Comment acknowledged.

Comment: *So, that is why I agree that SDS lumber, a long held family-owned business, should be allowed to move forward with its Whistling Ridge Energy Project. [LTR 185, CMT 4]*

Response: Comment acknowledged.

Comment: *It is inconceivable to me that a few people, with their own interests in mind, will succeed in stopping a well-designed wind farm project from being built on private land that is located outside the CRGNSA on the grounds that the project defiles the Gorge. Give me a break! It most surely does not, and their claims fail to approach any standard of common sense. [LTR 185, CMT 11]*

Response: Comment acknowledged.

Comment: *I strongly urge the Council to separate what is true from what is not, from what is self-service from what is in the best interests of the working families in south central Washington and north central Oregon, and that you recommend approval for the Whistling Ridge Energy Project to the governor. We also add that we hope that approval can be expedited. Thank you for your consideration. [LTR 185, CMT 12]*

Response: Comment acknowledged.

Comment: *The Skamania County Agri-Tourism Association is a Washington non-profit corporation dedicated to the promotion and improvement of sustainable agri-tourism in*

Skamania County. Our mission is to create and maintain favorable business conditions for association members. All members own and operate agricultural businesses in Underwood, Washington which is located in eastern Skamania County. Our unincorporated community sits directly across the Columbia from Hood River, Oregon. Members of the Skamania County Agri-Tourism Association include: [for list of member businesses see PDF page 2] [LTR 186, CMT 1]

Response: Comment acknowledged.

Comment: *Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action. [LTR 187, CMT 4]*

Response: Comment acknowledged.

Comment: *First, I am in favor of the wind turbines. [LTR 188, CMT 2]*

Response: Comment acknowledged.

Comment: *The U.S. Environmental Protection Agency (EPA) has reviewed the Bonneville Power Administration (BPA) Draft Environmental Impact Statement (DEIS) for the proposed Whistling Ridge Energy Project (CEQ# 20100187) in Skamania County, Washington in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Clean Air Act (CAA) §309. Section 309 of the CAA directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions. [LTR 189, CMT 1]*

Response: Comment acknowledged.

Comment: *The DEIS for this project includes a good analysis of anticipated environmental impacts from the project and identifies mitigation measures to offset the impacts and monitor effectiveness. Also, the DEIS states that Best Management Practices (BMPs) would be used to minimize any potential impacts. [LTR 189, CMT 4]*

Response: Comment acknowledged.

Comment: *I am writing to say the conclusions reached by the authors of the DEIS are wrong. It needs to be redone to reflect reality. [LTR 190, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS and EFSC application for the Whistling Ridge Energy Project, proposed in the Underwood area, along the Skamania and Klickitat county line. I have sent under separate cover my comments to EFSC. I have extensive background in ecological management and forest ecosystem In the Cascades. I am a member of a US Forest Service advisory committee for ecological restoration of east side ecosystem for the Northern Spotted Owl in Oregon. I was appointed to this Resource Advisory Committee by the Sec. of Agriculture. As such I have been involved in a number of ecosystem reviews and management plans involving areas of similar characteristics as the Whistling Ridge Project. [LTR 191, CMT 1]*

Response: Comment acknowledged.

Comment: *The proposed project would not have negative impacts to the environment. The project is located on commercial timberland that have been subject to decades of intensive harvesting operations under a sustain yield forestry program regulated by the Washington Department of Natural Resources. I have reviewed the wildlife baseline studies and I have visited the site. There are no significant sensitive wildlife and plant habitat areas associated with this project area. The ecology of this area is typical of a highly altered timber management property. Timber management operations will continue in this area for decades to come which is also evidence that the area is not currently or will it every evolve to a significant ecological resource area. It is a timber management area for industrial forest practices. Siting a wind farm in this area is an intelligent and appropriate compatible land use which will diversity the economic value of these timber lands and help to preserve these lands for timber production for decades to come. [LTR 191, CMT 2]*

Response: Comment acknowledged.

Comment: *BPA and EFSC should approve this project. [LTR 191, CMT 8]*

Response: Comment acknowledged.

Comment: *On behalf of the members of Seattle Audubon, I am submitting these comments in response to the May 2010 Draft Environmental Impact Statement (DEIS) for the proposed Whistling Ridge Energy Project. We are a formal intervenor in the EFSEC Site Certification*

proceeding for this project and we submitted scoping comments regarding the environmental evaluation of the project on May 18, 2009. Seattle Audubon was also an active participant in the development of the Washington Department of Fish and Wildlife's April 2009 Wind Power Guidelines. The mission of Seattle Audubon is to cultivate and lead a community that values and protects birds and the natural environment. Since 1916, Seattle Audubon has worked to protect birds of our region whose habitats are at risk. Our members have a long history of engagement on forest-related issues in Washington state and an on-going interest in the inter-relationship between bird habitat and human development activities in the forested landscape. [LTR 196, CMT 1]

Response: Comment acknowledged.

Comment: *We appreciate the opportunity to comment on the DEIS for this proposed project and look forward providing additional comment as the environmental review process and site certification proceeding move forward. [LTR 196, CMT 13]*

Response: Comment acknowledged.

Comment: *For this reason this project should be denied. [LTR 198, CMT 2]*

Response: Comment acknowledged.

Comment: *I, the Chairman of Yakama Nation Tribal Council, am requesting a continuance of thirty (30) days to review and comment on the Whistling Ridge Energy Project. My staff and I have not had the chance to meet on this important matter, and we would like to provide you with our input. [LTR 200, CMT 1]*

Response: Comment acknowledged.

Comment: *As residents of the area that will be able to see some of the turbines of this proposed project, my wife and I are in favor of it. [LTR 203, CMT 1]*

Response: Comment acknowledged.

Comment: *We can't continue the practice of saying "Yes, we need these projects but not in my area". This will not get us where we need to be down the road. SDS is a good and responsible company that cares. It is their land, and they have the right to do this, and they will*

do it in a responsible manner. PS - It is sad that some of the people speaking out against this project were the same ones that were cutting hiking/biking trails on SDS property in this same general area. They want to tell SDS what they can't do but at the same time, don't respect the private property of others. [LTR 203, CMT 2]

Response: Comment acknowledged.

Comment: *I am part of that silent majority who does not like to attend meetings where people argue and intimidate me but I feel my voice does need to be heard. I support the Whistling Ridge Energy Project. [LTR 204, CMT 1]*

Response: Comment acknowledged.

Comment: *Wind energy is a clean, quiet source which uses the natural winds of The Gorge. In my opinion, the people who are causing the obstacles in implementing this natural resource are the same people who have opposed most everything else that is proposed in The Gorge. They have personal agendas which are not for the good of the community but for their selfish interests. Wind Energy is a Good thing for The Gorge, a Good thing for the economy of The Gorge and a good, clean alternative that all the environmentalists have been insisting on. Let's move forward and let a Good thing happen [LTR 204, CMT 3]*

Response: Comment acknowledged.

Comment: *Everyone I know in Hood River is strongly opposed to the construction of these giant turbines looming over our natural and beautiful slice of the world. Please don't approve this project! [LTR 206, CMT 3]*

Response: Comment acknowledged.

Comment: *I am opposed to wind turbines going up on the scenic ridgeway near White Salmon. [LTR 207, CMT 1]*

Response: Comment acknowledged.

Comment: *I support the decision to proceed with the Whistling Ridge Energy Project; however, a couple of things should be addressed… [LTR 208, CMT 1]*

Response: Comment acknowledged.

Comment: *I support the wind project at Whistling Ridge. [LTR 209, CMT 1]*

Response: Comment acknowledged.

Comment: *I oppose the whistling ridge project. [LTR 211, CMT 1]*

Response: Comment acknowledged.

Comment: *I am in support of the Whistling Ridge project. [LTR 212, CMT 1]*

Response: Comment acknowledged.

Comment: *I feel wind energy is one of the cleanest forms of energy generation possible, and those who live in areas amenable to wind generation need to make a few sacrifices to enable it. [LTR 212, CMT 2]*

Response: Comment acknowledged.

Comment: *I live on Underwood Mountain, WA where the Whistling Ridge Wind Turbines are to be built. I have lived here 40 years, we are orchardist and grape growers. My house will be approximately 9000' from some of the turbines. I support the turbines. [LTR 215, CMT 1]*

Response: Comment acknowledged.

Comment: *We need this type of energy. A lot of people say to move it east to the wheat fields, we have the wind here, and it should be utilized. But I do not want more than the 50 being planned. [LTR 215, CMT 2]*

Response: Comment acknowledged.

Comment: *He feels that we should reduce power usage instead of creating more power sources. We should have a quota as to how much power people use -- use the amounts people use now, and decrease it. [LTR 216, CMT 2]*

Response: Comment acknowledged.

Comment: *Received email from ColumbiaGorgeForum.org regarding a wind project in the gorge sponsored by SDS Lumber Company to construct wind turbines in the gorge. Opposed to this project due to the abuse of tax dollars. Don't ruin the beauty of the gorge! [LTR 217, CMT 1]*

Response: Comment acknowledged.

Comment: *My name is John Saulie-Rohman and I am writing in support of the Whistling Ridge Wind Project. I am a first year student at Columbia Gorge CC and my family is from this area (White Salmon) [LTR 219, CMT 1]*

Response: Comment acknowledged.

Comment: *Even before the oil disaster I thought the wind project - Whistling Ridge of SDS of White Salmon, was a very good thing. As the population increases the need for energy will be paramount. So it is with deep appreciation and interest, I heartily endorse this project. PS my husband worked many years for Broughton Lumber Co and knew first hand their planning for the future. [LTR 222, CMT 1]*

Response: Comment acknowledged.

Comment: *After reviewing the draft EIS on the Whistling Ridge project I see no good reason for this project not to go forward. I live less than 2 miles from the proposed project and see no difficulty living near this project. [LTR 223, CMT 1]*

Response: Comment acknowledged.

Comment: *After reviewing the EIS I find it exceeding the requirements for this project. I support this project and see no environmental impacts that should delay it from advancing. [LTR 224, CMT 1]*

Response: Comment acknowledged.

Comment: *Please do not put the wind turbines on Whistling Ridge. White Salmon and Hood River are known for the famed double mt. views. All of our property values will drop when the area becomes known for its multi-turbine views. We need wind power but not in such a beautiful place. The turbine mess out east is bad enough. I am always thankful when I get west of all those blinking lights. It is enough to ruin the eastern gorge with these industrial giants. I don't know how many turbines are out there but adding another 50 turbines to that mess won't make much difference now. To put up 50 turbines on Whistling ridge would blight the whole area. This is a world class scenic area and should be preserved as that. The project west of the Dalles has been canceled and the middle mt. project south of Hood River has been stopped. If we would have known that Whistling Ridge was to become an industrial wind factory we never would have bought property in Mill A. Common sense tells us this is a bad idea and should never be put in. [LTR 225, CMT 1]*

Response: Comment acknowledged.

Comment: *I am a student in the Columbia Gorge Community College - Renewable Energy Technology program, and I support the Whistling Ridge Energy Project. [LTR 227, CMT 1]*

Response: Comment acknowledged.

Comment: *We do not have time to waste in repairing our environment after abusing it for so long. [LTR 227, CMT 2]*

Response: Comment acknowledged.

Comment: *I do not support or agree with this energy project. I want no new wind generators to be placed in Washington State. [LTR 228, CMT 1]*

Response: Comment acknowledged.

Comment: *Hidden behind Underwood Mountain from both the vast majority of the Scenic Area and view from local residents, yet accessible to wind and existing transmission lines, Whistling Ridge appears to be an ideal site for wind turbines. [LTR 231, CMT 5]*

Response: Comment acknowledged.

Comment: *I support the Whistling Ridge Energy Project. [LTR 232, CMT 1]*

Response: Comment acknowledged.

Comment: *I am VERY opposed to putting a wind turbine project there. [LTR 233, CMT 1]*

Response: Comment acknowledged.

Comment: *I'm obviously not in the state of Washington, but in the area that would be impacted across the river more or less. We've had to fight this kind of project. This is the Cascades, you know. This is not some kind of away from people and away from lots of wildlife kind of area. [LTR 233, CMT 4]*

Response: Comment acknowledged.

Comment: *So this is not a good area for this project. [LTR 233, CMT 6]*

Response: Comment acknowledged.

Comment: *I support the Whistling Ridge Energy Project. [LTR 234, CMT 1]*

Response: Comment acknowledged.

Comment: *I just wanted to say that it sounds great and I am glad to see that there are companies looking to the future for renewable energy sources! [LTR 238, CMT 1]*

Response: Comment acknowledged.

Comment: *I am interested in seeing this Whistling Ridge Energy Project go forward. Protecting the Columbia Gorge Scenic act is also very important, but we need to promote renewable energy sources when the opportunity presents itself. I feel this proposed site will project a low impact on our Gorge image. It's important to look at the wider scope of this project and the potential benefits it can bring to this area. [LTR 239, CMT 1]*

Response: Comment acknowledged.

Comment: *I support developing alternative energy sources, including in some cases, wind, but I oppose this project. [LTR 240, CMT 1]*

Response: Comment acknowledged.

Comment: *I support alternative energy projects that are developed in areas with zero or very minimal impact on the native wildlife and forest; that do not decrease the livability of the area; and that are in the best interests of all citizens, not a company that is trying to profit. Such projects should be "owned" and overseen by regional and/or federal government bodies and fully reviewed for environmental soundness before they are implemented. [LTR 240, CMT 5]*

Response: Comment acknowledged.

Comment: *While the Whistling Ridge Wind Project proponents deserve credit for responding thoughtfully to some of the previous objections to their earlier proposals, the revised proposal remains of great concern. [LTR 241, CMT 1]*

Response: Comment acknowledged.

Comment: *Granted our Nation needs alternative sources of energy and Skamania County needs new sources of revenue. But there are many less scenic areas of Washington, Oregon and the entire country which could also contain our windmills. Some things should not be traded for money. [LTR 241, CMT 3]*

Response: Comment acknowledged.

Comment: *Please do not introduce wind farms into the Gorge Scenic Area. Encourage the Whistling Ridge proponents to relocate their project to a suitable site. [LTR 241, CMT 7]*

Response: Comment acknowledged.

Comment: *Our home is located within sight and sound of the Whistling Ridge Project and we absolutely agree wind and solar time has come. [LTR 243, CMT 1]*

Response: Comment acknowledged.

Comment: *I am in opposition of the Whistling Ridge Energy Project. I vote the proposed project is denied. [LTR 244, CMT 1]*

Response: Comment acknowledged.

Comment: *I would like express my disapproval of the Whistling Ridge Energy Project. [LTR 245, CMT 1]*

Response: Comment acknowledged.

Comment: *Laura Bushman phoned the comment line on 8/25 to register her opposition of the wind farms that is being proposed in the gorge (Whistling Ridge). [LTR 247, CMT 1]*

Response: Comment acknowledged.

Comment: *I am dead against the Whistling Ridge Energy Project. [LTR 250, CMT 1]*

Response: Comment acknowledged.

Comment: *Ms. London phoned the Public Involvement extension on 8/26/10 at 7:05 am to voice her displeasure about the Whistling Ridge project. [LTR 251, CMT 1]*

Response: Comment acknowledged.

Comment: *I am totally opposed to it. [LTR 254, CMT 1]*

Response: Comment acknowledged.

Comment: *If things are so bad, where are the environmental groups? Why aren't they out protesting? Early on the wind power industry effectively dealt with the environmental groups. They rounded them up in a BPA round table discussion to generate mutually agreeable siting standards for wind power. This kept the environmental groups busy and made them feel like they were involved in the process while wind power developers where out securing sites for their projects. The round table talks ended with agreement on five voluntary siting criteria, all five of which were violated in the first proposed projects. Another aspect of the wind industries plan*

was to bring in wind power promotional groups. These "environmental" groups gave the appearance of a divided environmental community on the issues of wind power. The third method that the wind power industry used to control environmental groups has been to give (or deny) them money. The Bullitt Foundation has been the major source of grant money used to control groups in the NW. The Bullitt Foundation promotes wind power. When wind power was planning on moving into the Hood River Valley it was not coincidence that the Hood River Valley Residence Committee had just received a Bullitt grant for $17,000. That proved an effective grant. When The Friends of the Gorge protested wind power development overlooking the Columbia River Gorge they had their Bullitt grant pulled for the first time in years. National Audubon Society and Audubon Washington are major receivers of Bullitt grants, and we believe this has kept them from doing the one and only thing that Audubon could do that would effectively check wind power abuses, and that is to expose them In the media. We have pleaded with Audubon Washington to launch a media attack on wind power abuses, but they have ignored us. They know what would happen to their Bullitt grants if they were to take effective action against even the most abusive projects. Do not think that all is well, just because dozens of groups are not protesting Gorge wind power development. Most groups have been targeted and effectively muzzled. [LTR 256, CMT 2]

Response: Comment acknowledged.

Comment: *It was not that long ago when SDS proposed a major co-gen development for their mill. When they reached the public comment period for the proposal a member of the public discovered that the permit that they applied for was for a small mobile unit. The small mobile unit permit would have avoided major regulatory requirements. SDS immediately dropped their proposal. We seriously doubt that SDS or DOE could have gotten that far in the process without realizing that the wrong weaker permit was being applied for. All of this provides context for this proposal. The context you are getting here is more relevant than the false context that tells you that NW wind power makes sense, that proper siting is being applied, that the regulatory agencies are on the ball, and that the groups that you would expect to be in opposition are holding back because they really believe that wind power is not a problem. [LTR 256, CMT 4]*

Response: Comment acknowledged.

Comment: *Thank you for the opportunity to review the Draft environmental Impact Statement (DEIS) for the Whistling Ridge Energy Project. The project has many positive features and will make a positive contribution to the region. [LTR 257, CMT 1]*

Response: Comment acknowledged.

Comment: *We support development of wind, solar, biomass, geothermal, and other renewable energy projects in our region which are designed in a manner consistent with local regulations. MCEDD has supported the creation of the Columbia Gorge Bi-State Renewable Energy Zone as a means to engage in a cross-jurisdiction, inter-agency, bi-state collaborative approach to renewable energy development. [LTR 259, CMT 2]*

Response: Comment acknowledged.

Comment: *We look forward to working with the applicant as this project moves forward. [LTR 260, CMT 6]*

Response: Comment acknowledged.

Comment: *Hello Energy Facility Site Evaluation Council, As I wrote during the public comment period in 2009, I support the Whistling Ridge project. (I live in Stevenson, WA, and I would not object to installations in my 'back yard' either, if it were possible.) The EIS seems to me to be thorough and comprehensive. [LTR 264, CMT 1]*

Response: Comment acknowledged.

Comment: *Thank you for extending the public comment period and allowing me to submit these comments into the record. [LTR 266, CMT 7]*

Response: Comment acknowledged.

Comment: *Like most folks with consciences, I certainly care about preserving our energy resources and producing clean energy. However, the proposed wind project will surely damage the scenic ridgeline bordering the Columbia Gorge National Scenic area. Moreover, the planned turbines will do damage to the wildlife of the area, especially to birds of prey. Please look elsewhere for such projects. [LTR 268, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. The Columbia River Gorge National Scenic Area (CRGNSA) will be impacted again through the unnecessary slaughter of raptors being hit by the turbine blades. Raptors that are very*

important to the species food chain in the Gorge in that certain species will over produce with the demise of the raptors. The sight lines that are preserved in the Gorge with regulations will be invasive to the beautiful sights of the CRGNCA and the Lewis and Clark National Historic Trail from even the Columbia River itself. The Washington Department of Natural Resources has clear cut forest on both sides of the Pacific National Scenic Trail within the CRGNCA. Why now would huge wind turbines be located upon a forested ridge line where industrial clear cutting would again most likely be utilized to place the huge turbine wind generators on that scenic destroying and forest destroying ridgeline? [LTR 274, CMT 1]

Response: Comment acknowledged.

Comment: *I would like to voice my strong support for the Whistling Ridge Energy Project. Washington State utilities must reach the goals set by Initiative 937. Wind is the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020, which means we need to build more wind farms. Lewis County has the wind, Weyerhauser Lumber has the land: it is a match made in heaven. Many studies have shown that the environmental impact of the Whistling Ridge Energy Project would be minimal. For the last century, the site has been used in commercial forest operations. The land has already been cleared, roads built, transmission lines already installed, and wildlife habitats already fragmented. The impacts on a few other species that might be affected are rated low-risk. The environmental benefits are numerous. Wind is clean, renewable, and does not consume water or produce waste. Whistling Ridge will generate 75 megawatts of electricity; enough to power 20,000 homes a year, without contributing to global climate change. The choice is clear: support Whistling Ridge and Lewis County by approving this project. [LTR 275, CMT 1]*

Response: Comment acknowledged. We believe that the commenter meant to reference Skamania County in their comment.

Comment: *Thank you for the opportunity to comment on the Draft Environmental Impact Statement for the Whistling Ridge Energy Project. We deeply appreciate the extension of time allowed to review the document, as it has allowed us a fuller understanding of the impacts that the state intends to consider relative to this project. The DE IS overall appears to us to be a shallow (in spite of its sheer mass) analysis of the impacts of the proposed project. Since our expertise in the field of natural resource studies is limited, we will rely on others to address the project's impacts on bird and bat populations, although we note that reliance on studies conducted by the project proponents seem suspect. A party with a vested interest in the construction of a wind farm would not necessarily be the party we would select to provide unbiased data on any aspect of the potential harm to the public or resources. We would be much more comfortable with analysis by independent professionals in the various fields of study, selected by the state agencies the public employs to safeguard these important public resources. [LTR 277, CMT 1]*

Response: Comment acknowledged.

Comment: *My comments are bolded and italicized, located after sections upon which I wish to comment. Most of this information was not included in the DEIS and it should have been part and parcel of the discussion. Its lack of inclusion is a fatal flaw in the DEIS and should be addressed by BPA, SDS, and EFSEC. I have not included the entire document. The document is in quotation marks. [For text from supporting document with added emphasis, see PDF] [LTR 279, CMT 2]*

Response: Comment acknowledged.

Comment: *I am writing to submit a comment on the proposed Whistling Ridge energy project. I believe wind power will be an essential and large part of the future mix of energy sources, and generally do support wind projects, but I also think that each site that has been proposed for a project must be evaluated according to local criteria. [LTR 280, CMT 1]*

Response: Comment acknowledged.

Comment: *I would like to express my strong support for the Whistling Ridge Energy Project. I am proud to live in a community adjacent to this project. I am proud to say we will have such a project here. We are doing our part to help our Country become as environmentally conscious as possible in our energy production and use. [LTR 282, CMT 1]*

Response: Comment acknowledged.

Comment: *I am proud to live here in Mill A, in Skamania County Washington. Turn the tables everyone, use the Whistling Ridge Energy Project as an asset!! [LTR 282, CMT 4]*

Response: Comment acknowledged.

Comment: *Thank you for the opportunity to submit comments regarding the above captioned proposed industrial wind generating facility in Underwood, Washington. I strongly believe that this proposed industrial facility clearly warrants a siting denial by your Council. There are fatal flaws in the concept, location, design, construction and operation of an industrial energy facility in Underwood, Washington and the Columbia River Gorge. [LTR 283, CMT 1]*

Response: Comment acknowledged.

Comment: *The Whistling Ridge Energy proposed project is the wrong project for the Gorge, at the wrong time and wrong place. [LTR 283, CMT 20]*

Response: Comment acknowledged.

Comment: *I'm sure that I have many more questions, but the 5 p.m. deadline is upon me and I want to make sure that I get these comments in on time. [LTR 284, CMT 7]*

Response: Comment acknowledged.

Comment: *I forgot to include this article on wind farms creating challenges for the power grid, with my comments (submitted on 27 August 2010) in the document that I sent on Friday, entitled Comments_DEIS_BPA_Inadequate_27Aug2010. [LTR 285, CMT 1]*

Response: Comment acknowledged.

Comment: *I have bulletized the article, below, for a quick summary of my concerns about wind generation and its effects on BPA's power grid: Fast-growing number of wind farms; Has created new challenges for those who manage the power grid; Almost two nuclear plants worth of extra power was sizzling down the lines; Storm caused the largest hourly spike in wind power the Northwest has ever experienced; At BPA, it was too much of a good thing; More electricity than its customers needed; More than the available power lines could export; More than the grid could readily absorb; The edict went out: Feather your turbine blades; slash output; It's one likely to go out with increasing frequency; The last three years have seen a doubling of the generation capacity of wind farms in the region; By 2013, wind generation capacity expected to double again; In the real world, wind development, coupled with wild swings in its output, are overwhelming the region's electrical grid and outstripping its ability to use the power or send it elsewhere; In theory, better coordination could help solve the problem, reducing costs, eliminating bottlenecks and solving scheduling conflicts; In practice, risk-averse engineers, utility managers or public utility customers worried about rates increasing; Renewables explosion forcing the transmission issue to center stage now; California, which already buys much of the Northwest's wind energy, increasing its appetite for green power; The solution to the problem is to beef up or build new power lines, a five to ten year proposition; Involves coordination on what to build, where to put it and who pays; Only 15 percent of the electricity generated by wind farms in the Northwest goes to the public utilities that buy power directly from BPA; BPA manages three quarters of the region's high voltage transmission system, including the sections serving most of the region's wind farms; BPA's job is to balance wind farms' up-and-down power output, blending it with other sources of power so total generation at any given time matches total demand -- a requirement to maintain grid reliability; As the region's wind fleet grows, an ever bigger slice of the hydro pie is being reserved to fill in when the wind doesn't blow as scheduled; That means foregone sales of surplus power, a source of*

revenue that reduces BPA's rates for public utility customers; Dumping too much water over the spillways, to balance wind power production, harms fish; Another option is to cut generation at the wind farms; Too many curtailments undermines the economics of wind; "It's not fair to have a cost shift," said Elliott Mainzer, BPA's director of strategic planning; BPA proposed quadrupling its "integration" rate, Oregon's congressional delegation took up the wind developers' fight, accusing the agency of dragging its feet on renewables and focusing solely on maintaining low rates for its public utility customers. Sen. Ron Wyden was highly critical of the agency's attitude problem, and Rep. Earl Blumenauer even suggested it might be time for new leadership at the agency; In extreme situations, however, the agency continues to dump wind; At the current rate of wind development the region's system of dams and power lines will start running into consistent operational problems around 2013; In 2013, wind in BPA's territory will reach a total capacity of some 6,000 megawatts; The 6000 MW capacity ceiling will require major structural changes; The solution lies in better coordination of power plants across the west, more efficient use of existing power lines and some expansion of the grid; New lines often require new rights of way through sensitive habitat and private property, are phenomenally expensive, raising the show-stopping question of who pays; The piece that is not doing well is planning for moving wind out of the region; Changes won't come quickly, easily or cheaply. "We can't pay for everything at once, and we don't want to pay for everything on the table," said Jeff Bissonnette, a lobbyist for the Citizen's Utility Board of Oregon. "We have to figure out what makes sense to pay for first, second and third, and what makes sense for consumers and the environment." [LTR 285, CMT 3]

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. As you read the letters and impact statements that will be sent to you regarding this wind power project, the same ideas that have been covered before will be mentioned again, no doubt. But what I wish to have you connect with is how much we take for granted the beauty of this place and the life inhabiting it that makes it impact our senses. In our endeavor to make ourselves warm and happy, we hastily provide less than satisfactory power alternatives and arrive at an ugly display that destroys the beauty inherent in the place. It becomes a heartless displacement of animal and plant life as well as ruining natural geological formations that render peace and joy of heart to all who pass by to witness them. For some reason we are obsessed with destruction rather than with preservation of the Gorge for generations to come. Support a healthy scenic Gorge by presenting a true draft environmental impact statement that covers all the bases as well as the heights. [LTR 289, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near, the Skamania and Klickitat county lines. This proposal is likely to have different and greater wildlife impacts than any other wind energy*

facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains and on the boundary of the Columbia River Gorge National Scenic Area. [LTR 291, CMT 2]

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. STOP THIS TRAVESTY! THIS RUINATION IS CRIMINAL! This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a. forested ridgeline in the foothills of the Cascade Mountains and on the boundary of the Columbia River Gorge National Scenic Area. [LTR 292, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to comment on the DEIS for the Whistling Ridge Energy Project, proposed in the Underwood, WA area, near the Skamania and Klickitat county lines. This area is some of the most beautiful landscape in the country. Its beauty cannot be sacrificed just for first choice location of an energy company. Remember the gulf oil spill - repair after the fact is never available. This proposal is likely to have different and greater wildlife impacts than any other wind energy facility proposed in the State of Washington, because it is proposed along a forested ridgeline in the foothills of the Cascade Mountains and on the boundary of the Columbia River Gorge National Scenic Area. [LTR 293, CMT 1]*

Response: Comment acknowledged.

Comment: *I am writing to express my concern about the Whistling Ridge Energy Project, proposed in the Underwood, Washington area (near the Skamania and Klickitat county lines). I have reviewed some of the materials related to the project, and I am concerned about the extent of wildlife impacts. The proposed project may result in greater wildlife impacts than other wind energy facilities in Washington because of its location along a forested ridgeline in the foothills of the Cascade Mountains. [LTR 297, CMT 1]*

Response: Comment acknowledged.

Comment: *The Whistling Ridge Energy Project helps the state utilities reach the goals set by Initiative 937. It on industrial timber lands and the project plans are compatible with the State Forest Practices Act and County Planning Regulations. This is a west side wind project which is*

the most feasible and most cost-effective option for bringing 15% new renewable energy on the grid by 2020. SDS Lumber has developed a good plan for join us of its timber-lands to generate clear energy. This is a unique match that helps stabilize a major employer from cyclical financial cycles of the lumber market. [LTR 306, CMT 1]

Response: Comment acknowledged.

Comment: *The sites are challenging, but the wind resource is strong. The developers have solid plans for high quality projects. It's time to get wind power generation a little closer to the people who use it. [LTR 312, CMT 1]*

Response: Comment acknowledged.

Comment: *I am so saddened by even the thought of Whistling Ridge Energy Project in the Underwood Washington area. The impact would last a life time, not only to the world acclaimed scenery that is beyond price, but to the sensitive habitat and wildlife as well… There is a need for wind but please, please reconsider the location of this project. [LTR 313, CMT 1]*

Response: Comment acknowledged.

Comment: *We support this project. Review of the Draft EIS has not provided any reasons to justify opposition to the project. [LTR 317, CMT 2]*

Response: Comment acknowledged.

Comment: *I am in favor of this project… [LTR 317, CMT 4]*

Response: Comment acknowledged.

Comment: *I support the project and the Draft EIS. [LTR 317, CMT 11]*

Response: Comment acknowledged.

Comment: *CA needs this power and we need to protect the children of CA. [LTR 317, CMT 38]*

Response: Comment acknowledged.

Comment: *I am in support of this project. [LTR 317, CMT 46]*

Response: Comment acknowledged.

Comment: *I own 70000 acres of land, it is well handled. We are in support of the project, it has been well checked. [LTR 317, CMT 47]*

Response: Comment acknowledged.

Comment: *We live in the Columbia River Gorge - the wind howls. All human activity has impacts so the question becomes - How big are those impacts? [LTR 317, CMT 49]*

Response: Comment acknowledged.

Comment: *The positive impacts outweigh the negatives; we ought to go for it. [LTR 317, CMT 51]*

Response: Comment acknowledged.

Comment: *I support this project, I believe it will help reach the goal mandated by our voters in this state to make renewable energy the greater part of our state's energy consumption. [LTR 317, CMT 52]*

Response: Comment acknowledged.

Comment: *I am in favor of this project… I think it is an appropriate use of our resources [LTR 317, CMT 53]*

Response: Comment acknowledged.

Comment: *I am against the proposal for Whistling Ridge, and feel the DEIS does not adequately address all ramifications and impacts this wind farm will have here in our community. [LTR 317, CMT 54]*

Response: Comment acknowledged.

Comment: *We need something positive in this county. [LTR 317, CMT 60]*

Response: Comment acknowledged.

Comment: *We support and encourage the Whistling Ridge Project. SDS is a good company and a great asset to our community. [LTR 317, CMT 61]*

Response: Comment acknowledged.

Comment: *Summarizes that those against the project state birds and wildlife, the noise, view, and construction as issues. Those for the project state that construction would bring us enough power for all practical purposes, revenue derived would enhance the tax base, jobs and income, and the owner right to use the property as they see fit. [LTR 317, CMT 66]*

Response: Comment acknowledged.

Comment: *I support this project. [LTR 317, CMT 67]*

Response: Comment acknowledged.

Comment: *I support this project; we need to start paying the price for clean energy. [LTR 317, CMT 68]*

Response: Comment acknowledged.

Comment: *I support the project; SDS has built this community upon stewardship and proper decision making. The wind turbines would show that our community is doing their part in protecting our world. [LTR 317, CMT 70]*

Response: Comment acknowledged.

Comment: *I support the proposed action. [LTR 317, CMT 73]*

Response: Comment acknowledged.

Comment: *We need a petition so that CA maximizes their resources instead of using our natural resources up. [LTR 317, CMT 74]*

Response: Comment acknowledged.

Comment: *Wind turbines do not belong in the foothills of the Cascade Mountain Range. [LTR 317, CMT 75]*

Response: Comment acknowledged.

Comment: *The project ought to be approved. [LTR 317, CMT 76]*

Response: Comment acknowledged.

Comment: *This project is in the wrong place. [LTR 317, CMT 77]*

Response: Comment acknowledged.

Comment: *I support the project. [LTR 317, CMT 81]*

Response: Comment acknowledged.

Comment: *I support the project. I would rather this project then nuclear energy. [LTR 317, CMT 82]*

Response: Comment acknowledged.

Comment: *I support the project. SDS have been great stewards of the land and will continue to do so. [LTR 318, CMT 3]*

Response: Comment acknowledged.

Comment: *You did a fine job on the EIS. We need this project to generate money. Hopefully we keep the electricity generated local. [LTR 318, CMT 4]*

Response: Comment acknowledged.

Comment: *The Port and myself support this project. It will provide an economic upturn. [LTR 318, CMT 8]*

Response: Comment acknowledged.

Comment: *We support this project. [LTR 318, CMT 9]*

Response: Comment acknowledged.

Comment: *I am a long-time Skamania County resident and am in full support of this project. [LTR 318, CMT 11]*

Response: Comment acknowledged.

Comment: *I agree with Paul Pearce, Ann Leuders, and Dave L'Hommedieu. This project will help our families thrive in the county. [LTR 318, CMT 17]*

Response: Comment acknowledged.

Comment: *I support the project because this is the only one that doesn't use water. [LTR 318, CMT 18]*

Response: Comment acknowledged.

Comment: *I am in favor of this project. This is important for both economic advantages and the fact that a 'home grown' company is doing the work. [LTR 318, CMT 20]*

Response: Comment acknowledged.

Comment: *I fully support this wind power project because I think it is highly needed. [LTR 318, CMT 21]*

Response: Comment acknowledged.

Comment: *We support this project. I think it would be a great stimulus for the economy. [LTR 318, CMT 24]*

Response: Comment acknowledged.

Comment: *I am in favor of this project. Wind energy is clean, renewable energy, and we should support it for that reason alone. [LTR 318, CMT 25]*

Response: Comment acknowledged.

Comment: *I support this project. [LTR 318, CMT 30]*

Response: Comment acknowledged.

Comment: *I am opposed to the project as it is written. [LTR 318, CMT 32]*

Response: Comment acknowledged.

Comment: *We request additional time to review the document and an additional hearing later in the process after people have had a full opportunity to review the EIS. [LTR 318, CMT 42]*

Response: Comment acknowledged, the end date of the DEIS public comment period was extended from July 19, 2010 to August 27, 2010.

Comment: *I am an advocate for the project. [LTR 318, CMT 47]*

Response: Comment acknowledged.

Comment: *I support the project and will submit written comments. [LTR 318, CMT 48]*

Response: Comment acknowledged.

Comment: *We support the project on the condition that it be reconfigured. We would like the seven southerly most A towers moved back into the project. [LTR 318, CMT 57]*

Response: Comment acknowledged.

Comment: *I would like to reiterate the request to a) extend the comment period and b) hold an additional public hearing. [LTR 318, CMT 65]*

Response: Comment acknowledged, the end date of the DEIS public comment period was extended from July 19th, 2010 to August 27, 2010 and public hearings were held on June 16th and 17th, 2010.

INDEX

AMY, STEPHEN ..... LTR 280
ANDERSEN, BRAD AND PEGGY BRYAN ;
SKAMANIA COUNTY ECONOMIC DEVELOPMENT COUNCIL ..... LTR 140
ANDRUSS, STEVE ..... LTR 102, LTR 225
APOSTOL, DEAN ;
FRIENDS OF THE COLUMBIA GORGE ..... LTR 180
ARAMBURU, J. RICHARD ;
ARAMBURU & EUSTIS, LLP ..... LTR 148, LTR 175, LTR 176, LTR 184
AUDLEY, JOHN J. PH.D AND MEGAN WALSETH DECKER, J.D. ;
RENEWABLE NORTHWEST PROJECT ..... LTR 95
BACKUS, FRANK ..... LTR 72
BAILEY, JOAN ..... LTR 291
BAINNSON, BRIAN ;
QUATREFOIL, INC ..... LTR 141
BAIRD, BRIAN ;
U.S. CONGRESS ..... LTR 138
BAIRD, BRIAN AND DOC HASTINGS ;
U.S. CONGRESS ..... LTR 83
BAKER, NATHAN ;
FRIENDS OF THE COLUMBIA GORGE ..... LTR 145
BALMUTH, LAURIE ..... LTR 73
BARKER, JILL ;
COLUMBIA GORGE AUDUBON ..... LTR 77
BARNES, BETTY ;
MAYOR OF BINGEN ..... LTR 137
BARRETT, BRIAN ..... LTR 49
BATES, NICOLE ..... LTR 108
BAXTER, SHELLEY ..... LTR 62
BENVENISTE, VICTOR AND SHARON ..... LTR 50
BERG, KEN S. ;
WASHINGTON FISH AND WILDLIFE OFFICE ..... LTR 173
BLEAKLEY, BARBARA ..... LTR 273
BLOCH, WILL ..... LTR 315
BLOOM, STEVE ..... LTR 31
BREWER, ROGER ..... LTR 8
BRITT, JULIE ..... LTR 87
BROWN, KEITH AND TERESA ROBBINS ..... LTR 139, LTR 261, LTR 300
BRUNELL, DON C. ..... LTR 269, LTR 185
BRYAN, ALISON AND JOHN ..... LTR 255, LTR 310
BRYAN, JOHN ..... LTR 59
BURTON, LILY ..... LTR 265
BUSHMAN ..... LTR 246, LTR 247
THOMAS, CAM ..... LTR 96
CANADA/BEST VIBES ..... LTR 238
CANTRELL, SHAWN ;
SEATTLE AUDUBON SOCIETY ..... LTR 196
CARROLL, JAY ..... LTR 226

CARTER, JOAN ..... LTR 130
CARVALHO, CHRIS ..... LTR 12, LTR 201
CHAIMANIS, JOHN ..... LTR 40
COCHRAN, JOANNE ..... LTR 118
COCHRAN, STEVE ..... LTR 18
COLBY, GEORGE ..... LTR 271
COLE, JON ..... LTR 155
COLE, ROGER ..... LTR 128
CONAWAY, KENNETH ..... LTR 52
CORNELISON, PETER ..... LTR 67, LTR 287
COUNCIL ON ENVIRONMENTAL QUALITY ..... LTR 319
CROW, ANITA GAHIMER ..... LTR 282
CROW, DOUGLAS M. ..... LTR 51
CRUMPACKER, JOHN ;
SKAMANIA COUNTY AGRI-TOURISM ASSOCIATION ..... LTR 186
CUMMINGS, PATRICK ..... LTR 47
CURLEY, STEPHEN ..... LTR 91
DANCER, DANIEL ..... LTR 103
DAUBENSPECK, RON ..... LTR 160
DAVIDSON, ROD AND ELAYNE NOVOTNY ..... LTR 275
DAVIS, BOB ; ECOTOPE, INC ..... LTR 153
DELOFF, D. ..... LTR 127, LTR 288
DERRICK, BENJAMES ..... LTR 132
DEWEY ..... LTR 203
DEWEY, LES AND DEE ..... LTR 15
DONAT, CLARA ..... LTR 115
DOUGLASS ..... LTR 250
DRACH, LORELEY ..... LTR 147, LTR 263
DRACH, THOMAS ;
SAVE OUR SCENIC AREA ..... LTR 178
DUKE, FIBI ..... LTR 116
DUKES, AARON ..... LTR 134
DUNCAN, R.P. AND J.B. ..... LTR 37
DUSHAN, ALLAN ..... LTR 188
DYE ..... LTR 245
EASTWICK, JOYCE ..... LTR 124
EASTWICK, MIKE ..... LTR 60
EDWARDS, CAL ..... LTR 48
ENSMINGER ..... LTR 215
ENZ, DAN AND DONNA ..... LTR 30
ERDMANN, GREGORY S. ;
OCAS, INC ..... LTR 84
FARRELL, PAT AND LINDA ..... LTR 26
FEINAUER, DAVID ..... LTR 19
FISCHER ..... LTR 214
FITZPATRICK, KATHLEEN ; MOSIER CITY COUNCIL ..... LTR 129
FREIDMAN, PAULA ..... LTR 233
FRIENDS OF THE COLUMBIA GORGE ..... LTR 179

FRIENDS OF THE COLUMBIA GORGE MEMBERS ..... LTR 2, LTR 66, LTR 266
FRITSCH, LAURI ..... LTR 126
FRODEL, ANN ..... LTR 55
GAILEY, HAROLD L. ..... LTR 69
GARNER, DEBRA ..... LTR 117
GARNER, DON ..... LTR 22
GIBSON, STEVE ..... LTR 97
GILMER, KIM ..... LTR 57
GLASGOW, DALE W. ..... LTR 170
GOEKERMANN, JOHN ..... LTR 292
GOGOL, JOHN ..... LTR 3
GOHL, LARRY ..... LTR 17
GRASER-LINDSEY, ELIZABETH ..... LTR 6
GREENE, ERIC ..... LTR 16
GRESH ..... LTR 249
GRISWOLD ..... LTR 220
GROSS ..... LTR 207
GROSSMAN, ANDREW ..... LTR 267
GUNDLACH, MIKE, LYNDEN HOLLOWELL, MARK KING, NANCI SAYLER, AND KIT SILVER ; NORTHWESTERN LAKE DEVELOPMENT HOMEOWNERS' ASSOCIATION BOARD OF DIRECTORS ..... LTR 119
HALVORSON, MARY ..... LTR 75
HANES, DOUGLAS ..... LTR 121
HARDHAM, JOHN ..... LTR 70
HARKENRIDER, DANIEL T. ; UNITED STATES DEPARTMENT OF AGRICULTURE ..... LTR 257
HARPER, MARY ..... LTR 154
HELWIG, HEIDI ..... LTR 198
HENDERSON, MARY ..... LTR 199
HENLEY ..... LTR 229
HENRY, ASHLEY ..... LTR 156
HERTZ, RICHARD ; VISTAGE INTERNATIONAL, INC ..... LTR 88
HESS, ERIC ..... LTR 106
HILDEBRAND, ANNETTE LANGE ..... LTR 313
HILLMICK, ROY AND BARBARA ..... LTR 304
HINMAN, CHARLES ..... LTR 35
HOEY, AMANDA ; MID-COLUMBIA ECONOMIC DEVELOPMENT DISTRICT ..... LTR 192, LTR 259
HOGARTY, DON ..... LTR 63
HOLLISTON, DOUG ..... LTR 125, LTR 149
HOLMBERG, GLEN ..... LTR 190
HOWARD, JOHN AND CAROL ..... LTR 295
HUNTING, DUANE ..... LTR 293
INGLIS, JOHN ..... LTR 105
IRISH, SHERRI ..... LTR 151
JACKSON ..... LTR 240

JACKSON, CHIEF JOHNNY AND CHIEF WILBUR SLOCKISH ;
CASCADE TRIBES OF YAKAMA NATION AND KLICKITAT TRIBE
OF YAKAMA NATION....LTR 168
JACKSON, NATE....LTR 13
JDTYL@GORGE.NET....LTR 135
JIM, RUTH ;
CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION....LTR 11
JOHNSON, DEAN....LTR 29
JOHNSON, JACK E....LTR 159
JOHNSTON, REX, DAVID SAUTER, AND RAY THAYER ;
KLICKITAT COUNTY BOARD OF COMMISSIONERS....LTR 93
JONES, SALLIE TUCKER....LTR 76, LTR 272
KAHN, GARY ;
FRIENDS OF THE COLUMBIA GORGE....LTR 182
KAPP....LTR 223
KEEBLER, CRAIG....LTR 113
KESSLER, RANDY....LTR 111
KING, BARBARA....LTR 53
KINGSFORD-SMITH....LTR 210
KINGSLIEN, LIZ....LTR 39
KLOOS, JEANETTE ;
FRIENDS OF THE HISTORIC COLUMBIA RIVER HIGHWAY....LTR 242
KOHL, TIM....LTR 89
KRASNE, NORM....LTR 268
KREPS, CHRISTINE....LTR 24
KREPS, RYAN ;
RADCOMP TECHNOLOGIES....LTR 81
KURTZHALL, TERESA....LTR 163
KUTSCHERA, ELLYNNE....LTR 42, LTR 308
LARKMAN....LTR 202
LAUTERBACH, LYNDA....LTR 158
LEASE, LAUREL....LTR 157
LEWIS, JERRY A. ;
WHITE SALMON VALLEY SCHOOLS....LTR 174
LIEF, GREG....LTR 5
LONDON....LTR 251
LUEDERS, ANN....LTR 78
LUSTY, THERESA....LTR 122
MADDOX, KEN....LTR 131
MADDOX, LINDA....LTR 104
MALEN, DAVE....LTR 312
MARKEL, DAVE....LTR 112
MARLEY, PAMELA....LTR 43
MARTIN, RICHARD AND BEVERLY....LTR 150
MARTIN, RON....LTR 4
MARVIN, H. BRUCE ;
ATTORNEY GENERAL OF WASHINGTON COUNSEL FOR
THE ENVIRONMENT (CFE)....LTR 177
MAXEY, REBECCA....LTR 283

MAXEY, WIRT T. ..... LTR 301
MCCABE, CHRISTIAN M. ;
ASSOCIATION OF WASHINGTON BUSINESS ..... LTR 162
MCCARTHY, KATE ..... LTR 270
MCCLAIN, DAVID ..... LTR 28, LTR 191, LTR 306
MCGUIRE, DON ..... LTR 44
MCKENNA ..... LTR 205, LTR 206
MEEKS, PATRICIA ..... LTR 142
MENDOZA, SONIA ;
DEPARTMENT OF ECOLOGY – SWRO ..... LTR 171, LTR 187
METZGER, PAUL ..... LTR 309
MILEY, DOUGLAS ..... LTR 54
MILLER, BARBARA ..... LTR 9
MIRSKY, EDWIN ..... LTR 114
MOONEY ..... LTR 213
MORBY, DON ..... LTR 1
MOREAU, JACQUELINE ..... LTR 92
MORNINGSTAR, GARY AND LINDA ..... LTR 20
MUELLER, JULIAN ..... LTR 110
MYERS, BLAYNEY ..... LTR 167
MYERS, TODD ;
WINDWORKS! NORTHWEST ..... LTR 61
NAREY, MARY ..... LTR 289
NEELY, GREG ..... LTR 193, LTR 194
NEFF, SONJA ..... LTR 123
NELSON, TRAVIS AND GREG HUECKEL ;
DEPARTMENT OF FISH AND WILDLIFE ..... LTR 260
NEWELL, PAUL AND SALLY ..... LTR 277
NEWELL, SALLY ..... LTR 144
NIELSEN, MARILYN ..... LTR 222
NIELSON, JAMES ..... LTR 23
NIOSI, WILLEMINA AND JIM HUTCHISON ..... LTR 79
OHLSON, JON ..... LTR 71
O'BRIEN, ALLISON ;
DEPARTMENT OF THE INTERIOR. ..... LTR 320
O'NEAL, ELIZABETH ;
DEPARTMENT ON NATURAL RESOURCES ..... LTR 172
PACE ..... LTR 236
PARTIN, TOM ;
AMERICAN FOREST RESOURCE COUNCIL ..... LTR 25
PAULES, HELEN ..... LTR 65
PAULSON, LARRY ;
PORT OF VANCOUVER ..... LTR 195, LTR 258
PEARCE, PAUL ;
SKAMANIA COUNTY BOARD OF COMMISSIONERS ..... LTR 197
PENSWICK ..... LTR 239
PETERSON ;
VINEYARD VIEW BED AND BREAKFAST ..... LTR 218
PETERSON, DAVID ..... LTR 56

PEYROLLAZ ..... LTR 204
PEYROLLAZ, JOHN AND CLOIDA ..... LTR 21
POLLARD, RUSS AND LADONNA ..... LTR 243
POTTER, RICHARD ..... LTR 45
PRICE, KRISTIN M. ..... LTR 297
PROTHERO ..... LTR 237
PRYSE, VICKI ..... LTR 248
PYTEL, JIM ..... LTR 120
QUERRY, DAVE ..... LTR 64
RANSMEIER ..... LTR 252
RAPEJE, BONNIE ..... LTR 90
READY, VINCENT ..... LTR 46
REESE, MARY ..... LTR 7
REICHGOTT, CHRISTINE B. ;
ENVIRONMENTAL PROTECTION AGENCY REGION 10 ..... LTR 189
REPAR, MARY J. ..... LTR 143, LTR 82, LTR 278, LTR 279, LTR 281, LTR 284, LTR 285, LTR 286, LTR 311, LTR 314, LTR 316
RIBS, ROBERT ..... LTR 100
RITTER, MICHAEL ;
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE ..... LTR 94, LTR 183
ROBERGE ..... LTR 254
ROBERGE, VICTOR ..... LTR 32, LTR 296
ROBINSON, BARBARA ..... LTR 262
ROGERS, LEE ..... LTR 38
ROYAL, STEVE ..... LTR 274
SAUFLEY ..... LTR 208
SAULIE-ROHMAN, JOHN ..... LTR 219
SAVERY, C. WILLIAM ..... LTR 165
SCHEYER, SUMMER AND RUSS HASTINGS ..... LTR 86
SESKIN, SAMUEL ..... LTR 133
SHANK, JAMES AND CYNTHIA ..... LTR 80
SHERWOOD ..... LTR 217
SHETTERLY, KENNETH ..... LTR 41
SHETTERLY, LOIS ..... LTR 10
SIMMONS, DAVID ..... LTR 14
SLEEGER, PRESTON A. ;
U.S. DEPARTMENT OF THE INTERIOR ..... LTR 164
SLIWA LTR 212
SMALLWOOD, K. SHAWN ;
FRIENDS OF THE COLUMBIA GORGE ..... LTR 181
SMISKIN, HARRY ;
CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION ..... LTR 200
SMITH ..... LTR 244
SMITH, PAUL ..... LTR 74, LTR 146
SMITKE, COREY ..... LTR 107
SNYDER ..... LTR 221
SPATZ, DAN ..... LTR 68

SPENCER, PAUL ..... LTR 264
STARKE, GRETCHEN ;
VANCOUVER AUDUBON SOCIETY ..... LTR 276
STEGE ..... LTR 253
STEPHENS, DON ..... LTR 307
STEVENSON, DEAN ..... LTR 27
STEVENSON, THOMAS ..... LTR 34
STOOPS, THOMAS M. ;
OREGON DEPARTMENT OF ENERGY ..... LTR 85
STOVER, DAWN ..... LTR 36, LTR 161
THIES, DAVE ;
COLUMBIA GORGE AUDUBON SOCIETY ..... LTR 256
THOMAS, JAMES ..... LTR 294
THURNEYSSEN ..... LTR 227
TORRENCE, PAUL ..... LTR 290
TRENTER, JAMES ..... LTR 58
TWOMBLY, MARY ..... LTR 98
TYLER, JOHN ..... LTR 230, LTR 241
USEN ..... LTR 231
VANDERKLOOT ..... LTR 211, LTR 216
VENTURE, HEIDI ..... LTR 305
WAGEMAN ..... LTR 228
WALZ, JESSICA ;
GIFFORD PINCHOT TASK FORCE ..... LTR 302
WARBINGTON, RUTH ..... LTR 166
WARD ..... LTR 234
WARD, NORMAN ..... LTR 232
WARD, WILLIAM B ..... LTR 99
WASGATT, DAVID ..... LTR 152
WEBBER, JIM AND KEENAN ..... LTR 303
WESCOTT, RICHARD ..... LTR 298
WESTFOLD, ELINOR ..... LTR 109
WILCOX, ALAN ..... LTR 101
WILSON, PAULA ..... LTR 169
WOLD, RACHEL ..... LTR 299
WOODWARD, MARLENE AND THOMAS ..... LTR 33
YUN, CHRISTINE ..... LTR 136
ZIEGLER, JANIE ..... LTR 235
ZIMBELMAN ..... LTR 209

ENERGY FACILITY SITE EVALUATION COUNCIL
August 2011

STATE OF WASHINGTON

ENERGY FACILITY SITE EVALUATION COUNCIL

PO Box 43172 • Olympia, Washington 98504-3172

August 12, 2011

WHISTLING RIDGE ENERGY PROJECT

NOTICE OF AVAILABILITY

FINAL ENVIRONMENTAL IMPACT STATEMENT

Dear Interested Person:

This notice is to advise you that a Final Environmental Impact Statement (FEIS) has been issued for the proposed Whistling Ridge Energy Project. The proponent, Whistling Ridge Energy (LLC), has requested to build and operate a 75 megawatt wind power facility located on approximately 1,152 acres in Skamania County, Washington, approximately seven miles north of the City of White Salmon. The proponent has also requested interconnection to the Bonneville Power Administration (BPA) regional transmission system.

BPA and the Energy Facility Site Evaluation Council (EFSEC) released a Draft EIS (DEIS) in May 2010 for public review and comment. BPA and EFSEC considered all comments received on the DEIS and prepared a Response to Comments Appendix (Appendix G). Comment letters have been reprinted and included in Appendix H. EFSEC expects to makes its recommendation to the Governor in fall 2011. BPA expects to issue a Record of Decision (ROD) for the proposed project in fall 2011.

This FEIS has been issued by EFSEC to fulfill its State Environmental Policy Act (SEPA) lead agency responsibilities under the Washington Administrative Code (WAC) 463-47-150. BPA will be issuing this FEIS to meet its lead agency obligations under the National Environmental Policy Act (NEPA), before it makes a decision on whether to allow an interconnection of the proposed project to the BPA transmission system. EFSEC and BPA have worked together to ensure that this FEIS meets the requirements of SEPA and NEPA.

Copies of the FEIS will be mailed to persons and organizations who commented on the DEIS. The FEIS is available to other interested persons upon request. Copies of this document may be requested by contacting EFSEC at (360) 664-1363, by mail at P.O. Box 43172, Olympia, WA 98504-3172, or by e-mail at efsec@utc.wa.gov. The FEIS is also available on the internet at: www.efsec.wa.gov.

For information regarding the Whistling Ridge Energy Project and the EFSEC review process, you may contact Stephen Posner, EFSEC Compliance Manager at (360) 664-1903 or you may visit the EFSEC web site at: www.efsec.wa.gov. Copies of the FEIS are available for public review at the following locations:

Washington State Library
Joel M. Pritchard Library
Point Plaza East
6880 Capitol Blvd
Tumwater, WA 98504-2460
(360) 704-5200

Stevenson Community Library
120 NW Vancouver Avenue
Stevenson, WA 98648
(509) 427-5471

North Bonneville
Community Library
214 CBD Mall (City Hall)
N. Bonneville, WA 98926
(509) 427-4439

Energy Facility
Site Evaluation Council
1300 S. Evergreen Park Dr. SW
Olympia, WA 98504-3172
(360) 664-1345

White Salmon Valley Library
#5 Town & Country Square
PO Box 1579
White Salmon, WA 98672
(509) 493-1132

Al Wright
Manager, Energy Facility Site Evaluation Council

FACT SHEET

Project Title	Whistling Ridge Energy Project
Project Sponsor	Whistling Ridge Energy LLC
Proposed Action	Whistling Ridge Energy LLC (Applicant) proposes to construct and operate the Whistling Ridge Energy Project, an approximately 75-megawatt (MW) wind turbine facility, about seven miles north of the City of White Salmon in Skamania County, Washington. This wind project would be located on an approximately 1,152-acre site that is currently private commercial forest land. The wind project would consist of up to 50 wind turbines that could each range in size from 1.2 to 2.5 MW, an Operation and Maintenance facility, an electrical substation, underground collector lines and systems, and other ancillary facilities. Approximately 7.9 miles of existing roads would be improved and 2.4 miles of new roads would be constructed to provide access for project construction and operation.
Project Location	The Project Area is located approximately seven miles north of the City of White Salmon, Washington.
Date of Implementation	If the Project is approved, the Applicant proposes to begin project construction in the first quarter of 2012 with the goal of having construction completed and commercial power production initiated by January 2013.
Lead Agencies, Responsible Officials & Contacts	Bonneville Power Administration Andrew M. Montaño Environmental Protection Specialist P.O. Box 3621, KEC-4 905 N.E. 11th Avenue Portland, OR 92708-3621 (503) 230-4145 ammontano@bpa.gov Energy Facility Site Evaluation Council Stephen Posner Energy Facility Compliance Manager 1300 S. Evergreen Park Drive S.W. P.O. Box 43172 Olympia, WA 98504-3172 (360) 664-1903 sposner@utc.wa.gov
Required Permits, Approvals & Licenses	EFSEC's Site Certification Agreement for the project will identify all required state approvals. No federal permits have been identified at this time.
EIS Authors & Principal Contributors	The Whistling Ridge Energy Project EIS was prepared by the Washington Energy Facility Site Evaluation Council (EFSEC) and Bonneville Power Administration (BPA), with the assistance of URS Corporation (URS), a consulting firm, West Inc., Northwest Wildlife Consultants, GeoDataScape, and Carroz Consulting. In addition, ENTRIX Consulting was retained by Washington EFSEC to provide an independent, third-party review of the EIS for SEPA and NEPA compliance.

FACT SHEET

Environmental Document Being Submitted

Whistling Ridge Energy Project Final EIS (2011)

Additional Information

Information regarding the Whistling Ridge Energy Project and the EFSEC review process, you may contact Stephen Posner, EFSEC Compliance Manager at (360) 664-1903 or you may visit the EFSEC web site at: www.efsec.wa.gov.

Date of Final EIS Issuance

August 12, 2011

Availability of Final EIS

Copies of the FEIS have been mailed to persons and organizations who commented on the DEIS. The FEIS is available to other interested persons free of charge. Paper copies or CD-ROMs may be requested by contacting EFSEC by phone at (360) 664-1345, by mail at P.O. Box 43172, Olympia, WA 98504-3172, or by e-mail at efsec@utc.wa.gov. The FEIS is also available on the internet at: www.efsec.wa.gov.

Copies of the FEIS are available for public review at the following locations:

Washington State Library Joel M. Pritchard Library Point Plaza East 6880 Capitol Blvd Tumwater, WA 98504-2460 (360) 704-5200	Stevenson Community Library 120 NW Vancouver Avenue Stevenson, WA 98648 (509) 427-5471
Energy Facility Site Evaluation Council 1300 S Evergreen Park Dr. SW Olympia, WA 98504-3172 (360) 664-1345	North Bonneville Community Library 214 CBD Mall (City Hall) N. Bonneville, WA 98926 (509) 427-4439
White Salmon Valley Library #5 Town & Country Square PO Box 1579 White Salmon, WA 98672 (509) 493-1132	